Efficacy of the Supports Intensity Scale (SIS) to Predict Extraordinary Support Needs

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Abstract

Data were collected on 274 adults to investigate the efficacy of the Supports Intensity Scale (SIS) as a tool to measure the support needs of individuals with intellectual and related developmental disabilities. Findings showed that SIS scores contributed significantly to a model that predicted greater levels of support need. Moreover, scores from different sections of the SIS made unique contributions to explaining variance associated with a variety of support need proxies. Finally, data suggest that the SIS measures a different construct than that measured by traditional assessments of personal competence. The implications of these findings for decision-making, including decisions affecting the disbursement of state developmental disability funding, are discussed.

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In the 1992 American Association on Mental Retardation (AAMR) *Definition and Classification Manual*, Luckasson et al. (1992) adopted a theoretical model of intellectual disability that emphasized the nature of the disability as a fit between the person's capacities and the context in which that person functioned. The adoption, in turn, increased the interest in and need for information about supports as a means to improve individual human functioning and instruments for their measurement (Thompson et al., 2002). Thompson and colleagues defined *supports* as "resources and strategies that promote the interests and welfare of individuals and that result in enhanced personal independence and productivity, greater participation in an interdependent society, increased community integration, and/or an improved quality of life" (p. 390). In response to this, the AAMR (now the American Association on Intellectual and Developmental Disabilities [AAIDD]) appointed a task force to develop such an instrument. The outcome of that process was the Supports Intensity Scale (SIS) (Thompson et al., 2004a).

The SIS, developed over a 5-year period, was designed to provide information to help planning teams, agencies, and organizations understand the support needs of people with intellectual disability and closely related developmental disabilities. As Thompson et al. (2004b) described in the users manual, the SIS, which assesses the patterns and intensity of one's support needs, is composed of three sections: Section 1, the Support Needs Scale, which consists of 49 life activities that are

grouped into six support subscales; Section 2, a supplemental subsection, containing 8 items related to Protection and Advocacy Activities; and Section 3, Exceptional Medical and Behavioral Support Needs, which is comprised of 15 medical conditions and 13 problem behaviors that typically require increased levels of support, regardless of the person's relative support needs in other life activity areas.

During the scale validation process, the SIS authors (Thompson et al., 2004b) examined the correlation between SIS domain and total scores and two measures of adaptive behavior: the Inventory for Client Agency Planning–ICAP (Bruininks, Hill, Weatherman, & Woodcock, 1986) and the Vineland Adaptive Behavior Scales–VABS (Sparrow, Balla, & Cicchetti, 1984). Correlations between SIS domain scores and the ICAP ranged from −.23 (Employment) to −.68 (Community Living), with a correlation between total Support Needs Index (SNI) Scores and the ICAP Service Score of −.49. Correlations between SIS domain scores and the VABS composite score ranged from −.45 (Lifelong Learning) to −.61 (Home Living), with a correlation between total SIS SNI scores and the VABS Composite Score of −.49. The SIS authors concluded that the SIS was measuring a construct that was different from adaptive behavior (Thompson et al., 2004b).

Harries, Guscia, Kirby, Nettelbeck, and Taplin (2005) conducted a study of the relationship between support needs and adaptive behavior, examining correlations among scores from a prepublication version of the SIS, the Adaptive Behavior Scale–Residential and Community–ABS-RC:2 (Nihira, Leland, & Lambert, 1993), and the ICAP. They found generally higher correlations between SIS domain and total scores and the ICAP than did Thompson and colleagues (2004b), ranging from −.64 (Employment) to −.84 (Home Living), with a correlation between the SIS SNI and the ICAP Service Score of −.88. The correlations between SIS domain scores and ABS factor scores ranged from −.63 to −.92, with ABS factors scores correlating with SIS SNI scores ranging from −.76 (Personal–Social Responsibility) to −.94 (Community Self-Sufficiency). Harries and colleagues concluded that "the extent to which these two different types of scales are actually measuring the same construct, albeit in a reciprocal fashion" (p. 401) is not clear. Harries et al. noted, however, that their study had several limitations. The version of the SIS that they used was a prepublication version and was not identical to the published version. Further, their sample was drawn exclusively from a population of people with disabilities who were living in a large institution and, therefore, was not equivalent to the SIS norming sample that included individuals residing in a variety of living situations.

In this article we document findings from our study in which we attempted to obtain further information about the relationship and potential differences between the SIS and measures of personal competence. Specifically, our focus was on the efficacy of the SIS to predict extraordinary support needs for people with intellectual and developmental disabilities receiving services and supports from a state developmental disabilities agency that used an adapted version of the Developmental Disability Profile–DDP (Brown et al., 1986) to make its funding decisions. Specifically, our primary goal was to evaluate the efficacy of the SIS as a tool for use in evaluating extraordinary support needs and, as such, to provide further information about the validity of the SIS as a measure of support needs. In so doing, however, we sought to provide evidence with regard to the properties of the SIS in relationship with and in comparison to measures of personal competence.

Method

Participants

Study participants were 274 adults with intellectual and/or related developmental disabilities receiving funding from a state intellectual/developmental disabilities (ID/DD) agency. The mean age of participants at the time of testing was 41.6 years (range = 19 to 83, *SD* = 14.3). Approximately 61% of participants were male (n = 167), and 39% were female (n=107). The mean age of males was 41.5 years (range = 19 to 79, *SD* = 14.4) and for females, 41.8 years (range = 19 to 83, *SD* = 14.2). Seven percent of participants were African American (n = 19); one percent, Native American (n = 3), and approximately 90% (n = 246) were Caucasian, with all other ethnicities represented at less than 1% of the sample. Table 1 provides information on other demographic variables collected from state records relevant to this sample.

Most state ID/DD agencies have some process to identify people receiving funding from their agency who, because of the impact of their disability on daily functioning, require more in-

Table 1. Sample Demographic Variables

	Total participants	
Demographic variable	*n*	%
No. of psychiatric diagnoses		
0	144	53
1	87	32
2	31	11
3	12	4
Level of intellectual disability		
Mild	71	26
Moderate	63	23
Severe	39	14
Profound	101	37
Hearing abilities		
Within normal ranges	224	82
Hearing loss		
Mild	22	8
Moderate	14	5
Severe	4	1.5
Profound	10	3.5
Vision abilities		
Within normal ranges	178	65
Vision loss		
Moderate	53	19
Severe	19	7
Perceives only light	16	6
Undetermined	8	3
Living arrangement		
Alone	33	12
With 2 or fewer people with DD[a]	66	24
With 3 to 7 people with DD	126	46
With 8+ people with DD	4	1.5
With relatives	38	14
Other	7	2.5
Day activities		
Receiving special education in schools	14	5
Competitively employed	5	2
Working in congregate setting <20 hrs/wk	19	7
Working in congregate setting >20 hrs/wk	63	23
Involved in agency-based non-work	19	7
Generic community activities	154	56

[a]Developmental disabilities.

tense supports and services. In this study, participants were randomly selected from the population of all people receiving services from the state agency: people who received extraordinary funding (extraordinary funding group, who received additional government funding to pay for needed supports); and people not receiving extraordinary funding (no extraordinary funding group). Participants were restricted to persons 18 years and over because the SIS was normed for use with adults. At the time of assignment to the sample, 335 people were receiving extraordinary funding from the state agency. From the population of people receiving extraordinary funding, 200 participants were randomly selected. Similarly, 200 potential participants from the pool of people not receiving extraordinary funding were selected. Informed consent was sought for all 400 potential participants. Consent was obtained for 133 people in the extraordinary funding group and 182 in the no extraordinary funding group. Using procedures described below, we completed SIS interview data for 123 people in the extraordinary funding group and 160 in the no extraordinary funding group. Ten people in the extraordinary funding group and 22 people in the no extraordinary funding group who provided consent did not complete SIS interviews. The principal reason for this was that the person was unavailable (e.g., due to health, transportation, or work reasons) for the interview at the scheduled times at their support agency. Upon completing SIS data collection, we obtained DDP data for all participants with a completed SIS; DDP data were no longer available for 8 people, and 1 participant was eliminated from the sample because DDP data indicated that this person had average intelligence, resulting in 274 total participants, 117 of whom received extraordinary funding and 157 of whom did not.

Procedure

All data collection was conducted by the second author and three graduate research assistants whom he trained to mastery on the administration of the SIS, as described in the SIS manual (Thompson et al., 2004b). Research staff collaborated with state agency personnel to schedule interview dates, times, and locations. All interviews, which were conducted at a location convenient to the person with the disability and informants, were arranged in conjunction with the cooperating direct support providing agency. A primary contact at each local direct support agency was

designated as being responsible for coordinating the location for all SIS interviews. Respondent teams, ranging from 2 to 4 persons, were configured with the following parameters pertaining to who should participate: (a) the person served to the maximum extent possible and based upon the person's preferences; (b) a direct support professional who had experience working with the person on a daily basis; (d) a representative from the person's community support provider; and (d) the person's case manager, guardian, and/or a family member.

In all interviews, at least one direct support person was a respondent. In 16% of interviews (n = 44), a parent or guardian also served as a respondent. Throughout the interviews, researchers who were interviewers remained blind to whether a participant was receiving extraordinary funding.

Interrater reliability. For 34 participants (12.4%), two interviewers completed SIS protocols while interviewing the same respondent. In all 34 reliability analyses, the second author served as the primary rater and one of the graduate research assistants was the second interviewer. Data on interrater reliability were entered into an SPSS for Windows version 13.0 database with the participant as the case and each item and rating type (frequency, duration, type) as variables for analysis.

Instruments

Supports Intensity Scale. The SIS was developed to measure the level of support that adults with intellectual and developmental disabilities required to participate in everyday life and community-based activities. The SIS is composed of three sections, only two of which were relevant to this study. The primary section from which norm-referenced indices are generated, the Support Needs Scale, involves 49 life activities grouped into six subscales or subdomains: (a) Home Living, (b) Community Living, (c) Lifelong Learning, (d) Employment, (e) Health and Safety, and (f) Social. Section 3, Exceptional Medical and Behavioral Support Needs, lists 15 medical conditions and 13 problem behaviors. An underlying assumption is that certain medical conditions and challenging behaviors predict that a person will require increased levels of support, regardless of his or her relative intensity of support needs in other life domains. For example, people with high support needs in terms of respiratory care need maximum support in their daily life regardless of their level of support needs in specific activities associated with Home Living, Community Living, and so forth. Likewise, a person who is physically aggressive will require additional support, regardless of his or her level of 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 the medical conditions and challenging behaviors: 0 = no support needed, 1 = some support needed, and 2 = extensive support needed. The SIS was normed on a sample of 1,306 people with disabilities in 33 states. The scale has adequate internal consistency reliability, with alpha levels of .94 or higher for each subscale or subdomain, adequate test–retest and interrater reliability, and adequate content and criterion-related validity (Thompson et al., 2004b).

Developmental Disabilities Profile. The DDP (Brown et al., 1986) was developed by the New York State Office of Mental Retardation and Developmental Disabilities and yields scores for three domains: Adaptive, Maladaptive, and Medical/Health. In the original version, an individual's score in each domain is divided by the highest score obtained by any individual in the sample for that domain, and these domain factors are then totaled to yield a final score from 50 to 300 (Brown et al., 1986). The state ID/DD system from which their sample was derived used the DDP with a modified scoring system, which is described in greater detail below This assessment has been used as part of the funding determination process in several state systems and for research purposes (Holburn, Jacobson, Schwartz, Flory, & Vietze, 2004: Jacobson, 1998; Janicki & Dalton, 1998) and, as Holburn and colleagues observed, the validity and reliability of the DDP are "comparable to those for adaptive behavior scales generally" (p. 66). Because the DDP is used to collect information about personal characteristics as well as personal performance issues, it is a measure of both personal competence (similar to an adaptive behavior scale) and support needs, although it must be considered to be primarily a measure of personal competence.

Dependent and Independent Variables

In designing a study to determine the efficacy of the SIS to predict extraordinary support needs, one must use the SIS scores as the independent variable, and the dependent variable must be some other indicator of "true support needs." Identifying measures for the independent variable

was a simple process because the SIS provides a composite standardized score, the Support Needs Index (SNI), which is derived from responses to Section 1, The Support Needs Scale, as well as raw scores indicating extraordinary behavioral and medical support needs (Section 3). However, identification of a dependent variable is not straightforward. Theoretically, every person has a "true" level of support need, and the ideal dependent variable would accurately reflect this true level. However, because measuring support needs is in its infancy in the field of developmental disabilities, there are no other established measures of support needs available. We considered several alternative proxies in an effort to select the best possible dependent variable in light of the practical constraints in collecting data for this study. The relative merits of each option under consideration are summarized below:

- *Extraordinary funding group.* Theoretically, people who receive extraordinary funding should constitute a group that has greater support needs and, thus, membership in the extraordinary funding or no extraordinary funding group could be used as a dependent variable against which to judge the efficacy of the SIS. In practice, however, multiple factors have determined eligibility for extraordinary funding, with support-needs being only one.
- *Overall funding level.* Within the state system, an overall funding rating of 1 indicates the highest level of funding eligibility and 5, the lowest; thus, overall funding level could serve as the dependent variable. The limitation to this is that overall funding level is determined by the highest funding level from each of the three DDP domains: Health, Maladaptive Behavior, and Adaptive Behavior. For example, a person who had a level of 5 in two areas but a 1 in the third area was assigned an overall funding level of 1, the same level as a person with a funding level of 1 in all three areas. It is probable that the person with three rankings of 1 would have more intense support needs than does a person with two 5 funding levels and a 1, but both are treated the same by the overall funding level system.
- *Converted DDP score.* Health, Adaptive Behavior, and Maladaptive Behavior DDP scores were converted by the state into an overall, "converted" DDP score, which could be used as an indicator of support needs. This option has two primary threats to its validity, the first being that the DDP itself must be considered primarily a measure of personal competence, not support needs. In addition, although researchers were not informed about the exact formula used by the state to calculate the converted DDP score, the formula more heavily weighted the Maladaptive Behavior raw score in the converted score than it did for scores from the other two domains. Although this may be justified for the purpose of establishing a means for allocating funding, there is no theoretical reason that maladaptive behavior should be weighted any differently than medical needs or other areas of support need when determining overall support needs. Although it is true that the presence of serious maladaptive behavior will predict high support needs, so will the presence of critical medical needs, a significant lack of adaptive skills, and so forth.
- *DDP Score for Health, Adaptive, and Maladaptive domains.* The fourth option for consideration involved using DDP raw scores for each of the DDP domain areas as dependent variables. This option also has two threats to its potential validity, beginning with the aforementioned problems with the DDP as a measure of personal competence instead of support needs. Additionally, however, the range of possible scores in each domain varies in the version used by the state. That is, Health DDP scores range from 0 to 22; Maladaptive, from 0 to 186; and Adaptive, from 0 to 800. As a result, there is no basis for meaningfully comparing a score of 22 on any one DDP domain area with a score of 22 in another.
- *Funding level for Health, Adaptive, and Maladaptive domains.* THE DDP scores in each of the three domains result in a funding level score used to determine whether the person is eligible for high (rating of 1) or low (rating of 5) levels of funding (as well as to calculate the overall funding level score), and these domain funding level scores in each area could be used as an indicator of support need in that area. This final option is hampered by the same limitations discussed for the overall funding level option; funding level scores are derived from DDP raw scores and the DDP is a measure of personal competence, and there are unequal intervals used in converting DDP domain scores to funding level scores due to unequal ranges of the raw scores.

Though there were obvious limitations to each of these five options, we were nonetheless limited to utilizing one or a combination of these because there were no other indicators of support needs available with which to evaluate the SIS. Ultimately, we decided to create a unique variable to use as our primary dependent variable that drew from the DDP raw scores for Health, Maladaptive, and Adaptive domains by doing a *z*-score transformation for raw scores in each domain for each participant, then summing across those transformed scores to create an overall indicator we call the sum DDP score. The obvious advantage of converting DDP domain raw scores to *z* scores is that by doing so, we are able to correct for the problem introduced by the differing intervals and ranges in DDP scores. We note, however, that although this transformation addresses problems associated with unequal ranges and intervals in the DDP raw scores, it does not fix the problem that the DDP is a measure of personal competence and not a dependent variable that is a true measure of support need. Therefore, and as discussed subsequently, we ran multiple analyses with combinations of these dependent variables as means to examine the properties of the SIS.

Results

Interrater Reliability

Percentage agreement for each item and for each indicator of support need (e.g., frequency, duration, type of support) for the Section 1 SNI ranged from 88% to 100% for individual items and from 95.12% to 99.62% on total section scores. Overall, agreement was 97.75% for Frequency ratings, 97.90% for Daily Support Time ratings, and 98.83% for Type of Support ratings, for an overall reliability of 98.16%. There were 4,998 unique opportunities for agreement/disagreement (49 items $\times$ 3 ratings per item $\times$ 34 participants). Of these 4,998 ratings, there were disagreements between the primary rater and the student rater on 92 ratings in the Section 1 SNI section. The overall interrater reliability for the Exceptional Medical Support Needs section was 99.2%. For the Exceptional Behavioral Support Needs section, it was 99.75%, resulting in an overall reliability rating for Section 3: Exceptional Medical and Behavioral Support Needs of 99.48%.

Demographic and Descriptive Analyses

We conducted a number of analyses that described participants and differences between and among them on a number of variables. Previously, we noted that although extraordinary funding status was not a clear indicator of support needs, it is viable to assume that people in the extraordinary funding group may, indeed, have greater support needs (as a group) than do participants in the no extraordinary funding group because they have more severe disabilities. The data provided from the state database did not include IQs but did have level of intellectual disability data (e.g., mild, moderate, severe, profound); therefore, we conducted a chi-square analysis of level of intellectual disability (mild, moderate, severe, profound) by extraordinary funding group. The Pearson chi-square value (88.98) was significant, $p = .0001$. Participants receiving extraordinary funding were dramatically underrepresented in the mild and moderate intelligence levels and overrepresented in the profound level. Those participants not receiving extraordinary funding had trends exactly the opposite, and both groups were roughly at what was expected for the severe level. Univariate analyses of variance for DDP scores by extraordinary funding status showed significant differences between these groups for Health, $F(1, 272) = 30.18$, $p = .0001$, Maladaptive, $F(1, 272) = 12.25$, $p = .001$, and Adaptive, $F(1, 272) = 87.70$, $p = .0001$, domains, as well as in the converted DDP score, $F(1, 272) = 97.99$, $p = .0001$. In each case, the extraordinary funding group scored higher, indicating greater impairment or support need. The same trends held on univariate analyses for DDP scores based on level of functioning. The ANOVA results showed significant differences between these groups for Health, $F(4, 269) = 19.24$, $p = .0001$, Maladaptive, $F(4, 269) = 4.34$, $p = .005$, and Adaptive, $F(4, 269) = 211.21$, $p = .0001$, domains, as well as in the converted DDP score, $F(1, 269) = 77.61$, $p = .0001$. Post-hoc analyses indicated that differences on the Health domain were between participants with mild or moderate impairment and participants with profound levels of intellectual disability. For the Maladaptive domain score, those differences were between people with moderate and severe levels and between people with severe and profound levels of impairment. In the Adaptive area, there were significant differences among all levels. Significant differences existed on the converted DDP score between participants with mild

or moderate impairment and participants with severe or profound levels of disability.

Turning to investigation of how the SIS fares on similar analyses, we found that univariate ANOVA for the SIS SNI scores by extraordinary funding group status yielded significant main effects, $F(1, 272) = 120.82$, $p = .0001$. People receiving extraordinary funding had a mean SIS SNI score of 111.16 ($SD = 9.86$); people not receiving extraordinary funding had a mean SIS SNI score of 95.50 ($SD = 12.85$). The SIS SNI had a higher F value than any of the DDP domains or the converted total. With regard to the ANOVA for SIS SNI by intellectual functioning level, there were significant effects, $F(4, 269) = 91.68$, $p = .0001$.

Examining the correlations among the DDP scores and the SIS scores provides another way to look at how these measures might be similar and how they might differ. Table 2 provides correlation coefficients for the relationships among these scores. The SIS SNI score correlated most highly with the Adaptive DDP score, $r = .82$, followed by the converted DDP score, $r = .73$, then the Health DDP score, $r = .44$, and, finally, the Maladaptive DDP score, $r = .16$. The SIS Section 3A: Exceptional Medical Supports Needed scores correlated highly with the Health DDP score, $r = .53$, but also the Adaptive DDP score, $r = .65$. Section 3B: Exceptional Behavioral Supports Needed scores correlated most strongly with the Maladaptive DDP scores.

Regression Analyses

To examine the degree to which SIS scores predicted the above indicated dependent variables, we conducted a series of regression analyses. For the first two we used the sum DDP score as the dependent variable with the SIS SNI score alone in model and, again, with the SIS SNI score and raw scores from Section 3A and 3B (Extraordinary Medical and Behavioral Needs) in the model. The second and third sets of regression analyses had the state-calculated converted DDP score and raw DDP scores from each DDP domain (Health, Maladaptive, Adaptive), respectively, with SIS SNI alone and with SIS Section 3 scores as independent variables. Finally, we conducted a series of logistic regression analyses with extraordinary funding group as a dichotomous dependent variable and SIS and/or DDP scores as predictor variables. All analyses were conducted using SPSS version 13 for Windows.

Standardized regression weights and R^2 values for Model 1 (SIS SNI only) and Model 2 (SIS SNI, Sections 3A and 3B) for sum DDP, converted DDP, and DDP subdomain scores as dependent variables are provided in Table 3. With regard to the analysis with the sum DDP as the dependent variable, the SIS SNI alone accounted for almost 50%, $R^2 = .49$, of the variance for the sum DDP score. As a model, it is highly significant, $F(1, 272) = 265$, $p < .0001$. Further, although this is a strong relationship, accounting for half of the variance, it also leaves fully half of the variance unaccounted. Much of the unaccounted variance could logically be attributed to the differences between measuring support needs and measuring personal competence, the former being the explained variance and the latter, in part, the unexplained variance. Adding the Section 3 scores into the equation created a model that accounted for more of the variance, $R^2 = .58$, and was again highly significant, $F(3, 270) = 121$, $p < .0001$. Further, each of the SIS sections contributed significantly to the model, with the SNI accounting for the highest percentage, followed by Section 3B: Exceptional Behavioral Support Needs and Section 3A: Exceptional Medical Support Needs.

Table 2. Correlations (Pearson *r*s) Among SIS Sections 1 and 3 Scores and Five DDP Scores

Measure	1	2	3	4	5	6
1. Maladaptive DDP[a]	.10	—	—	—	—	—
2. Adaptive DDP	.50**	−.03	—	—	—	—
3. Converted DDP	.75**	.52**	.75**	—	—	—
4. SIS[b] Section 3A[c]	.53**	−.18**	.65**	.50**	—	—
5. SIS Section 3B[d]	.07	.68**	−.06	.33**	−.22**	—
6. SIS SNI[e]	.44**	.17**	.82**	.73**	.56**	.19**

[a]Developmental Disability Profile. [b]Supports Intensity Scale. [c]Exceptional Medical Supports raw score. [d]Exceptional Behavioral Supports raw score. [e]Support Needs Index.
**$p < .01$ (2-tailed), $n = 274$.

With regard to the regression analysis with the converted DDP score and the SIS SNI alone and with Section 3 scores, as can be seen in Table 3, the SIS SNI alone accounted for slightly more than half, $R^2 = .54$, of the variance for the converted DDP score, a finding similar to that for the sum DDP. As a model, it is highly significant, $F(1, 272) = 317$, $p < .0001$. As with the previous findings, this leaves almost half of the variance unaccounted. Adding the Section 3 scores into the equation created a model that accounted for quite a bit more of the variance, $R^2 = .78$, and was again highly significant, $F(3, 270) = 137$, $p < .0001$. Each of the SIS sections contributed significantly to the model in the same order (the SNI accounting for the highest percentage, followed by Section 3B: Exceptional Behavioral Support Needs, and Section 3A: Exceptional Medical Support Needs. The SIS SNI and Section 3 scores accounted for only about 54% of the variance when the sum DDP was the dependent variable, but 77% of the variance when the converted DDP was the dependent variable. One potential explanation for this is that the converted DDP weights Maladaptive Behavior more heavily than the other two domains, and the SIS SNI is picking up more of the variance because of the emphasis on behavioral issues in the converted DDP.

For the Health DDP scores, the SIS SNI alone accounted for less than half, $R^2 = .44$, of the variance for the Health DDP score, and the model was highly significant, $F(1, 272) = 265$, $p < .0001$. Adding the Section 3 scores into the equation increased the variance to account for slightly less than 60% of the variance, $R^2 = .57$, and was again significant, $F(3, 270) = 43$, $p < .0001$. In this case, though, when the Section 3 scores were entered into the model, the SIS SNI score dropped from being a significant contributor to the model, with the Section 3A Exceptional Medical Support Needs becoming the most significant predictor, Beta = .503, and the Section 3B Exceptional Behavioral Support Needs contributing slightly. Thus, although the SNI does account for some of the variance when entered into the model on its own, it is eclipsed by entering the Section 3A data. This is entirely consistent with the role of the SIS SNI and the Section 3 Medical and Behavioral Needs scores. In fact, because the Health DDP domain is predominantly a personal characteristics measure, these findings are consistent with the role of the SIS SNI and the "balance and check" role of the Section 3 scores.

With the Maladaptive DDP scores, somewhat surprisingly, the SIS SNI alone accounted for little of the variance, $R^2 = .17$, for the Maladaptive DDP score, although the model did achieve significance, $F(1, 272) = 7.8$, $p = .006$. Adding the Section 3 scores into the equation increased the variance to account for almost 70% of the variance, $R^2 = .68$, however, and was highly significant, $F(3, 270) = 78$, $p < .0001$. As predicted, the addition of the Section 3B scores eclipsed the impact of the SNI score as well as rendering the Section 3A score moot. The Beta for the Section 3B scores was .635. Again, these are not surprising findings and, in fact, the SIS SNI should not pick up a lot of the variance with a score that represents very highly personal characteristics, although the R^2 for the SNI alone was smaller than anticipated. However, when the Section 3B scores were added in, the model robustly predicted much of the variance, while leaving almost one

Table 3. Summary of Standardized Regression Weights, R^2 Values for Two Predictor Models

Dependent variable	Model 1	Model 2			R^2	
	SIS SNI[a]	SIS SNI	Section 3A	Section 3B	Model 1	Model 2
Developmental Disability Profile (DDP)						
Sum	.70**	.48**	.27**	.30**	.49	.58
Converted sum	.73**	.54**	.24**	.28**	.54	.78
Health score	.44**	.11	.50**	.16**	.44	.57
Maladaptive score	.17**	.11	−.10	.64**	.17	.68
Adaptive score	.82**	.76**	.16**	−.18**	.82	.86

[a]Supports Intensity Scale Support Needs Index.
**$p < .01$.

third unaccounted for and, presumably, related to the measurement of actual support needs.

Finally, analyses from the Adaptive scores analysis were consistent with those predicted. In fact, the SIS SNI alone accounted for a large amount of the variance, $R^2 = .82$, for the Adaptive DDP score, resulting in a highly significant model, $F(1, 272) = 565$, $p < .0001$. Adding the Section 3 scores into the equation increased the variance to account for 86% of the variance, $R^2 = .86$, and was also highly significant, $F(3, 270) = 255$, $p < .0001$. Although the SIS SNI score was the dominant predictor variable, both of the Section 3 scores reached significance, though for the Section 3B score, that was a negative or inverse relationship. In all, this analysis confirmed that the Adaptive DDP is, of the three DDP domains, most capable of measuring support needs.

Because the variance explained by the SIS SNI was minimal in the other two DDP domains, both of which are clearly personal competence/characteristics driven, and was so substantial in the Adaptive DDP area, there is strong support for the claim that the SIS measures a construct other than personal competence (e.g., that the SIS measures support needs). Based on data from this investigation, it is reasonable to conclude that unexplained variance in previous analyses is, at least to some degree, accounted for here and, thus, can be attributed to support needs instead of personal competence.

Table 4 presents the summary of the logistic regression analyses predicting extraordinary funding group. With the converted DDP as a predictor of extraordinary funding group membership, the model was significant and not just attributable to chance; the Hosmer and Lemeshow Test was not significant, indicating that the model was a good fit; and the Nagelkerke R^2 suggested that about 35% of the variance in extraordinary funding group membership can be attributed to the converted DDP score. Seventy-one percent of the cases could be correctly classified by the model. With the SIS SNI score as the predictor variable (Model 2, Table 4), the model was again significant and not just attributable to chance; the Hosmer and Lemeshow Test was not significant, indicating that the model was a good fit; and the Nagelkerke R^2 suggested that about 41% of the variance in extraordinary funding group membership can be predicted by the SIS SNI score. Seventy-nine percent of the cases could be correctly classified by the model.

Table 4 also reports the summary of the logistic regression for the SIS SNI along with the SIS Section 3 indicators (Model 3). Adding the Section 3 scores improved the model's fit somewhat, up to 44% of the variance under the Nagelkerke R^2. The model was significant according to the chi-square test, and the Hosmer and Lemeshow Test was nonsignificant, indicating a good fit. Each of the predictor variables contrib-

Table 4. Summary of the Logistic Regression Analyses Predicting Extraordinary Funding Group

	R^2			Odds	Cox &	Nagelkerker
Model	B	SE	Wald	Ratio	Snell	R^2
Model 1						
Converted	−.03	.00	57.5**	.98	.26	.35
Model 2						
SIS SNI[a]	−.11	.01	62.3**	.89	.31	.41
Model 3						
SIS SNI	−.09	.02	24.5**	.92	.33	.44
Section 3A	−.13	.06	5.8	.88		
Section 3B	−.10	.04	6.8**	.91		
Model 4						
SIS SNI	−.07	.02	12.9**	.93	.34	.45
Section 3A	−.11	.06	3.6	.90		
Section 3B	−.07	.04	3.3	.93		
Converted	−.01	.00	3.7	.99		

[a]Supports Intensity Scale Support Needs Index.
**$p < .01$.

uted uniquely, with the SIS SNI still the strongest predictor.

As a final examination, Table 4 provides data from a logistic regression analysis with all independent variables included in the model: converted DDP, SIS SNI, and Sections 3A and 3B of the SIS (e.g., Model 4). This model is slightly better than the previous one, although when entered together, the only independent variable that contributed significantly is the SIS SNI. However, the model, as a whole, predicts 45% of the variance.

Discussion

Our purpose in this study was to evaluate the efficacy of the SIS as a tool for use in the evaluation of extraordinary support needs for adults with intellectual and closely related developmental disabilities. Before summarizing findings from this study, we note that decisions pertaining to resource allocation are subject to a variety of factors that influence those decisions, and any analysis of existing funding allocations must, necessarily, presume that any one variable will not capture all the factors impacting funding. The present study involved 274 people receiving supports from a state ID/DD system who were randomly selected from one of two study subsamples: people receiving extraordinary funding and people not receiving extraordinary funding.

Before discussing the findings, we point out several limitations that readers should consider when interpreting these findings. First, until there are other widely available indicators of support need, it is difficult to determine the validity of a tool such as the SIS, other than looking at the assessment's relationship with and difference from measures of adaptive behavior and tools such as the DDP. Second, our sample consisted solely of participants from a single state, and further research across other states and, potentially, countries, is needed. Third, we offer a caution with regard to reliability issues. We controlled, to the degree feasible, for threats to reliability by using a small cadre of highly trained interviewers. In the field, it will be difficult to achieve this, because most states or agencies will need to use many more interviewers to complete interviews. Further, one should keep in mind that although we assessed interrater reliability, interviewers who are not familiar with the person being rated by the SIS, as was the case here, must rely upon the accuracy of respondent's reports, and because such reports will vary in accuracy based upon the respondent's knowledge of the person and the circumstances in which that person interacts with him or her or the person's capacity to self-report. This may impact the reliability of the assessment independent of interrater reliability issues. Finally, our conclusion that the SIS and DDP are measuring, to some extent, differing constructs needs to be interpreted with the acknowledgement that an alternative explanation for these findings was unsystematic variation due to the differences in when and with whom the two assessments (DDP and SIS) were completed.

Given the above limitations, the SIS showed expected properties with regard to individual characteristics, such as level of intellectual functioning and extraordinary funding group status. In fact, the SIS was a strong predictor of current extraordinary funding group status, performing as well or better than the DDP, even though the DDP is the mechanism currently used by the state to make decisions about extraordinary funding. Further, when plotted out against the individuals' level of intellectual functioning, it was evident that the SIS was as, or more, sensitive to variations in support needs as a function of intellectual disability than was the converted DDP. Overall, correlational analyses showed conceptual relationships between the SIS and the DDP, both converted and domain raw scores. It is evident that there is some shared measurement performance between these two assessments, as expected. That is, measures of personal competence, particularly adaptive behavior, and the SIS, as a measure of support needs, assess similar activities and life aspects, but from a different perspective. Measures of personal competence provide indicators of a person's proficiencies and abilities in relation to conceptual, social, and practical skills. Assessment of support needs provide indicators of the support a person would require to fully participate in daily life activities. So, the most important aspect of the correlational analyses was that whereas these measures were clearly related, our interpretation of these results is that these instruments may not be measuring identical constructs. Subsequent research with dependent measures that are more uniquely indicators of support needs are needed to confirm our interpretation. These findings are consistent with similar correlational analyses reported in the SIS manual (Thompson et al., 2004b).

The regression analyses we used to examine this issue more specifically provided evidence that

the SIS would be an effective instrument to measure extraordinary support needs and, indeed, would, in our estimation, be as effective or more effective than using the DDP exclusively. The SIS SNI score, alone, accounted for nearly half the variance in the sum DDP statistic, indicating that although the two share common measurement themes, there is a significant amount of variance not accounted for, nearly half, that can be explained, at least in part, by differences between measuring support needs and measuring personal competence. Essentially, we interpret this to mean that the SIS was measuring something, presumably support needs, that was not being captured in the sum DDP score, which was an indicator of personal competence. Adding Section 3 Exceptional Medical and Behavioral Support Needs scores into the regression model increased the amount of variance accounted for to about 57%, but still left more than 40% unaccounted for. These trends continued throughout the regression analyses, including linear regression analyses used to examine the capacity of the SIS to account for variance in the converted DDP score. Further, regression analyses with DDP domain score (Health, Maladaptive, Adaptive) provided evidence suggesting that the SIS is measuring something different from the DDP and that this something is support needs. Finally, with regard to the overall question as to whether the SIS would be effective in determining extraordinary support needs, the final logistic regression analyses show the SIS was clearly as or more effective in predicting existing extraordinary funding group membership than the DDP, even though the existing extraordinary funding group was configured, in part, using DDP data.

In conclusion, findings from this study suggest that the SIS is an effective instrument for measuring differences in support needs and informing decision-making in regard to disbursing funding. Although its relative efficacy compared to other measures in use, particularly the ICAP, cannot be determined by results of this study, we believe that our correlational and regression analyses support the hypothesis that the SIS measures something different from the DDP and that this difference is that the SIS is measuring aspects of support needs not measured by the DDP. We note that this is not a criticism of the DDP, per se, because it was not originally developed to measure support needs, so the degree to which it does overlap with a measure of support needs is, probably, a positive reflection on this instrument.

Across multiple indicators the SIS seemed to measure something other than personal competence and/or adaptive behavior. It is evident from the data collected for this study that the SIS would be as effective or potentially more so for equitably determining need for extraordinary funding if *equitable* refers to funding on the basis of an individual's intensity of supports needed. As discussed earlier, there are many reasons that decisions about extraordinary funding would be made taking into consideration factors in addition to actual supports needed. We can determine no justifiable reasons, however, that such decisions would or should be made without the best evidence of actual support needed as part of the determination process. Having said this, we emphasize that intellectual and related developmental disabilities are multifaceted conditions that result in a complex spectrum of intensity and type of support needs. One should not expect that the SIS, or any other singular supports assessment instrument, will explain 100% of the variance in funding required to provide these supports.

It is clear from this study that using the SIS as a means to determine actual supports needed would be as or more effective then using the DDP or professional/personal judgment alone, Further, it is evident that a process including all three measures of personal competence as determined by the DDP; determination of actual support needs by the SIS; and personal judgment, as a function of person-centered planning teams considering all aspects of a person's environment, preferences, and capacities would likely lead to the most equitable and effective determination of the need for extraordinary support. Finally, it was clear that models including both SIS SNI scores and the Section 3 Medical and Behavioral raw scores were stronger predictors than any one section alone, and any potential use should involve all of these indicators.

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