The validity of a parent report instrument

Article *in* Journal of Child Language · July 1989

DOI: 10.1017/S0305000900010394 · Source: PubMed

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J. Child Lang. **16** (1989), 239–249. Printed in Great Britain

The validity of a parent report instrument of child language at twenty months*

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(*Received* 3 *November* 1987. *Revised* 7 *June* 1988)

ABSTRACT

When carefully assessed and analysed, parent report can provide a valuable overall evaluation of children's language at 20 months. Norming information and validity coefficients are presented here for a vocabulary checklist assessment included in the Early Language Inventory. Normative data are provided for fullterm, preterm, and precocious samples, including selected vocabulatory subsets that are indicative of early language learning style. The vocabulary checklist has substantial validity as indexed by correlations with the Bayley Scales of Infant Development and particularly with a language subscale derived from that test.

INTRODUCTION

The systematic, empirical study of child language began in the late eighteenth and early nineteenth centuries, with the parental diary studies of Tiedemann, Taine, Darwin and others (see Bar-Adon & Leopold (1971) for an overview

[*] The data forming the basis of the analyses of this paper were collected in projects supported by grants from the New England and Seattle Nodes of the John B. and Catherine T. MacArthur Foundation Network on the Transition from Infancy to Childhood, and from the National Institute of Mental Health. We are grateful to Kathryn Barnard, Principal Investigator of NIMH grant MH 36894, 'Clinical Nursing Model for Infants and Their Families', for making the Early Language Inventory data for the Seattle Preterm, Fullterm, and Social Risk samples available for this project; and to Donna Thal for her helpful comments on the paper. Address for correspondence: Philip S. Dale, Department of Psychology, University of Washington NI-25, Seattle, WA 98195, USA.

and numerous selections). Since these early studies there has been a methodological tension between the use of parent report in various forms and the systematic observation of child language by trained observers under more or less structured circumstances. It has been nearly universally recognized that parents have far more experience than other observers and hence can produce a more comprehensive estimate of child language; however, lack of specialized training and a natural pride can produce substantial bias. Studies of comprehension, and of specific structural and contextual factors that may influence language performance, are especially likely to require more structured assessments. Nevertheless, parental report has continued to be a major methodology for child language research to the present day. It is particularly valuable for research that attempts a comprehensive estimate of a selected aspect of language (Nelson 1973), focuses on relatively rare occurrences (Bowerman 1985), or requires extensive contextual information (Gopnik & Meltzoff 1986).

Parent report may also be valuable as the basis for a rapid overall evaluation of child language, either for screening purposes in clinical or educational settings, or in research studies investigating correlates of language development. The collection, transcription, and analysis of even a modest language sample, say 100 utterances, is a very substantial undertaking, and often not possible for research studies with large numbers of children. Here the advantages of parent report may outweigh the disadvantages.

Two parent report instruments have been under development over the past decade by Bates and her colleagues; one focused on language at 1;1, and a second focused on language at 1;8 (Snyder, Bates & Bretherton 1981, Bretherton, McNew, Snyder & Bates 1983, Bates, Bretherton & Snyder 1988). The construction of both instruments has been governed by the following considerations, which we propose as general conditions for the effective use of parent report, either interview or questionnaire.

(1) *Assess current behaviours only.* Parents should only be asked about behaviours that have occurred in the very recent past; retrospective reports are likely to be much less reliable.

(2) *Focus on new behaviours.* The interview/questionnaire should focus on newly emerging skills that occur with enough frequency to be noticed, but are still within the limits of a casual, albeit intimate, observer. Thus mothers can evaluate comprehension vocabulary at 1;0 and productive vocabulary during the second year of life, but both tasks would be beyond the ability of mothers of children a year or so older.

(3) *Recognition format.* Recognition memory appears to be more useful than recall memory. Thus, rather than asking 'What animal words does your child know?', it is better to present a list of animal words common in early vocabularies and ask if any have shown up yet.

(4) *Probe for examples.* More valid information can be obtained if the interviewer probes for anecdotal information about the way particular words are used.

(5) *Awareness of the efficiency/validity trade-off.* Short forms of interviews, and questionnaires, can be useful, but concurrent and predictive validity decreases when they are used, and they must be evaluated relative to specific uses.

Bates *et al.* (1988) report a longitudinal study of 27 children between 0;10 and 2;4, which included a parent report of vocabulary at 1;8, based on a 404-item checklist. At both 1;8 and 2;4, a 2–3 hour language sample was recorded at home and in the laboratory. At 1;8, the parent report of vocabulary was correlated with the total number of distinct words in the language sample at $r = +0{\cdot}83$. Reported vocabulary at 1;8 had substantial predictive validity as well, correlating +0·83 with MLU and +0·51 with Peabody Picture Vocabulary Test scores at 2;4. In addition, parental report of vocabulary in selected subcategories, such as open class and closed class words, had substantial concurrent and predictive validity for the identification of distinct language learning strategies, as confirmed by a variety of other measures. (See Bates *et al.* for details, as well as information on the concurrent and predictive validity of parent report measures of comprehension and production at 1;1.) The few differences observed in the composition of early vocabularies as assessed by these two methods, such as a higher proportion of function words in the language samples, were consistent with the view that 'parental report is more likely to reflect what the child KNOWS, whereas free speech reflects those forms that she is more likely to USE' (Bates *et al.* 1988: 57).

Following the research reported in Bates *et al.* (1988), an expanded parent report form, termed the 'Early Language Inventory (1984 version)' was developed. Based on a review of literature on children's vocabulary, and on the language observed in the above-mentioned study, the vocabulary checklist was enlarged to include 644 words in 19 semantic categories. This list constitutes Part I of the Early Language Inventory; Part II (not discussed here) contains questions concerning early sentences and language use. The present paper represents a pooling of data from several studies that have used this instrument, in order to provide norming and validation information.

METHOD

This report is based on data drawn from three research projects, one project providing three samples, the other two, one sample each. Table 1 provides an overview of the samples; more detailed information follows. The three fullterm samples were also combined to form a larger and more diverse sample.

TABLE 1. *Description of samples*

Sample	N	Boys	Girls	*M* SES[a]
New England	64	34	30	55·3
Seattle Fullterm	32	16	16	52·1
Seattle Social Risk	65	30	35	24·8
Combined Fullterm	161	80	81	42·4
Seattle Preterm	21	12	9	41·8
Seattle Precocious	44	18	26	n.a.

[a] Based on Hollingshead (1975).

New England sample

The New England sample comprised 100 infants participating in a study of individual differences. The sample was recruited through a mailing to parents of children born in Boston area hospitals. Somewhat predictably, the sample consisted predominantly of first-born (66%), Caucasian (97%), fullterm (91%) children of older and relatively well-educated parents. None of the children was preterm according to the 1500 grams criterion used for the preterm sample described below. All subjects were assessed at 1;2, and 91 returned to the laboratory for a second assessment at 1;8. Each parent was given a copy of the Early Language Inventory at this time, but only 61 parents returned completed forms. The 30 families who did not return the ELI did not differ from the 61 families who did on any of the demographic variables.

Seattle samples

The children included in the first three Seattle samples were participants in a longitudinal study of cognitive and social development during the second year of life. Mothers completed the Early Language Inventory during laboratory visit at 1;8.

Fullterm sample. Names of fullterm infants were obtained from birth announcements in local newspapers. A telephone interviewer solicited participation in the study and verified that the infants were fullterm and healthy. Approximately 35% of the families contacted expressed interest, and 60% of these ($n = 32$) agreed to participate.

High social risk sample. High social risk subjects were recruited during the middle trimester of pregnancy through public health clinics in King County, Washington. Mothers were considered at high social risk if they lacked social support and were young, or poor, or had a low level of education. Alternative qualifying criteria included a history of alcohol or drug abuse, previous child maltreatment, or significant, diagnosed mental health problems. The mothers

were primarily Caucasian, lower-middle-class women who had not completed high school, were without partners, and were supported by public assistance. The infants were primarily fullterm; although six (5·1 %) were premature, none was below the 1500 g cut-off used for the preterm sample described below. For this high social risk sample, child assessments followed a home-based prevention programme conducted through pregnancy and the infant's first year. Of the original 147 mothers recruited during pregnancy, 78 were seen with their children at 1;8. Comparisons of women who dropped out and those who remained indicated that the groups did not differ on any of the intake variables. Early Language Inventory data are available for 65 of the children seen at 1;8.

Preterm sample. The 21 preterm infants were drawn from a sample of very low birthweight (< 1500 g) infants born during 1983 and 1984. All study families lived within 90 miles of University Hospital, Seattle, Washington, and were contacted through the premature infant follow-up project conducted at the Child Development and Mental Retardation Center, University of Washington. Approximately 75 % of those contacted agreed to participate. Assessments occurred at 1;8 corrected age.

Seattle precocious sample

Subjects were recruited for a study of linguistic precocity through a series of articles and advertisements placed in local newspapers and diaper service newsletters. Parents contacted the project at various child ages; when the children were 1;6 the parents were sent a copy of the Early Language Inventory. Approximately 80 parents returned this form. On the basis of information provided on this form, 49 children were invited to participate in a laboratory and home assessment at 1;8; all agreed to participate. Generally a vocabulary total of 200 or over (1;6 mean vocabulary was 319), or other remarkable language facility, such as convincing evidence for three-word sentences, was taken as sufficient. The assessment at 1;8 included completion of the vocabulary measure a second time. For 44 subjects, this measure was completed within two weeks of the actual 1;8 birthdate; these subjects comprised the sample for the present analysis. The group included 18 males and 26 females. The sample was predominantly Caucasian (89 %) and first-born (71 %) with moderately high parental education (median = bachelor's degree) and income.

Measures

Early Language Inventory. The results reported here are based on Part I: Vocabulary Checklist of the 1984 version of this Inventory, which contains 644 words arranged in 19 categories. The following summary variables were computed for each subject.

TABLE 2. *Distribution of total vocabulary size at 1;8 for selected samples*

Sample	Percentiles					*M*	S.D.
	10	25	50	75	90		
New England	33	69	146	302	415	197·5	157·8
Seattle Fullterm	42	82	162	195	256	155·0	86·5
Seattle Social Risk	22	66	130	203	293	146·6	105·6
Combined Fullterm	32	71	143	220	378	168·5	127·6
Seattle Preterm	0	62	105	203	227	125·9	85·7
Seattle Precocious	246	379	421	488	539	427·3	97·9

Nouns: Animals, Vehicles, Food and drink, Clothing, Body parts, Toys, Small household items, Furniture and rooms, Outside things, Places to go, and People.

Verbs: Actions, Activities, Games and verbs (a single category).

Adjectives: Qualities and attributes (a single category).

Open class words: Nouns, Verbs, and Adjectives.

Closed class words: Question words, Prepositions and articles, Quantifiers, and Auxillaries.

Bayley Scales of Infant Development (Bayley 1969). In addition to the overall Mental Development Index (MDI), three subscores were computed for each subject.

Receptive language: Items 89, 90, 100, 107, 109, 117, 126, 128, 132, 139, 144, 148, 152, 158, 162, 163

Expressive language: Items 106, 113, 124, 127, 130, 136, 138, 141, 146, 149

Total language: Sum of Receptive and Expressive language.

RESULTS AND DISCUSSION

Total vocabulary size for various samples

Table 2 summarizes the distribution of total vocabulary size for the various samples, as well as a combined fullterm sample, including the New England, Seattle Fullterm, and Seattle Social Risk groups. A one-way analysis of variance comparing the means for the Seattle Preterm, Combined Fullterm, and Seattle Precocious samples produced a significant main effect ($F = 88{\cdot}0$; d.f. = 2,223; $p < 0{\cdot}001$). Duncan's multiple-range tests revealed that the mean for the Seattle Precocious sample was significantly higher than the means for the other two groups. Note also that the combined Fullterm mean of 168·5 is substantially higher than the mean of 142 obtained by Bates *et al.*

TABLE 3. *Distribution of frequencies and proportions of lexical categories for selected samples*

Sample/category	Percentiles					*M*	S.D.
	10	25	50	75	90		
Combined Fullterm							
Open class							
freq.	28	65	133	203	346	155·3	115·8
prop.	87	90	93	96	97	926	048
Closed class							
freq.	0	2	5	10	18	8·1	9·1
prop.	00	03	04	06	08	045	031
Nouns							
freq.	22	46	97	156	223	108·6	76·7
prop.	54	60	65	72	79	659	009
Verbs							
freq.	4	12	24	43	76	33·3	28·6
prop.	12	15	19	23	26	194	069
Seattle Preterm							
Open class							
freq.	0	60	98	192	214	117·6	80·1
prop.	00	89	93	95	98	846	283
Closed class							
freq.	0	1	4	8	11	5·5	4·4
prop.	00	02	04	06	08	041	028
Nouns							
freq.	0	46	72	139	151	85·1	57·8
prop.	00	58	68	73	73	613	214
Verbs							
freq.	0	8	18	35	45	22·8	16·8
prop.	00	12	17	19	22	156	066
Seattle Precocious							
Open class							
freq.	233	349	393	437	471	387·7	81·8
prop.	87	89	91	93	94	912	040
Closed class							
freq.	12	15	23	31	38	26·3	15·3
prop.	03	05	06	07	08	061	038
Nouns							
freq.	186	242	265	281	313	258·5	48·9
prop.	53	58	60	63	66	614	064
Verbs							
freq.	53	77	90	103	117	88·9	23·5
prop.	18	20	21	22	23	206	022

(1988). The Bates *et al.* mean represents 35·1 % of the original 404-item checklist; the present Combined Fullterm mean represents 26·2 % of the 644-item revision. The difference between these two percentages suggests that the higher mean in the present study is not simply due to parents having a longer list of items to check. Rather, it appears that the longer list captures

TABLE 4. *Vocabulary totals and open and closed class proportions for boys and girls*

Sample measure	Boys	Girls	Significance
Combined Fullterm			
Vocabulary total	136·5	200·1	$p < 0{\cdot}001$
Prop. open class	930	921	n.s.
Prop. closed class	043	047	n.s.
Seattle Preterm			
Vocabulary total	113·9	141·9	n.s.
Prop. open class	860	827	n.s.
Prop. closed class	043	039	n.s.
Seattle Precocious			
Vocabulary total	440·7	418·0	n.s.
Prop. open class	911	912	n.s.
Prop. closed class	065	059	n.s.

a higher proportion of the children's actual vocabulary by including lower-frequency words.

Subcategories of vocabulary

Table 3 summarizes the distribution of the frequencies and proportions of several important subcategories of words for the three major samples. Analyses of variance performed on the proportions produced a significant main effect in each case. Duncan's multiple-range tests revealed that for open class words and for verbs, the means for the Combined Fullterm and Seattle Precocious samples were higher than for the Seattle Preterm sample. For closed class words, the mean for the Seattle Precocious sample was higher than that for the Combined Fullterm and Seattle Preterm samples. For the proportion of nouns, no two group means were significantly different.

Correlations with subject variables

SES. For the Combined Fullterm sample, total vocabulary and Hollingshead Index were significantly, but weakly, correlated: $r = 0{\cdot}17$ ($p < 0{\cdot}05$).

Sex. Table 4 summarizes the mean vocabulary total and proportions of open and closed class words for boys and girls, and the results of *t*-tests comparing them. For the Combined Fullterm sample, the total vocabulary mean is significantly higher for girls than for boys; a similar but non-significant trend is observed in the smaller Seattle Preterm sample. However, in the Seattle Precocious sample the trend is in the opposite direction, though non-significant. The Precocious sample is the result of parent nomination, and the

TABLE 5. *Selected validity correlations for parental report of vocabulary at 1;8*

Sample	Correlation with Bayley			
	MDI	Language	Exp. language	Rec. language
Seattle Fullterm (tested at 24 months)	0·47[b]	0·59[b]	0·54[b]	0·59[b]
Seattle Social Risk (tested at 24 months)	0·39[b]	0·48[b]	0·43[b]	0·41[b]
Seattle Preterm (tested at 24 months)	0·25	0·33	0·48[a]	0·13
Seattle Precocious (tested at 20 months)	0·55[b]	0·63[b]	0·63[b]	0·50[b]

[a] $p < 0.05$.
[b] $p < 0.01$.

results may reflect a parental bias or expectation concerning possible sex differences. For example, linguistic precocity may be less expected among boys, and therefore a higher degree of advancement may be necessary for identification by parents. However, this question cannot be settled on the basis of the present data. No significant differences among groups were obtained on vocabulary subcategories.

Validity of the vocabulary measure

For four of the samples, the Bayley Scales of Infant Development were administered, either at 1;8 or at 2;0, and language subscores were computed, along with the total Mental Development Index. Table 5 reports the correlations between total vocabulary at 1;8 and these validation measures. Except for the Seattle Preterm sample, the smallest of the four, the correlations are consistently significant, even when there is a four-month interval between the parent report and the standardized test. In addition, the correlations with the language subscore are consistently higher than those for the full test, and in three of the four cases, higher for the expressive items of the Bayley than the receptive items.

Several group differences are also relevant as validation of parental report of vocabulary. The mean Bayley MDI scores for the Seattle Preterm, Fullterm (Seattle Fullterm and Social Risk), and Seattle Precocious groups were 96·0, 110·1, and 135·0, respectively; an order identical to that for total vocabulary. An analysis of variance and Duncan's multiple-range tests determined that all of the differences in MDI were significant. Similarly, for the Seattle Precocious sample, largely selected on the basis of parental report of vocabulary, the mean Peabody Picture Vocabulary Test-Revised age equivalent at 2;0 chronological age was 3;0.

CONCLUSION

The results reported above, based on five independent samples, demonstrate the usefulness of this parent report measure of language at 1;8.[1] Of particular interest is the low relationship between vocabulary and SES, suggesting the usefulness of this measure across a wide range of social class. Even literacy on the part of the parent is not essential, as the list can be read to the parent. For clinicians, the checklist and total vocabulary score can serve as a valuable component of a screening battery for delayed language. For researchers, the measure provides a simple method of equating children for overall language development in experimental and quasi-experimental designs. It is also a useful brief measure for research investigating environmental or cognitive correlates of language development.

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[1] A comprehensive set of Communication Development Inventories (CDI) for children between 0;8 and 3;0 is now available from the Center for Research on Language, University of California, San Diego. The CDI includes a slightly modified version of the instrument reported here, now called 'Words and Sentences'. This instrument is designed for children between 1;5 and 2;0. The CDI includes three additional instruments:

Early Communication: an assessment of first attempts to communicate with gestures and sound between 0;8 and 1;0.

Language and Gesture: an assessment of the first words and gestures produced and comprehended by infants between 0;9 and 1;6.

Grammatical Development: an assessment of inflectional morphology, designed for children between 1;11 and 3;0.

In addition, abbreviated forms of the vocabulary checklist discussed in this report have been developed, and norming and reliability information for these 'CDI Words Short-Form' measures are presented in Reznick & Goldsmith (1989). Interested persons should contact Donna J. Thal, Center for Research on Language, University of California, San Diego, La Jolla, CA 92093.

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