

The Supports Intensity Scale—Children’s Version: Preliminary Reliability and Validity

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Abstract

This article introduces the Supports Intensity Scale—Children’s Version (SIS-C) designed and normed to be used with children across multiple contexts, including home, school, and community life. Steps taken to develop the scale are described, and findings from data collected on a field test version of the SIS-C are shared. Preliminary findings in regard to reliability and validity suggest that the SIS-C has strong psychometric properties.

Key Words: *support needs assessment; intellectual disability; psychometrics*

The measurement of support needs has received increased attention in the intellectual disability field. The social-ecological model of disability adopted by the World Health Organization’s International Classification of Functioning, Disability, and Health (ICF; WHO, 2001) and the American Association on Intellectual and Developmental Disabilities’ (AAIDD) Terminology and Classification committee (Luckasson et al., 1992, 2002; Schalock et al., 2010) defines disability as a function of the fit between a person’s capacities and the demands of the environment. Conceptualizing intellectual disability in this manner prompts a focus on the *supports* needed to address discrepancies between an individual’s personal capacities and the demands or requirements of different environments and contexts.

Supports are resources and strategies that enhance human functioning (Luckasson et al., 2002). Although everyone uses supports, the types and intensity of supports needed by people with intellectual disability are different from those needed by most people in terms of intensity, duration, and type. *Support needs* is a psychological construct referring to the pattern and intensity of support a person requires to participate in activities associated with typical human functioning (Thompson et al., 2009). The support needs construct is based on the premise that human functioning is influenced by the

extent of congruence between individual capacity and the environments in which that person is expected to function.

Recognizing the need for standardized, reliable, and valid measures of support needs, the Supports Intensity Scale (SIS) (Thompson, 2004) and the Supports Intensity Scale—Adult Version (SIS-A) (Thompson et al., in press) were developed to measure support needs of adults with intellectual disability ages 16 to 64. The reliability and validity of the SIS (in the original English version as well as translated versions) have been well established (see Buntinx, Van Unen, Speth, & Groot, 2006; Morin & Cobigo, 2008; Thompson et al., 2004; Thompson, Tassé, & McLaughlin, 2008; Verdugo, Arias, Ibanez, & Schalock, 2010). Within the United States, it has been adopted on a widespread basis by state intellectual disability/developmental disabilities systems in 28 U.S. states and Canadian provinces to more equitably distribute resources and to assist in the planning of individualized supports (Nygren, 2011). The SIS has been shown to more reliably predict the need for extraordinary supports than other instruments that were traditionally used for such purposes, and it therefore provides a more equitable means to make resource allocation decisions (Wehmeyer et al., 2009). In addition, provider organization planning teams use the SIS to identify a support needs profile to provide

information about supports a person would need to be successful in key life domains (see Bailey & Nixon, 2014, in this issue).

Support needs, however, do not begin in adulthood. There is also a need for a standardized, reliable, and valid tool to measure the intensity of supports needed by children with intellectual and related developmental disabilities. Such a tool would be helpful to state disability service systems to inform policy decisions such as resource allocation, as well as to school systems for educational planning. For these reasons, the Supports Intensity Scale–Children’s Version (SIS-C) (Thompson, et al., in press-b) was developed. In the following sections, we describe the SIS-C in greater detail, and present preliminary findings on its reliability and validity from the sample generated to standardize the scale.

Supports Intensity Scale–Children’s Version (SIS-C)

The SIS-A was used as a starting point in developing the SIS-C, although a systematic process was followed so that the SIS-C would be congruent with the unique support needs of students with intellectual disability ages 5 to 16. The measurement structure of the SIS-A was maintained; items are rated on type, frequency, and amount of time of support needed. The subscale structure, however, was changed to better reflect the areas of support need for children and youth. In total, there are seven subscales: Home Living Activities, Community and Neighborhood Activities, School Participation Activities, School Learning Activities, Health and Safety Activities, Social Activities, Advocacy Activities. Although the Advocacy Activities section (called Protection and Advocacy on the SIS-A) had been removed from the standardized portion of the scale in the SIS-A because of initial concerns with reliability (which further research has suggested are not a concern [see Shogren et al., 2014, this issue]), it was always intended to be part of the standardized portion of the SIS-C. The SIS-C also includes an Exceptional Medical and Behavioral Support Needs section as found in the SIS-A, therefore recognizing that certain medical conditions and challenging behaviors result in a child requiring increased levels of support, regardless of his or her relative intensity of support needs in other life domains.

Item Selection

The item selection process for the SIS-C began with identifying items from the SIS-A that might, with modifications if necessary, be appropriate for use to determine the support needs of children ages 5 to 16. This step was conducted by a task force appointed by AAIDD that included professionals in special education and individuals familiar with state ID/DD service systems. Once a candidate pool of items from the SIS-A version was identified, the task force conducted a review of the extant literature to determine support areas that might be included in an SIS-C that were not reflected in the SIS-A, and generated an item pool for those support areas. This review was completed by searching: (a) major electronic databases (e.g., ERIC, Psychlit, Educational Abstracts); (b) published assessments of adaptive behavior and curriculum guides developed for children with disabilities; (c) relevant texts and recent review articles; (d) published articles in which the SIS-A was used as instrumentation; and (e) unpublished governmental reports related to service provision. A candidate item pool of additional, new items was generated and, when combined with items from the SIS-A, a pool of 75 potential indicators (candidate items) of support need (e.g., eating, participating in co-curricular activities, socializing within and outside the family) resulted.

Q-Sort

The task force then developed detailed descriptions of each candidate item in the item pool. Using procedures described by McKeown and Thomas (1988), the task force conducted a Q-Sort to determine the content validity of the items. Items that did not show consistent loading in an area of support were eliminated. Respondents had the opportunity to place a candidate item in one of seven support areas (Home Living Activities, Community and Neighborhood Activities, School Participation Activities, School Learning Activities, Health and Safety Activities, Social Activities, Advocacy Activities), or indicate that an item was not relevant to any of the support areas. Fifty-one respondents replied, and 61 candidate items that a simple majority of respondents placed into a specific area were retained. These items were used to develop an initial pilot test version of the scale, which also included instructions to interviewers for data collection as well as demographic items. The initial pilot test version was shared with a

focus group of experts that provided training on the SIS-A who were asked to pay particular attention to consistency of implementation of the SIS-C with the SIS-A. A pilot test version of the SIS-C was finalized based on feedback from the focus group.

Pilot Test

Once a pilot version of the SIS-C was finalized, it was piloted with participants from three states (Illinois, North Carolina, and Tennessee). Twenty-five interviewers in North Carolina, 23 interviewers in Illinois, and four interviewers in Tennessee were trained on the administration and scoring of the SIS-C by one of the authors. Interviewers were asked to interview at least two respondents who were very familiar with a child with intellectual disability who was between the ages of 5 and 16. These interviewers were also asked for their perspectives on administering and scoring the scale, with a particular focus on any items that were unclear or confusing. Descriptive statistics were calculated and showed a wide range of raw scores for each subscale as well as the entire scale. Minor edits were made to the instrument (including item descriptions) as a result of this pilot test, and a new field test version was developed.

Field Test Version

The field test version of the SIS-C was the tool that was used to collect the data from the normative sample described subsequently. As mentioned previously, the Support Needs Index score (the portion of the SIS-C that will be standardized) includes items grouped into seven subscales or domains:

- *Home Living Activities* (9 items): Activities completed as a function of living in a household.
- *Community and Neighborhood Activities* (8 items): Activities completed as a function of being a member of a community or neighborhood.
- *School Participation Activities* (9 items): Activities associated with participating in the school community.
- *School Learning Activities* (9 items): Activities associated with acquiring knowledge and/or skills while attending school.
- *Health and Safety Activities* (8 items): Activities that ensure safety and health across home, school, and community environments.
- *Social Activities* (9 items): Activities that pertain to social integration with others, both children and adults.

- *Advocacy Activities* (9 items): Activities that are related to acting as a causal agent in one's life, making choices and decisions, and availing oneself of leadership opportunities.

Each domain included eight or nine unique items that are rated across three support dimensions: *type* (the nature of support that is needed); *frequency* (how often is support needed); and *time* (how much total daily time is needed to provide support). To maintain the metric of the original scale even though the domains have different numbers of items, responses on these three areas will be averaged for the SIS-C to generate a score for each item.

Once the standardization process is completed, the intent is for the administration of SIS-C to provide a standard score for each subscale and a standard composite score (referred to as the Support Needs Index score). The Support Needs Index score will not only provide an overall measure of the intensity of a child's support needs, it will also allow a meaningful comparison of a child or adolescent's support needs with the larger population of children or adolescents with ID/DD. Importantly for educators and disability support providers, the completion of the SIS-C will also result in the development of a support needs profile. Percentile scores will be calculated and can be graphed for each child/adolescent in each life domain (subscale). Educators and disability support providers will be able to chart out a support needs profile across domains and to look at individual items to determine the relative intensity, duration, and types of supports needed. This will provide critical information for the development of support plans and (within schools) individualized education programs (IEPs).

As mentioned previously, the SIS-C also has an Exceptional Medical and Behavioral Support Needs section that lists common medical conditions and problem behaviors, and provides the opportunity for raters to identify other types of medical and behavioral concerns. As with the SIS-A, the underlying assumption is that certain medical conditions and challenging behaviors predict that a child/adolescent will require increased levels of support, regardless of his or her relative intensity of support needs in other life domains. For example, children with high needs in respiratory care require maximum support in their daily life, regardless of their level of support needs in specific activities across all domains. Likewise, a child who acts in a physically aggressive manner

will require additional support, regardless of his or her level of relative independence in other areas of life. A scale ranging from 0 to 2 is used to rate the relative significance of supports needed to manage medical conditions and challenging behaviors: 0 = no support needed, 1 = some support needed, and 2 = extensive support needed.

Administration of the SIS-C

Like the SIS-A, the SIS-C is completed by a qualified interviewer. Interviewers need to have completed at least a bachelor-level degree in a field such as education, social work, or psychology, and need to have been trained in the administration of the scale. The scale is completed via a semi-structured interview with two or more respondents who know the child well. The interviewer focuses on gathering information about the support that the assessed child/adolescent with a disability needs in order to function successfully (i.e., fully participate) in typical settings. A *respondent* can be a parent, relative, guardian, educational assistant, direct support professional, work supervisor, teacher, or any other individual who works or lives with the child being evaluated and understands his or her specific support needs. Detailed information about the administration of the instrument will be provided in a user's manual to be published by AAIDD along with the SIS-C.

Technical Properties of the Supports Intensity Scale—Children's Version

This section describes the procedures that are being undertaken to standardize the SIS-C, including (a) normative information and sample selection, (b) demographic characteristics of the norming sample, and (c) preliminary reliability and validity information.

Normative Information and Sample Selection

The task force, based on literature and knowledge of the field, assumed that the support needs would be confounded with age. Typically functioning younger children require more support than typically functioning older children (i.e., a 5-year-old needs more assistance than a 15-year-old). Not only do children change dramatically from the age of 5 to 16, they, in fact, often have significant changes within the span of a year or two. As such, the SIS-C task force decided that the

sample generated to standardize the scale would be stratified by age cohorts that varied by two years: 5–6-year-olds, 7–8-year-olds, 9–10-year-olds, 11–12-year-olds, 13–14-year-olds, and 15–16-year-olds. Power analysis indicated that a sample size of approximately 420 children per age cohort was needed. The SIS-C task force also decided—because of the range of intellectual functioning/adaptive behavior of students with intellectual disability—to further stratify the age cohorts by commonly used classifications of students with intellectual disability, based on IQ scores (i.e., mild, $IQ > 55$; moderate, $IQ 40-55$; severe/profound, $IQ < 40$). The decision was made to use IQ estimations for classification, as these scores are generally more readily available and known by respondents. When, however, IQ estimation information was missing, information on adaptive behavior estimations was used to classify students into one of the age/intellectual functioning groups. This occurred in 129 cases (3.2% of cases). For the remaining cases (2.2% of cases), to be able to retain these students in the normative sample, multiple imputation was used to capture unbiased parameter estimates. The statistical program, R (R Development Core Team, 2008), was used to impute missing data by feeding the data to Amelia Package with 100 iterations (Honaker, King, & Blackwell, 2011).

To summarize, we structured our sample to collect data in 18 cells (see Table 1) generated by crossing six age bands with three levels of intellectual functioning. It is important to note that we did not independently test intellectual functioning or collect data on adaptive behavior. We instead relied on information recorded on the demographic form by interviews based on information provided by respondents.

Additionally, because the SIS-A is normed from ages 16 and upward, and the SIS-C was normed for students ages 5 to 16, we collected data for 17–18-year-olds with both the SIS-C and the SIS-A to provide a linking sample to calibrate scores across the two measures. In the present description of the SIS-C normative sample, only data from the 5- to 16-year-old sample will be described, as this is the sample that will be used to norm the SIS-C.

Sampling Method

To generate the normative sample, data were collected through multiple sources. To obtain data for children and adolescents receiving supports

Table 1
Sample Size for Age Cohorts and Intellectual Functioning

Age Cohort	Mild	Moderate	Severe/Profound	Total
5-6	151	168	194	513
7-8	197	176	189	562
9-10	227	280	280	787
11-12	226	320	298	844
13-14	241	295	286	822
15-16	166	172	149	487
Total	1,208	1,411	1,396	4,015

Note. Mild ID Group is IQ > 55 or Adaptive Behavior (AB) in mild range for the assessment; Moderate ID Group is IQ 40-55 or AB at moderate range for assessment; Severe/Profound Group is IQ < 40 or AB at severe/profound.

through state developmental disabilities (DD) services systems, a request for participation was sent to state DD systems currently using the SIS-A. Once appropriate consent was obtained, data from willing states were collected and redacted versions sent to task force participants involved in data entry and analysis. Second, so as to ensure that a representative number of protocols in the norming sample were obtained from school districts (rather than state DD systems), members of the task force were funded by a federal education agency to collect data with children and youth in schools. In all, data from either a DD system or school district in 23 states were obtained, representing all geographic regions of the United States.

Table 2
Demographic Characteristics of Interviewers

	N	%
Gender		
Female	564	81.3
Male	93	13.4
Missing	37	5.3
Ethnicity		
White	500	72.0
Black	95	13.7
Asian/Pacific Islander	21	3.0
Native American	2	0.3
Hispanic	29	4.2
Multiple ethnic backgrounds	10	1.4
Other	1	0.1
Missing	36	5.2

Table 3
Demographic Characteristics of Respondents

	n	%
Relationship to participant		
Family	3,315	27.5
Teachers	1,556	12.9
Direct service providers/caregivers/ social workers	609	5.1
Paraprofessionals	606	5.0
Case managers	375	3.1
Other (friends/mentor/advocate)	309	2.6
Program coordinators/service coordinators	301	2.5
Residential service managers/ group home associates	138	1.1
Therapists	118	1.0
Qualified developmental professionals/education service providers	115	1.0
Foster parents/guardians	104	0.9
Self	99	0.8
Behavioral specialists	55	0.5
Not specified/unclear	4,350	36.1
Number of years respondent has known the participant*		
Less than 1 year	583	7.3
1-2 years	2075	25.8
3-5 years	990	12.3
6-10 years	1365	17.0
More than 10 years	1785	22.2
Missing	1232	15.3

*Data were only collected for the first two respondents, sample size = 8,030.

Table 4
Demographic Characteristics of Normative Sample

	<i>n</i>	<i>% of Sample</i>
Gender		
Female	1,202	29.9
Male	2,710	67.5
Missing	103	2.6
Age		
5–6	513	12.8
7–8	562	14.0
9–10	762	19.0
11–12	804	20.0
13–14	818	20.4
15–16	487	12.1
Missing	69	1.7
Ethnicity		
White	2,244	55.9
Black	820	20.4
Asian/Pacific Islander	159	4.0
Native American	26	0.6
Hispanic	384	9.6
Multiple ethnic backgrounds	237	5.9
Other	73	1.8
Missing	72	1.8
Primary language		
English	2,299	57.3
Spanish	88	2.2
English and Spanish	52	1.3
Nonverbal & sign language	12	0.3
Others (Nepalese, Farsi, Russian, Urdu, etc.)	26	0.6
Missing	1,538	38.3
Student's intelligence level		
< 25 or profound	459	11.4
25–39 or severe	862	21.5
40–55 or moderate	1,321	32.9
55–70 or mild	1,157	28.8
Missing	216	5.4
Student's adaptive behavior level		
Profound	563	14.0
Severe	1,052	26.2
Moderate	1,335	33.3
Mild	948	23.6
Missing	117	2.9

(Table 4 continued)

Table 4
Continued

	<i>n</i>	<i>% of Sample</i>
Additional Diagnoses/ Classifications		
Low Vision/Blindness	545	13.6
Deafness/Hearing Impairment	191	4.8
Psychiatric Disability	248	6.2
Developmental Delay	1,588	39.6
Physical Disability (Arm & Hand limitations)	742	18.5
Physical Disability (Mobility limitations)	950	23.7
Chronic Health Condition	673	16.8
Autism Spectrum Disorder	2,124	52.9
Brain/Neurological Damage	763	19.0
Speech Disorder	1,527	38.0
Language Disorder	1,174	29.2
Learning Disability	1,028	25.6
ADD or Attention Deficit Hyperactivity Disorder	696	17.3
Other	578	14.4
Student's Home Residence		
Family Home	3,789	94.4
Foster Family Home	59	1.5
Small Group Home (less than 7 residents)	37	0.9
Midsize Group Home (7–15 residents)	46	1.1
Large residential school/facility (>15 residents)	17	0.4
Other residential facility	18	0.4
Missing	49	1.2

There were 694 interviewers that participated in collecting data on the 4,015 students that were part of the normative sample. The majority of interviewers were female (81%) and most had a graduate degree and more than 10 years of experience in the field. Most interviewers knew the student that was the focus of the completed SIS-C (average years interviewers had known students: 1.1 years, *SD* = 1.79). Table 2 provides information on the demographic characteristics of the interviewers.

Table 5
Reliability Indices for Total Sample

	Cronbach's	
	Alpha	Omega
Home Living Activities	0.927	0.970
Community and Neighborhood Activities	0.936	0.978
School Participation Activities	0.928	0.966
School Learning Activities	0.948	0.982
Health and Safety Activities	0.930	0.973
Social Activities	0.948	0.982
Advocacy Activities	0.928	0.972

As mentioned previously, respondents for a SIS-C can be anyone who knows the target child/adolescent well. Interviewers solicited at least two respondents for each interview. In all interviews, at least two respondents participated and, in 14% of interviews, more than two respondents participated. In total, 12,050 respondents participated across all interviews. As shown in Table 3, family members were the most frequent respondents (28%), followed by teachers (13%). There was variability in how long the respondents had known the participants, with the largest groups of respondents knowing the participants for 1 to 2 years or for more than 10 years. The average length of time respondents had known the participants was 6 years ($SD = 4.99$). Further information on the characteristics of respondents is provided in Table 3.

Table 6
Means and Standard Deviations for SIS-C subscales

Subscale	5–6		7–8		9–10		11–12		13–14		15–16	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
HLA	2.64	.89	2.47	.84	2.44	.86	2.31	.89	2.24	.95	2.03	1.04
CNA	2.98	.78	2.89	.76	2.87	.72	2.79	.72	2.77	.73	2.60	.82
SPA	3.10	.78	3.07	.76	3.03	.76	2.98	.78	2.94	.82	2.74	.92
SLA	3.26	.73	3.31	.67	3.30	.60	3.29	.64	3.27	.65	3.15	.77
HSA	3.10	.84	3.05	.78	3.01	.73	2.95	.77	2.89	.82	2.69	.93
SA	3.08	.88	3.05	.83	3.00	.83	2.88	.90	2.79	.92	2.59	1.02
AA	3.03	.85	2.99	.79	2.98	.73	2.94	.77	2.91	.82	2.76	.89

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

Characteristics of the Supports Intensity Scale–Children’s Version Normative Sample

The normative sample consisted of 4,015 children and youth with intellectual disability aged 5–16. As mentioned previously, a stratified sampling plan was developed with 18 cells to fill, representing our age/intellectual functioning cohorts. Table 1 provides the number of children or youth in each of our 18 cells (age cohorts crossed by level of intellectual functioning). On average, there were 223 children/youth in each cell.

In the overall student sample, females comprised 30% ($n = 1,202$) of the total participants while males were 68 % ($n = 2,710$). Gender information was not available for the rest of the sample. The majority of participants were White ($n = 2,244$, 56%) or Black ($n = 820$, 20%), although children/youth from other ethnic groups were also represented in the sample. Data were collected on children/youth from 23 different U.S. states. Table 4 provides information on other demographic characteristics of children/youth being rated, including home residence and primary language.

Preliminary Reliability and Validity Information

Data collection for the normative sample for the SIS-C was recently completed, and analysis of the reliability and validity of the SIS-C is underway. It is important to note that these analyses are ongoing and the information presented here involves the initial findings, but provides similar

Table 7
Intercorrelations of SIS-C Domain Scores

	HLA	CNA	SPA	SLA	HSA	SA	AA
HLA	1						
CNA	.79*	1					
SPA	.74*	.81*	1				
SLA	.61*	.72*	.82*	1			
HSA	.75*	.84*	.80*	.75*	1		
SA	.67*	.75*	.78*	.71*	.83*	1	
AA	.67*	.78*	.77*	.76*	.85*	.85*	1

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

* $p < .001$.

reliability and validity properties of the SIS-C in comparison to the SIS-A.

Reliability. To examine the reliability of the items on the SIS-C, we calculated internal consistency indices to determine the extent to which measured scores are precise or consistent across groups (Widaman, Little, Preacher, & Sawalani, 2011). Specifically, coefficient alpha (Cronbach, 1951) and coefficient omega (McDonald, 1970, 1999, 2013) were computed for the entire sample. Cronbach’s alpha is the most often used internal consistency index; however, it assumes that items of the scale are equally good indicators of the latent variable (Schmitt, 1996). Coefficient omega can be reported when the factor loadings are not identical for all items, which is the case for the SIS-C. To obtain necessary values to compute Cronbach’s alpha and coefficient omega, the equations provide by Widaman et al. (2011) were used.

Table 5 provides Cronbach’s alpha and coefficient omega values for the total sample. Both Cronbach’s alpha and coefficient omega valued exceeded .90 for all subscales in the total sample, which is considered excellent internal consistency values ($\alpha \geq .9$; Kline, 2000; $\omega > .9$; McDonald, 2013).

Validity. Instruments are said to yield valid results if they measure the underlying construct they intend to measure. An instrument’s validity must be examined over time, and in multiple ways. In previous sections, we documented our attempts to establish the content validity of the SIS-C by describing the systematic process through which items were elected and piloted,

leading to the field test version. We have also begun preliminary analyses of construct validity, specifically the “extent to which a test measures some type of theoretical characteristic or concept” (Taylor, 2002, p. 66). First, because we hypothesized that support needs would vary based on age cohorts for students age 5 to 16 years old, we report the raw score means and standard deviations in Table 6. Analyses are undergoing to inform the standardization process, but these preliminary values suggest that there may, in fact, be differences in average scores of SIS-C domains across age/intellectual functioning cohorts, confirming the importance of developing norms for differing age cohorts. Such data will be reported in the forthcoming user’s manual.

We also examined the pattern of relationships among the SIS-C subscales. The assumption is that because all domains measure aspects of support needs, they should be significantly intercorrelated. As shown in Table 7, there were significant intercorrelations among the subscale scores, with all intercorrelations significant at the .001 level, and ranging from .61 to .85.

Next Steps

A systematic process was followed to develop the SIS-C, building on work that has already been conducted establishing the reliability and validity of the SIS-A, but addressing unique issues identified in the literature and by experts in the field related to measurement of the support needs of children/youth with intellectual disability ages 5 to 16. We are actively engaged in

further examining the reliability and validity of the SIS-C, and will undertake the process of developing standardized scores (referred to as the Support Needs Index score) and percentile scores for each of the SIS-C domains based on age cohorts. Within the next year, the SIS-C will be available to enable resource planning and allocation as a function of relative student need, as well as the development of a support needs profile across domains that will provide critical information for the development of support plans and, ultimately, IEPs.

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