Reference Data for the LARSP Profile Chart for 2- and 3-year-old Children

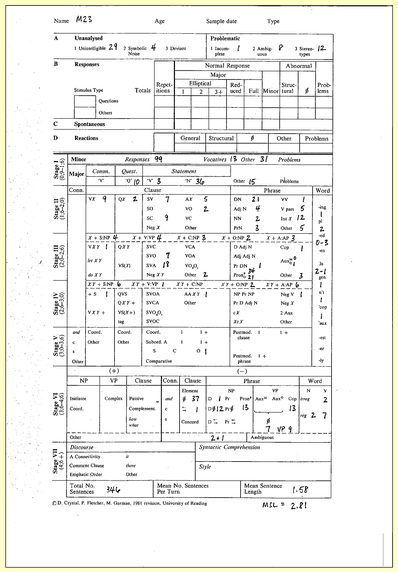
Thomas Klee, *University of Canterbury, Christchurch, New Zealand*
William J Gavin, *Colorado State University, Fort Collins, USA*

Introduction

The *Language Assessment, Remediation and Screening Procedure* (LARSP)[1-3] was one of the first linguistically-principled assessment procedures and one of the first clinical procedures aimed at analysing a child's expressive language within a conversational context. LARSP is grounded in the descriptive framework of an adult reference grammar[4] and each utterance in the language sample is analyzed at the clause, phrase and word levels of description.

Utterance	he *is wash/ing the doggie.
Clause	S V Od
Phrase	Pron-P Lex D N
Word	-ing
Expansion	XY+O
Errors	Aux ø

The profile chart summarizes the frequency of occurrence of each grammatical construction in the language sample and presents the data within the framework of seven hypothetical developmental stages.



Advantages of the original LARSP procedure

- Gives snapshot of grammatical structures present in language sample
- Provides profile of grammatical strengths and weaknesses
- Informs diagnosis and intervention
- Complements formal testing

Disadvantages

- Normative data unavailable to aid interpretation
- Can't readily distinguish lack of knowledge from non-occurrence

Motivation for the present study

- Need for empirical data based on standardized sampling context

Purpose

1. To provide quantitative data for the LARSP profile chart (means, standard deviations, 95% confidence intervals) for English-speaking 2- and 3-year old children, based on a standardized sampling context
2. To determine the percentage of children in each age group showing evidence of each grammatical construction
3. To explore whether data from the profile chart can be used to produce a summary language score associated with age

Method

Participants

- N = 152 (50% boys)
- Age range: 24 to 47 months
- 50% from UK, 50% from USA
- Standardized language test (RDLS-3, RDLS-US or SICD-R) and audiological screen administered. Children *not* excluded on the basis of language ability.
- Further information regarding the sample previously published[7]

Procedures

- 20-minute mother-child language samples
- Free-play interaction with standard set of toys in lab or clinic
- Transcription done in SALT format[5]; grammatical coding done with TAS[6] based on standard LARSP procedure[1-3]
- Transcription and coding done blindly with respect to children's age, sex and language test outcome
- Inter-observer point-to-point coding agreement calculated
  - Clause level coding: 91%
  - Phrase level coding: 94%
  - Word level, Stage VI-VII, error coding: 96% each

Statistical analyses

1. For the first analysis (see Purpose section above), each child's raw frequencies were converted to proportions by dividing the frequency of occurrence of each construction by the total number of complete and intelligible (C&I) utterances in the 20-minute language sample. Means, standard deviations and 95% confidence intervals were then calculated for each construction in each age group, with a subset of constructions presented in Results section 1.
2. For the second analysis, the percentage of children producing 2 or more instances of each construction per 100 C&I utterances was calculated and summarized for each age group, with a subset of constructions presented in Results section 2.
3. For the third analysis, multiple regression analyses were conducted to determine whether chronological age could be predicted accurately by the frequency of occurrence of selected grammatical categories observed across the language samples. Categories were chosen as predictor variables when 70% of the children in a given age group produced at least 2 instances per 100 C&I utterances over two consecutive age groups. Sex and nationality were also entered as predictors to control for possible sampling bias, with a scatterplot and regression line presented in Results section 3.

Results

Children produced a mean of 164.1 C&I utterances (SD = 49.8) during the 20-minute language samples.

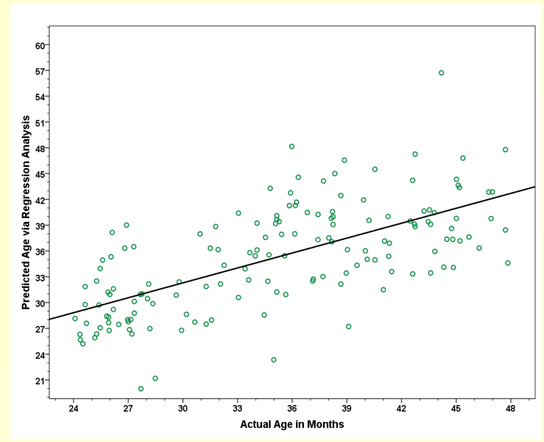
1. *Mean frequency of constructions, with SD and 95% confidence interval, per 100 'major' utterances (subset of data shown).*

	Age (Months)							
	24 - 26 (n = 28)	27 - 29 (n = 18)	30 - 32 (n = 11)	33 - 35 (n = 25)	36 - 38 (n = 22)	39 - 41 (n = 15)	42 - 44 (n = 19)	45 - 47 (n = 14)
Clause level								
SVO	7.04 (6.37) [4.55 – 9.52]	7.04 (5.26) [4.42 – 9.65]	11.87 (5.15) [8.41 – 15.33]	9.72 (4.24) [7.97 – 11.47]	13.08 (6.43) [10.23 – 15.93]	11.79 (4.92) [9.07 – 14.52]	12.83 (4.89) [10.47 – 15.19]	11.84 (2.63) [10.32 – 13.36]
SV	3.32 (2.36) [2.40 – 4.23]	3.91 (2.60) [2.62 – 5.20]	6.84 (4.58) [3.77 – 9.92]	7.01 (3.70) [5.49 – 8.54]	9.64 (6.03) [6.96 – 12.31]	8.39 (5.09) [5.57 – 11.20]	7.34 (3.83) [5.49 – 9.18]	9.21 (4.22) [6.77 – 11.65]
SVOA	1.24 (1.70) [0.58 – 1.90]	1.67 (3.27) [0.04 – 3.29]	1.54 (3.13) [-0.56 – 3.65]	2.94 (2.10) [2.08 – 3.81]	4.23 (2.98) [2.89 – 5.53]	4.48 (3.18) [2.72 – 6.24]	4.22 (2.51) [3.01 – 5.43]	4.96 (2.38) [3.58 – 6.33]
Subordination	0.74 (1.80) [0.04 – 1.44]	0.56 (0.80) [0.16 – 0.95]	1.53 (2.14) [0.09 – 2.96]	2.58 (2.78) [1.44 – 3.73]	4.01 (2.23) [3.02 – 5.00]	4.47 (3.86) [2.33 – 6.61]	4.73 (3.64) [2.97 – 6.48]	4.79 (2.31) [3.46 – 6.13]
Coordination	0.09 (0.25) [-0.01 – 0.18]	0.03 (0.12) [-0.03 – 0.09]	0.74 (1.86) [-0.51 – 2.00]	0.34 (0.54) [0.12 – 0.56]	1.20 (1.75) [0.42 – 1.98]	1.02 (0.92) [0.51 – 1.53]	1.22 (1.29) [0.60 – 1.84]	2.01 (2.16) [0.77 – 3.33]
QVS	4.68 (7.83) [1.64 – 7.71]	3.47 (6.57) [0.20 – 6.73]	3.16 (3.41) [0.87 – 5.45]	5.10 (4.70) [3.16 – 7.05]	6.15 (6.64) [3.20 – 9.10]	3.54 (2.24) [2.30 – 4.78]	4.26 (4.54) [2.07 – 6.44]	4.78 (3.56) [2.72 – 6.84]
VS(X)	0.73 (1.12) [0.29 – 1.16]	0.62 (0.90) [0.17 – 1.06]	1.07 (2.27) [-0.45 – 2.60]	2.34 (2.72) [1.22 – 3.46]	2.55 (2.63) [1.38 – 3.72]	2.10 (2.07) [0.96 – 3.24]	3.01 (2.75) [1.69 – 4.33]	2.94 (2.61) [1.43 – 4.44]
Phrase level								
DN	17.21 (12.79) [12.25 – 22.18]	16.77 (9.15) [12.22 – 21.32]	25.58 (12.13) [17.44 -33.73]	27.06 (6.92) [24.20 – 29.91]	26.34 (7.86) [22.86 – 29.83]	24.81 (8.08) [20.34 – 29.29]	23.23 (7.42) [19.65 – 26.81]	23.90 (7.24) [19.72 – 28.08]
Pr DN	1.96 (3.52) [0.60 – 3.33]	4.18 (4.92) [1.74 – 6.63]	5.36 (3.63) [2.92 – 7.79]	4.90 (4.13) [3.19 – 6.60]	7.06 (5.67) [4.55 – 9.58]	6.49 (2.79) [4.94 – 8.03]	7.52 (4.64) [5.28 – 9.75]	7.90 (4.41) [5.35 – 10.45]
Pr D Adj N	0	0	0.06 (0.21) [-0.08 – 0.20]	0.26 (0.50) [0.05 – 0.46]	0.23 (0.50) [0.01 – 0.45]	0.04 (0.15) [-0.05 – 0.13]	0.21 (0.47) [-0.02 – 0.44]	0.36 (0.59) [0.02 – 0.71]
Cop	12.36 (11.74) [7.81 – 16.92]	9.92 (7.31) [6.28 – 13.55]	12.97 (10.43) [5.97 – 19.99]	18.56 (8.16) [15.19 – 21.93]	19.46 (8.89) [15.52 – 23.40]	18.35 (7.53) [14.18 – 22.52]	17.87 (6.15) [14.90 – 20.83]	16.59 (6.76) [12.69 – 20.50]
Aux-O	5.05 (4.98) [3.12 – 6.99]	5.55 (6.54) [2.30 – 8.80]	9.01 (6.32) [4.76 – 13.26]	11.24 (6.96) [8.36 – 14.11]	15.08 (7.17) [11.90 – 18.26]	14.70 (7.20) [10.71 – 18.69]	16.00 (5.51) [13.34 – 18.66]	14.88 (4.32) [12.39 – 17.37]
Aux-M	1.20 (1.93) [0.45 – 1.95]	0.92 (1.42) [0.21 – 1.62]	3.16 (4.05) [0.44 -5.87]	5.50 (4.09) [3.81 – 7.19]	6.84 (3.65) [5.23 – 8.46]	5.73 (4.15) [3.44 – 8.03]	9.81 (4.82) [7.49 – 12.13]	10.40 (6.20) [6.82 – 13.98]
Neg V	2.66 (3.53) [1.29 – 4.03]	1.72 (2.16) [0.65 – 2.80]	5.56 (3.21) [3.40 – 7.71]	5.91 (3.66) [4.40 – 7.42]	7.35 (5.39) [4.96 – 9.74]	7.66 (4.47) [5.19 – 10.13]	6.77 (3.45) [5.11 – 8.43]	8.46 (4.91) [5.62 – 11.29]
Word level								
3s	15.48 (14.96) [9.68 – 21.28]	10.77 (9.10) [6.24 – 15.29]	14.87 (11.63) [7.06 – 22.69]	26.35 (10.22) [22.13 – 30.56]	25.46 (10.48) [20.82 – 30.11]	24.31 (9.82) [18.87 – 29.75]	24.53 (9.99) [19.71 – 29.35]	20.83 (7.71) [16.38 – 25.28]
-ing	2.53 (3.92) [1.01 – 4.05]	5.54 (6.39) [2.36 – 8.72]	5.39 (3.60) [2.97 – 7.81]	5.05 (3.99) [3.40 – 6.70]	5.62 (3.78) [3.95 – 7.30]	5.34 (4.01) [3.12 – 7.56]	6.76 (3.91) [4.88 – 8.65]	7.32 (4.05) [4.98 – 9.66]

2. *Percentage of children producing two or more instances of each construction per 100 'major' utterances (subset of data shown).*

	Age (Months)							
	24 - 26 (n=28)	27 - 29 (n=18)	30 - 32 (n=11)	33 - 35 (n=25)	36 - 38 (n=22)	39 - 41 (n=15)	42 - 44 (n=19)	45 - 47 (n=14)
Clause level								
SVO	75	83	100	100	100	100	100	100
SV	68	72	91	100	100	93	100	93
SVOA	36	33	18	60	73	80	84	93
Subordination	11	6	27	44	86	80	74	93
Coordination	0	0	18	0	23	20	26	43
QVS	61	44	39	76	68	67	68	79
VS(X)	14	11	9	36	45	33	58	57
Phrase level								
DN	96	100	100	100	100	100	100	100
PR DN	29	50	73	64	82	87	90	93
Pr D Adj N	0	0	0	0	0	0	0	0
Cop	71	89	91	100	100	93	100	100
Aux-O	64	56	100	96	100	100	100	100
Aux-M	25	22	36	76	91	80	95	100
Neg V	39	39	100	84	91	87	90	93
Word level								
3s	75	83	91	100	100	100	100	100
-ing	43	50	82	72	95	67	95	93
-ed	21	33	36	60	77	60	63	71
-en	32	44	54	60	41	40	53	43
pl	82	67	91	88	86	87	100	93
gen	14	6	0	4	14	0	16	7

3. *Scatterplot with regression line depicting predicted language age scores, computed as a function of 39 grammatical categories, sex and nationality of each child, as a function of actual age.*



In this attempt to develop a numerical index representing the child's overall level of grammatical development, the correlation between predicted language age scores and age was high (r = .83, R^2 = .69); however, the 95% confidence interval (8.94 months) was too large to be clinically informative.

Conclusions

The quantitative data resulting from this study of 152 British and American preschool children represent an initial attempt at establishing a reference database for the LARSP profile chart. Normative data should be of clinical use in interpreting the results of the LARSP analysis, but further research is needed to develop the clinical potential of the database, including the need to:

- Develop an 'error' profile for 'Stage VI-' of the chart;
- Extend the upper age range of the database;
- Determine the extent to which the profile can differentiate children with and without language impairment at the individual level (diagnostic accuracy).

References

1 Crystal, D., Fletcher, P., & Garman, M. (1989). *Grammatical analysis of language disability,* 2nd ed. London: Whurr.

2 Crystal, D. (1979). *Working with LARSP. New York: Elsevier.*

3 Crystal, D. (1992). *Profiling linguistic disability, 2nd ed.* San Diego, CA: Singular.

4 Quirk, R., Greenbaum, S., Leech, G., & Svartvik, J. (1972). *A grammar of contemporary English.* London: Longman.

5 Miller, J.F. & Chapman, R.S. (1981-2004). *Systematic analysis of language transcripts (SALT).* Madison: Language Analysis Laboratory, University of Wisconsin-Madison.

6 Gavin, W.J. & Klee, T. (2001). *Transcript analysis system (TAS).* Fort Collins, CO: Author.

7 Klee, T., Gavin, W.J., & Stokes, S.F. (2007). Utterance length and lexical diversity in American- and British-English speaking children: what is the evidence for a clinical marker of SLI? In R. Paul (Ed.), *Language disorders from a developmental perspective: essays in honor of Robin S. Chapman* (pp. 103-140). Mahwah, NJ: Erlbaum.

Data summaries of full database available upon request

- thomas.klee@canterbury.ac.nz
- william.gavin@colostate.edu

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