ijbd

International Journal of Behavioral Development
1–8

DOI: 10.1177/0165025416644078
ijbd.sagepub.com
SAGE

The Swedish Communicative Development Inventory III: Parent reports on language in preschool children

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Abstract

A revised form of MacArthur-Bates Communicative Development Inventory III (SCDI-III) was presented designed for Swedish speaking children aged 2 years 6 months–4 years 0 months with the objective to give a proxy measure of their language competence. The instrument contains a vocabulary checklist with 100 words, mainly predicates, from four areas; Food words, Body words, Mental words and Emotion words. Two sections assess the child's grammar skills and a final section appraises the child's metalinguistic awareness. Assessments from 1,134 parents are reported. Scales with adequate psychometric properties were formed for each section. Monthly median values and spread of score distributions are presented for each scale. Girls scored higher than boys on all scales. The revision, sampling procedures, demographic variables and issues of reliability and validity, are discussed. The general structure of the instrument can well be integrated in similar instruments designed for other languages and cultures.

Keywords

assessment, CDI, checklist, language development, parental report, preschoolers

Parent report instruments to assess children's language skills have been widely used over the last 25 years after the publication of the Language Development Survey (LDS, Rescorla, 1989) and the Communicative Development Inventories (CDIs, Fenson et al., 1993), later MB-CDIs (MacArthur-Bates Communicative Development Inventories, Fenson et al., 2007). The first two versions of MB-CDI, with the extensions W&G (Words and Gestures, designed for children aged 8–16 months) and W&S (Words and Sentences, designed for children aged 16–30 months), have been adapted to over 60 languages (see MB-CDI homepage, http://mb-cdi.stanford.edu) including Swedish (Berglund & Eriksson, 2000; Eriksson & Berglund, 1999). The current article describes the development of a revised form of the CDI-III adapted for Swedish-speaking children. Norms for Swedish children aged 2 years 6 months–4 years 0 months are also presented.

A parent report instrument with an extension for 3-year-olds called the CDI-III was developed by Dale (Dionne, Dale, Boivin, & Plomin, 2003; Feldman et al., 2005; Fenson et al., 2007) but has not been as successful as the two previous instruments with respect to covering the intended age range. The CDI-III contains a 100-item vocabulary checklist, a 12-item syntax scale developed from the complexity measure in CDI-W&S, and a third section with 12 items reflecting language use in a broad sense. It has been normed on 356 children aged 2 years 6 months–3 years 1month (Fenson et al., 2007). It can be seen from the norms that there are ceiling effects for the upper half in all three measures and in particular for the two latter scales. In addition, less validation evidence is available for CDI-III compared to CDI-W&G and CDI-W&S. However, many of the reasons put forth for the development of the first two instruments apply also for 3-year-old children. Many 3-year-olds are still shy or cautious in interaction with strangers and therefore not well apt for formal testing. Parent reports are non-intrusive, inexpensive and invite the parent to participate and share their knowledge of their child. Parent reports of preschool children are hence responsive to a recent European Union recommendation that endorse parental involvement in early childhood education and care (Lindeboom & Buiskool, 2013).

The CDI-III has been adapted to few languages apart from English. Garcia et al. (2014) have recently developed a Basque version. It follows the structure of the original version although the vocabulary checklist was extended to 120 words and a new section on morphology was added. Results from over 700 children aged 2 years 6 months–4 years 2 months were reported with significant progression with age up to the ages of 3 years 6 months–4 years 0 months depending on scale. Although the progression with age is significant for all scales, there are ceiling effects after the age of 3 years 6 months. Jackson-Maldonado (2011) reported also on the development of a Mexican Spanish version with 100 words and a 26-language complexity measure. Preliminary data from 504 children aged 2 years 6 months–3 years 11 months with reasonable developmental trends were presented although no statistics were reported. Preliminary evidence of diagnostic validity of the American-English CDI-III was found by Skarakis-Doyle, Campbell and Dempsey (2009) and by Guiberson and colleagues with a translated CDI-III into Mexican Spanish (Guiberson & Rodríguez, 2010; Guiberson, Rodríguez, & Dale, 2011).

The instrument presented in the current article is a revised form of the CDI-III adapted for Swedish speaking children aged 2 years

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6 months–4 years 0 months with the objective to give a proxy measure of their language competence by means of parent reports. No such instrument exists today. The instrument presented here is called the Swedish Communicative Development Inventory III (SCDI-III). The great challenge was to find a way to assess the vocabularies of preschoolers with a short form that displayed a significant increase with age.

Development of the checklist

Two pilot versions of the checklist were developed and administered within a prospective project at the University of Stockholm, studying the effects of enhanced parental input on young children's vocabulary and subsequent literacy development (SPRINT, http://sprint.ling.su.se). A total of 342 checklists of children aged 2 years 6 months–2 years 9 months were collected electronically in 2011, and 99 checklists of the same population was gathered a year later comprising children aged 3 years 6 months–3 years 9 months. Items and scales were tested for age progression and scales were tested for internal consistency. Based on that pilot work, the SCDI-III was developed.

Level of communication. As a first question the parent was asked which of six alternatives best applied to their child's level of communication. A similar question was used by Dionne et al. (2003).

Vocabulary. Several versions of multi-composite checklists containing all sorts of words were tested in the SPRINT project. These checklists resulted in ceiling effects and low correlation with age. To address this problem, a strategy was developed to focus mainly on verbs. Because of their close correspondence with syntax, verbs have been proposed to play a special role in children's acquisition of language (e.g. Tomasello & Merriman, 2014). A large number of verbs were therefore tried out in a new checklist administered in the second pilot of the SPRINT project. The general result from the verb list was mixed. Many verbs discriminated well while others had reached ceiling at age 3 years 0 months. A modified strategy was therefore developed in which four themes of words that would be central for children and that typically expand during the preschool years (as described in the developmental literature, see in what follows) were identified. The majority of these words had been piloted. It was considered better to be rather exhaustive within these themes than to select words at random or based on available frequencies alone.

The first theme was Food words. Food is an essential part of life and words for food are common in children's early vocabulary (Clark, 1995; Fenson et al., 1994). Focus was put on verbs in food preparation. The second theme was Body words. Body words include external and internal body parts, words designating health status and some bodily functions. Children start to acquire words for external body parts during their second and third year (Andersen, 1978; Fenson et al., 1994). However, children's knowledge of words for inner organs is more challenging and is acquired slowly. Children's knowledge of invisible things during the preschool and school years has been studied for long within cognitive development (e.g. Carey, 1985; Gelman & Wellman, 1991). The third and fourth themes concerned Mental words and Emotion words respectively. Children start to use such words around 3 years and they are known to be acquired at a slow pace during the preschool years (Bartsch & Wellman, 1995; Dunn, Bretherton, & Munn, 1987; Naigles, 2000). Talk about emotions is important for children's early socialization and promotes children's pro social functioning (Drummond, Paul, Waugh, Hammond, & Brownell, 2014). In particular, cognitive words show high correlation with other language measures such as total vocabulary, Mean Length of Utterances (MLU), and propositional complements (Carlson Lee & Rescorla, 2006).

Syntax. The syntax section consists of two subscales. The first scale, *Language complexity*, assessed how complex or elaborated the child's current language was, a skill that develops during the preschool years (e.g. Bowerman, 1979; Diessel & Tomasello, 2000). The addition of a preposition and a nominal phrase, or a subordinate phrase, to a single sentence was used as examples of elaborated speech. Swedish-speaking children typically start to use subordinate clauses before the age of 3 years. Relative clauses are acquired first and followed by other types during the coming year (Håkansson & Hansson, 2000). A total of 20 pairs were tested in the SPRINT project and the half with largest progression with age (at least 10%) was selected for inclusion in the final version.

The second subscale concerned children's grammatical constructions. About 20 direct questions on children's use of grammatical constructions that typically develop during the preschool years were tested in the SPRINT project (for a brief description of Swedish children's acquisition of grammar, see Lange & Larsson, 1977; Plunkett & Strömqvist, 1990). About half of the questions were discarded at an early stage because of ceiling effects.

The items from Language complexity and Grammatical constructions were merged into a single scale. The two subscales correlated highly ($r = .68$ after control for age), ceiling effects were diminished when a longer scale was used, and a single broad measure of syntax was considered more useful than two separate measures.

Metalinguistic awareness. Children typically start to develop metalinguistic skills between the ages of 3 and 4 years and these skills are also correlated with language skills (e.g. Chaney, 1992; Smith & Tager-Flusberg, 1982). Metalinguistic skills are known to predict later literacy (e.g. Adams, 1998; Lundberg, Frost, & Petersen, 1988; Melby-Lervåg, Lyster, & Hulme, 2012). A corresponding scale has not been included in parental reports before, but it was considered appropriate for this age group as it has potential to predict children's future reading and writing. Skills assessed are phonological awareness, orthographic awareness and understanding the existence of other languages.

Phonology. One general question on the child's phonology was included that did not require any particular linguistic competence from the parent to answer but that contributed to the overall picture of the child's language.

Method

Recruitment

A total of 7,200 letters were mailed to parents of children aged 2 years 6 months–4 years 0 months. The parents were randomly selected from the national population register and 7,135 (99%) reached their destination. All parents received information about the project by regular mail. Two methods of participation were compared in the project. One group with 4,653 parents was asked to participate by the internet. A total of 547 (12%) parents participated this way. (In all, 99% of all individuals in Sweden aged 20–44 years had access to internet in their home 2013, Statistics Sweden, 2013.)

Table 1. The sample's distribution over age (months) and gender.

	Age (months)																			
	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	Σ
Girls	31	32	20	35	30	34	23	39	29	34	26	27	32	32	42	29	34	27	24	580
Boys	22	26	37	25	18	28	37	36	24	25	21	44	25	28	38	40	25	25	20	544
Total	54	59	58	61	49	63	60	77	53	60	47	71	57	60	80	69	59	53	44	1134

Note. Columns for which the total number of children exceeded the sum of girls and boys include children without reported gender.

The other group with 2,482 parents could choose between participating online or using a regular paper version that also came with the information together with a prepaid return envelope. A total of 125 (5%) parents in this group participated online and additionally 595 (24%) participated by mailing their forms. Thus, most parents preferred to participate by completing the paper and pencil version. In all, 1,267 (18%) parents completed the checklist. No difference in language skills (vocabulary, language complexity, grammatical constructions or metalinguistic awareness) as determined by a MANOVA were found depending on whether the form was completed online or by paper and pencil (Wilks' $\wedge = .99$, n.s.).

Exclusions

A total of 29 children fell outside the stipulated age range of 2 years 6 months–4 years 0 months, possible due to late responding, or false or mistaken reports. Six additional children were excluded because they were internationally adopted. Children with health problems related to language, for example developmental delay, deficient hearing, language disorder, more than 2 weeks prematurity, and suspected autism spectrum disorders were excluded and such problems were reported for 36 children. The sample was not entirely monolingual but Swedish was required to be the dominant language of all children. This excluded 62 additional children which were reported to be more proficient in another language than Swedish. After these exclusions, 1,134 children remained in the sample.

Sample characteristics

Data were reported for 580 girls and 544 boys. In addition, 10 forms were completed for which gender was not reported. Totally 567 children were firstborns, 543 children were laterborns and 24 children were twins. We did not explicitly ask for form of daycare but 93% of all children aged 2–4 years attend preschool in Sweden (Statistics Sweden, 2013). In all, 161 children (14%) were regularly exposed to another language. These children were retained in the sample as regular exposure to another language is common and preliminary regression analysis showed it had only a marginal effect ($r^2 = 1.2\%$) on total vocabulary after age and gender were controlled for. See Table 1 for children's distribution over age groups and gender.

The instrument was completed by the children's mothers for 85% of the sample, by their fathers for 15% and in two cases by foster parents. Parental education was used as a proxy for socioeconomic status (SES). Nine years of Compulsory school was the highest education reported for 2% of the parents, Upper secondary education was reported as highest education for 19%, Higher education or Advanced vocational training (2 years) was reported for another 12%, and 68% reported Higher education of 3 years or longer. This is significantly higher, $\chi^2(3) = 38.98$, $p < .01$, than for the general population of 20–44-year-olds as reported by Statistics Sweden (2013). Because few parents with 9 years' Compulsory school as highest education responded (16 parents), this group was merged with the group with Upper secondary school as highest education in subsequent analyses including SES and thus using three levels. See Table 2 for parents' educational level compared to that of adults aged 20–44 years in the Swedish population on which the chi-square analysis of independence reported above was based.

Table 2. Educational level of responding parents compared to that in the nation (percent).

	SCDI-III (%)	Nation (%)
Compulsory school (9 years) or lower	2	9
Upper secondary Education (2–3 years)	19	49
Higher education or advanced vocational training (2 years)	12	16
Higher education (> 2 years)	68	26

Checklist

The final version included 127 items plus 10 background questions. See Appendix 1 for general structure, example of items and response alternatives.

Level of communication (1 item). The parent was asked to indicate which of six alternatives best corresponded to their child's present level of communication. This item served as a filter within the instrument. If the child did not speak at all (alternative 1) or did not speak intelligible (alternative 2), no further questions applied.

The vocabulary section (100 items). This section included 100 words divided in four themes; food words (16 items), body words (26 items), mental words (30 items), and emotion words (28 items). The scale score ranged from 0 to 100.

The syntax section (18 items). This scale consists of two parts. Language complexity (10 items) measured how complex or elaborated the child's current language was. Grammar (8 items) assessed the child's use of particular constructions such as past tense, modifiers and use of connecting words. The scale score ranged from 0 to 36.

Metalinguistic awareness (7 items). This section assessed metalinguistic skills such as phonological awareness, orthographic awareness and understanding the existence of other languages. The scale score ranged from 0 to 7.

Pronounciation (1 item). The parent was asked to indicate whether their child sounds *a little younger*, *same age* or a *little more advanced* than other same-aged children.

Analyses

Dimensionality of the developed scales was investigated by a principal component analysis (PCA) with no rotation. A single component that accounts for a large proportion of the variance is the desired psychometric property of a scale (e.g. DeVellis, 2012). Internal consistency of scales was investigated by Cohen's coefficient α (Cronbach, 1951) and α > .65 was considered adequate. Finally, substantial progression with age was expected in all scales. Norms and different percentile levels in figures for each scale are based on fitted values. Different models for curve estimations were investigated. In contrast to younger children for whom a logistic model has commonly been used, a linear model provided as good or better fit for the children in the present age span than any alternative. Scores were therefore fitted by means of a linear model.

Age group (in months) and gender were first included as factors in three separate ANOVAs, one for each scale. No tendency to interaction between age group and gender was found in any of these analyses. The effects of age groups and other demographic variables were therefore analysed by separate regression analyses, allowing age to be measured in days. ANOVAs and *t* tests were used in follow-up analyses of group differences. As the sample was large, an α-level of .01 was adopted.

Results

The results are reported section by section. Scale properties are first reported for the scales followed by associations to age which also are described by percentile levels and depicted in figures. Associations to gender, birth order and SES are then analysed and group differences of significant associations are followed up. Finally, the correlations between scales are analysed.

Level of communication

All parents reported that their children had started to talk, but three parents reported that they could not understand their child. These three children were all girls and aged 3 years 1 month, 3 years 11 months, and 4 years 0 months, respectively. As no more items applied to these three children, they are recorded as missing values in the following analyses. There was a large ceiling effect at the other end with 13% of the children reported to talk in *fairly complete sentences* and 81% were reported to talk in *long and complicated sentences*.

Vocabulary

An initial PCA yielded 13 components with an eigenvalue over 1.00 although only three had an eigenvalue over 2.00 (which is to say that only three components explained more than 2% of the variance in this case with 100 item). In total, 89 words loaded highest in the first component, 8 words loaded highest in the second component, and 3 words loaded highest in the third component. Most of the words that loaded highest in the second and third component had loadings of similar magnitude in the first component. Thus, the first component dominated greatly. It accounted for 26.8% of the variance while the second component accounted for additional 9.2% of the variance and the third accounted for 3.0% of the variance. Strict unidimensionality was thus not attained, but this is rare for scales including this many items. Internal consistency as determined by Cronbach's alpha was .97.

Table 3. Impact of demographic variables on measures in SCDI-III.

Variable	*B*	*SE B*	*β*	adjR^2	*N*
Vocabulary					
Age	.055	.003	.491	.241**	1127
Gender	5.866	1.067	.162	.026**	1117
SES	.486	.445	.033	< .001	1123
Birth order	−.887	1.091	−.024	< .001	1103
Syntax					
Age	.026	.002	.452	.203**	1054
Gender	2.419	.561	.132	.017**	1044
SES	.057	.233	.008	.001	1050
Birth order	.250	.570	.014	−.001	1030
Metalinguistic awareness					
Age	.006	<.001	.497	.247**	1104
Gender	.671	.113	.176	.030**	1094
SES	.151	.047	.096	.008**	1100
Birth order	−.366	.116	−.096	.008**	1104

**$p < .01$.

Separate regression analyses showed that age (in days) accounted for 24.1% of the variance (Table 3). Median number of used words at age 2 years 6 months was 51 and it grew slowly up to a mean of 80 words at age 4 years 0 months. There were no floor or ceiling effects and the slopes for different percentiles over age were about the same. See Figure 1 for growth curves and Appendices 2 A–C for norms. Gender accounted for 2.6% of the variance. A *t* test showed that girls, $M = 67.89$, $SD = 16.66$, had larger vocabularies than boys, $M = 62.03$, $SD = 19.99$, $t(1,078) = 5.48$, $p < .01$. SES and birth order were not associated to the children's vocabulary size.

Syntax

A PCA analysis on the 18 items in the syntax scale extracted two components. All items loaded highest in the first component that had an eigenvalue of 8.3 and explained 46.1% of the variance. Thus, the first dimension dominated greatly. The second component had an eigenvalue of 1.6 and explained additionally 8.7% of the variance. The internal consistency as determined by Cronbach alpha was .93.

Simple regression analysis showed that age (in days) accounted for 20.3% of the variance (Table 3). Median score at age 2 years 6 months was 18 and it advanced to 31 at age 4 years 0 months. Children in the 90th percentile hit the ceiling at age 3 years 9 months. The slope for the 25th percentiles over age was slightly steeper than for the other percentiles whereas the slope for the 90th percentile was somewhat flatter (Figure 2 and Appendices 2 d–f). Gender accounted for 1.7% of the variance. Girls, $M = 25.03$, $SD = 8.96$, scored higher than boys, $M = 22.61$, $SD = 9.16$, $t(1,045) = 4.32$, $p < .01$. SES and birth order were not associated to syntax.

Metalinguistic awareness

A PCA analysis on the seven items on metalinguistic awareness extracted one single factor that accounted for 37.0% of the variance.

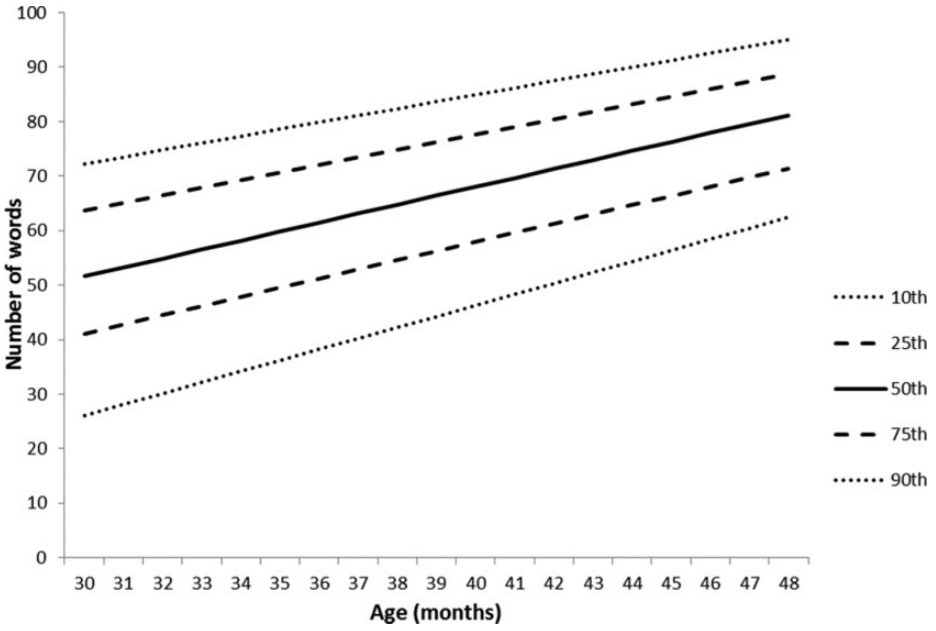

Figure 1. Vocabulary scores for five percentiles over 19 age groups. Fitted by a linear model. $N = 1128$.

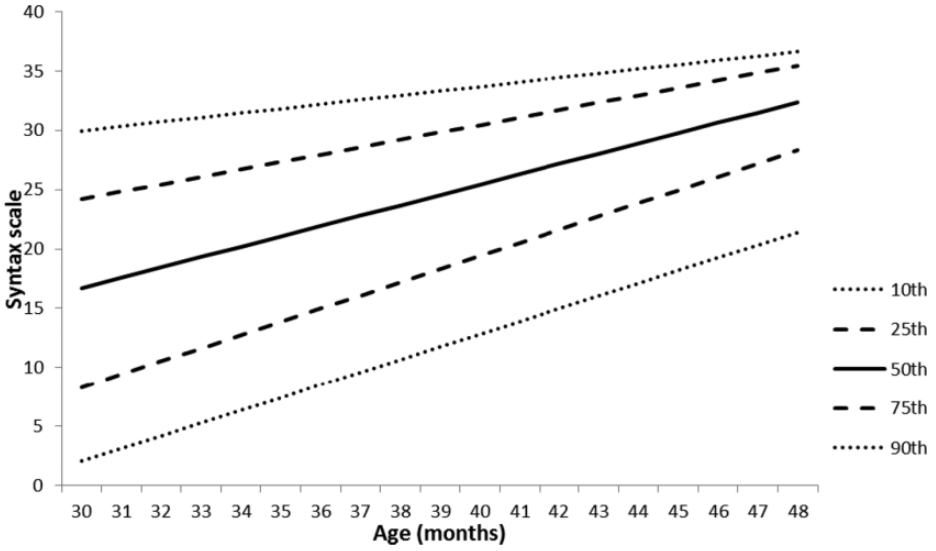

Figure 2. Syntax scores for five percentiles over 19 age groups. Fitted by a linear function. $N = 1055$.

The internal consistency was .70. Age accounted for 24.7% of the variance (Table 3). The median score for metalinguistic awareness at age 2 years 6 months was 2, and increased to 6 at age 4 years 0 months. Ceiling (7 scores) was reached for children in the 90th percentile at age 3 years 9 months when applying norms (Appendices 2 g–i) that are rounded to whole numbers, although this is not visible in Figure 3 that use decimals. The slope was steepest for children in the 25th and 50th percentiles. Gender accounted for 3.0% of the variance. Girls, $M = 4.00$, $SD = 1.87$, scored higher than boys, $M = 3.28$, $SD = 1.88$, $t(1,093) = 5.91$, $p < .01$. SES accounted for 0.8% of the variance in metalinguistic awareness, and so did birth order. A follow up ANOVA with pairwise comparisons between groups revealed a higher mean score for children of parents with the highest education, $M = 3.81$, $SD = 1.90$, $N = 220$, compared to children of parents with the lowest education, $M = 3.34$, $SD = 1.92$, $N = 607$. Firstborns, $M = 3.84$, $SD = 1.82$, scored higher than laterborns, $M = 3.49$, $SD = 1.97$, $t(1,103) = 3.05$, $p < .01$.

Pronunciation

Most parents, 49.1%, considered that their child's speech sounded like that of slightly older children. A total of 41.4% found their child to speech sounded like other same-aged children, while 9.5% found that their child sounded like slightly younger children. This asymmetry might be taken as evidence of parents systematically overestimated their own child's language skills. Previous evidence

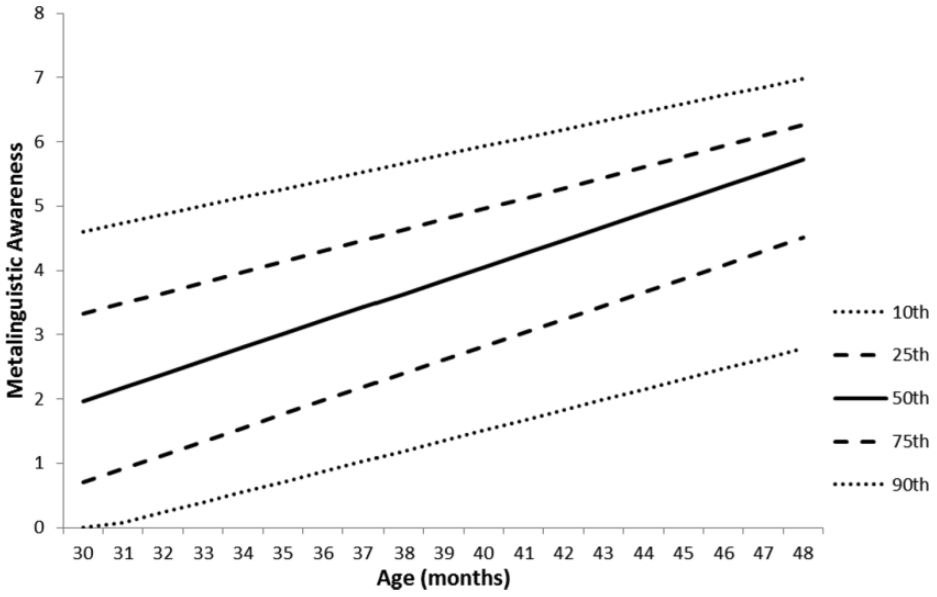

Figure 3. Metalinguistic awareness for five percentiles over 19 age groups. Fitted by a linear function. $N = 1105$.

Table 4. Correlations among vocabulary, syntax and metalinguistic awareness with and without control for age. $N = 1035–1104$.

	Vocabulary	Syntax
Syntax	.780	
Metalinguistic awareness	.548	.544
Partial correlation controlling for age		
Syntax	.718	
Metalinguistic awareness	.426	.413

$p < .01$ for all correlations.

of overestimations in parent reports on child language was found for low SES parents regarding grammar, but not for productive vocabulary (Feldman et al., 2000). However, parental overestimations are seldom reported. We suggest that parental overestimations are confined to this question on pronunciation and that it reflects a simple familiarity effect. Parents understand their own child's speech better than the speech of other children because they are used to it. Inclusion of the question might still be merited as information on children whose parents report them to sound like somewhat younger children might be valuable for a clinician forming a general view of a child's language skills.

Correlation between scales

All three scales correlated significantly with each other ($p < .01$, Table 4). The correlation between vocabulary and syntax was particularly high. Controlling for age had the largest effect on the correlations to Metalinguistic awareness. The facts that Vocabulary and Syntax display lower correlations to Metalinguistic awareness ($r = .55$ and $r = .54$, respectively) than to each other ($r = .78$), that controlling for age had a greater effect on the these variables correlations to Metalinguistic awareness (a decrease of .12−.13) than to each other (a decrease by .06, and that SES and Birth order influenced Metalinguistic awareness but not Vocabulary or Syntax (Table 3), suggests that Metalinguistic Awareness taps into a slightly different set of knowledge than Vocabulary and Syntax.

Discussion

This study has presented a revised version of the CDI-III designed for Swedish-speaking children aged 2 years 6 months–4 years 0 months. The SCDI-III measures children's vocabulary, syntax and metalinguistic awareness in three scales. Based on a norming study on more than 1,100 children, the scales had adequate psychometric properties and were strongly related to age. Internal reliability was consistently high. Content validity was ensured by the fact that all items in the instrument are thoroughly grounded in research on child language. The validity of SCDI-III was also supported by the high correlation to age, by a gender difference that is commonly found for preschool children, and by a high correlation between Vocabulary and Syntax that is similar to that found in numerous studies (e.g. Bates & Goodman, 1997; Dixon & Marchman, 2007). However, it is acknowledged that more studies on the validity of SCDI-III are needed, as is a study of test-retest reliability.

The instrument is not exhaustive in the assessed areas nor are all, or even all major areas in a child's language, covered. It does not contain any items on pragmatics because parent report instruments that include elaborated sections on this area are already developed (Bishop, 1998; O'Neill, 2007). The word *inventory* in the name of the instrument should therefore not be taken in its literal sense as it refers primarily to its affinity with the previous CDI instruments.

The main advantage of SCDI-III compared to the original CDI-III is that its application is extended almost a year and covers children up to 4 years 0 months. The revision of the vocabulary checklist to focus on words from four thematic themes rather than to include all kinds of words was important in this achievement. The scale on metalinguistic awareness is also new and links spoken language to written language. Similar changes could well be integrated in instruments designed for other languages and cultures.

Ceiling effects were a problem in previous versions of CDI-III (before the age of 3 years 0 months in Fenson et al., 2007; after age 3 years 6 months in Garcia et al., 2014). The SCDI-III is not free from all ceiling effects but the new approach taken to the vocabulary measure differentiated well between children at all ages and most percentile levels (Appendix 2). Syntax and Metalinguistic

awareness differentiated between children at all percentiles up to age 3 years 9 months after which ceiling effects occurred in the upper percentiles. Thus, there is room for some improvements of these two scales and the challenge is to add more items without impairing the dimensionality and internal consistency.

Addresses to caretakers of children in relevant ages were identified and randomly drawn from the population register. However, the response rate (18%) was rather poor and the sample was biased towards respondents of middle and high SES. To contact parents at their visits to the local Child Health Clinic (CHC) and ask for completion on the spot is another strategy that possibly would increase the representativeness of the sample.

It was found that parents preferred the paper and pencil procedure to the computer based one. Only a few parents complained about failing links or other computer-related problems. On the other hand, most parents meeting technical problems would probably just give up without letting us know. One speculation is that parents might find the paper version more convenient to complete at different times (although it was also possible to pause the computer version).

Low response rates are common in similar studies, if reported at all, and because low SES families often are underrepresented, many developmental checklists, including the MB-CDIs (Fenson et al., 2007) are normed for a middle-class sample. However, the skewness towards a middle-class sample in the present study was probably of limited importance as SES had no impact on Vocabulary, and Syntax. This is in agreement with Berglund, Eriksson, and Westerlund (2005) who reported no association of communicative skills and SES in a representative sample (collected by the CHCs) of Swedish children at 1 year 6 months. However, many other studies using the MB-CDI (e.g. Arriaga, Fenson, Cronan, & Pethick, 1998; Fenson et al., 2007) have reported that low SES is associated with low scores on productive vocabulary and indices of grammar. Fenson et al. (2007) also reported a consistent interaction between SES and age; the effect of SES is larger for older children. Thus, an effect of SES was more plausible for children aged 3–4 years than for younger children. Yet, it should be recalled that there were few parents with really low education in the present study and effects of SES found in studies from other cultures might depend on a higher proportion with genuinely low education. The impact of SES varies among societies and conclusions across societies should always be made with caution. Some societies, like Sweden, may have a narrower range of class differences compared with, for example, the United States or the United Kingdom. Moreover, the high attendance to publicly financed preschools is likely to moderate differences due to home environment. However, SES had a significant effect on Metalinguistic Awareness in the present study. The effect was small (0.8%) but it is likely that these skills are stimulated by book-reading and other activities in the home that might be associated to SES. Further research on this relation is needed. Metalinguistic awareness was also the only scale that was sensitive to birth-order (firstborns scoring slightly higher than laterborns). Girls performed slightly higher than boys in all three subscales of SCDI-III (1%–3%). This effect is commonly found and seems to be robust across different societies (Eriksson et al., 2012).

SCDI-III have many areas of application such as in research on the relation between different language skills, comparisons between language and other cognitive skills, in studies of bilingual and multilingual development, in identifying important external factors for children's development of language. It has also a potential to predict later language skills including reading and writing, although this remains to be proven. It can be used to give a quick overview of a child's language skills relative age-based norms. This is particularly valuable in countries like Sweden where age-based norms are rare.

Funding

The author(s) declared receipt of the following financial support for the research, authorship, and/or publication of this article: This research was funded by a grant from the Kempe-Carlgenska foundation, Stockholm, Sweden.

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