Singapore Longitudinal Early Development Study (SG LEADS)

Panel Survey Wave 1

Technical Report 11

Interviewer effect of SG LEADS

Chen Xuejiao, Weijun Jean Yeung
Centre of Family and Population Research
National University of Singapore

22 June 2020

In the wave 1 of Singapore Longitudinal EArly Development Study (SG LEADS), children aged 3 years and above participated in the Woodcock-Johnson IV Test of Achievement (WJ IV-ACH). The assessment includes four subsets: (1) Letter-Word Identification, (2) Passage Comprehension, (3) Calculation, and (4) Applied Problems. The WJ Test is administered only if the child is able to speak or understand English. Among the 2980 SG LEADS children aged 3 and above, 18 did not participate in the WJ assessment because of the language issue. Another ten children refused to take the assessment. Therefore, we end up with 2952 children for the assessment. Table 1 shows the age distribution of eligible children and participants.

Table 1. Age Distribution of the Sample

age	Children aged 3 and above	Child who took the WJ test
3	806	784
4	713	711
5	724	722
6	737	735
Total	2,980	2,952

During the fieldwork of SG LEADS, trained interviewers, who had undergone one week of training for the study, administered the WJ test in person at the child's home. The interviewers were instructed to request for a quiet area, for example, a room or a quieter corner in the house - to administer the test whenever possible. The interviewers explained the test to the parents or other adults present at home and requested no interference or assistance from adults during the test. The interviewers were instructed to spend some time building a rapport with the child first before administering the test. Then the interviewers explained to the child what the test entails and what the rules are, and a short example test was administrated to demonstrate the rules. The interviewers were instructed to start the test and record the duration of each test with the help of the CAPI system only when the child understands the rules. A colored test easel was presented to the child, and the child was asked to respond verbally to the questions and the interviewers recorded the child's answer in a response booklet. The child was allowed to skip any questions he or she does not know. Scoring was done back in the central office after the response booklet was submitted to the office to reduce scoring errors.

The number of WJ assessments completed by each interviewer is presented in Table 2. As seen, 17 out of 31 interviewers have completed more than ten assessments. In total, assessments conducted by these 17 interviewers account for 98.8% of all the assessments.

Table 2. Number of Assessment Completed by Each Interviewer in Descending Order (n=2952)

Interviewer ID	Freq.	Percent	Interviewer ID	Freq.	Percent
30	637	21.57	6	16	0.54
4	507	17.17	20	5	0.17
26	450	15.24	8	4	0.14
9	387	13.11	7	3	0.1
15	265	8.97	14	3	0.1

16	173	5.86	19	3	0.1
17	107	3.62	25	3	0.1
21	100	3.39	29	3	0.1
12	56	1.9	2	2	0.07
31	54	1.83	10	2	0.07
18	44	1.49	13	2	0.07
3	40	1.35	27	2	0.07
22	26	0.88	11	1	0.03
1	21	0.71	24	1	0.03
23	18	0.61	28	1	0.03
5	16	0.54			

The description of the duration the child spent on each test by age is presented in Table 3. As seen in Figure 1, the average duration of each subtest increases as the child ages. This is consistent with the fact that older children have relatively better development in their verbal and numeracy skills, thus answer more questions and spend more time on the test (for the developmental trend of each test by the child's age, refer to the technical report on the WJ test Singapore norming). For the full assessment, 75% of all the children spend 16.1 minutes or less (Table 4). The corresponding duration for 3- to 6- year-olds is 10.1 minutes, 13.7 minutes, 17.8 minutes, and 20.3 minutes respectively.

Table 3 Duration (in minutes) of Each Subtest by Age

Age in years	n	Mean	Min	P25	Median	P75	Max
3							
letter-word identification	749	2.7	0.0	1.1	1.9	3.3	25.6
applied problems	717	2.2	0.0	1.0	1.6	3.0	14.1
passage comprehension	732	1.9	0.0	0.9	1.5	2.6	14.1
calculation	757	1.3	0.0	0.4	0.9	1.6	22.2
4							
letter-word identification	696	3.0	0.1	1.5	2.3	3.7	24.3
applied problems	673	2.8	0.0	1.2	2.3	3.7	13.0
passage comprehension	672	2.7	0.0	1.2	2.2	3.6	19.1
calculation	692	2.2	0.0	0.6	1.4	2.7	42.9
5							
letter-word identification	708	3.4	0.0	1.6	2.8	4.2	35.0
applied problems	690	3.4	0.0	1.5	2.8	4.4	18.2
passage comprehension	690	3.4	0.0	1.5	2.7	4.6	28.4
calculation	692	3.4	0.0	1.2	2.6	4.8	18.6
6							
letter-word identification	719	3.6	0.0	2.0	3.0	4.4	31.9
applied problems	704	4.1	0.0	2.0	3.2	5.1	31.9
passage comprehension	699	4.1	0.0	2.0	3.4	5.5	24.3
calculation	702	4.4	0.0	1.8	3.6	5.9	31.0
Total							

letter-word identification	2,872	3.2	0.0	1.5	2.5	4.0	35.0
applied problems	2,784	3.1	0.0	1.3	2.4	4.1	31.9
passage comprehension	2,793	3.0	0.0	1.3	2.3	4.1	28.4
calculation	2,843	2.8	0.0	0.8	1.6	3.9	42.9

Note: P25 refers to the 25 percentile, and P75 refers to the 75 percentile.
Cases with missing values in time stamps (n=36) were excluded from the analysis. For each test, cases where the duration of the test is 0 minute while the child had at least one correct answer were excluded from the analysis of the duration shown in this table.
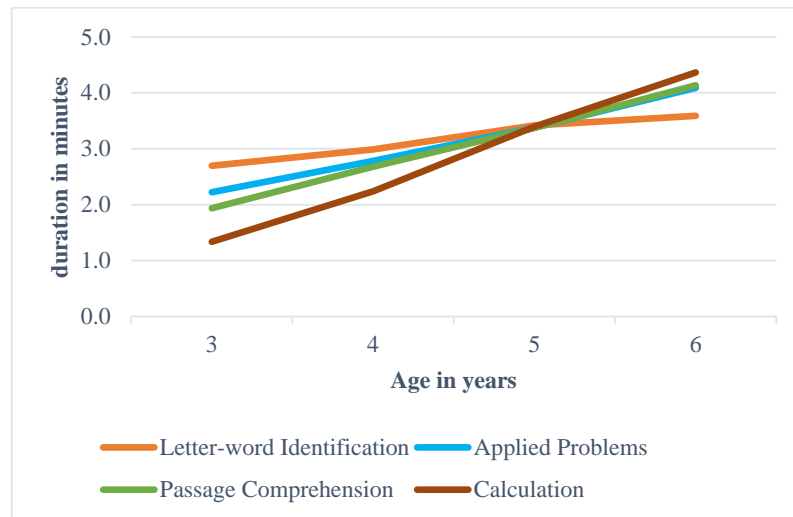

Figure1. Averaged Duration of Each Subset by Age

Table 4. Total Duration of the Whole Assessment

Age in years	n	mean	p25	Median	p75	p99
3	706	8.0	4.5	6.7	10.1	24.7
4	655	10.6	5.7	9.5	13.7	31.1
5	656	13.4	7.3	12.5	17.8	34.7
6	676	16.2	9.9	15.0	20.3	46.3
Total	2,693	12.0	6.0	10.3	16.1	36.7

Note: P25 refers to the 25 percentile, and P75 refers to the 75 percentile.
Total duration only includes cases with no missing values in time stamps of all 4 subtests.

Next, we employed the Multilevel Modelling (MLM) to examine the interviewer effect on children's achievement scores measured by Wscore generated by the WJ offline solution. The SG LEADS adopts a multi-stratified sampling strategy where the sample is nested within 34 planning areas across five planning regions in Singapore. For the MLMs, we nested the interviewers within the 34 planning areas. Two models were built to test the interviewer-level effect for each subtest: a null model without any control, and a control model with several individual level controls. The controls include the child's age in months, gender, the child's race, biological/adoptive parents' educational level and housing type (refer to appendix 1 for the MLM results).

Table 5 Intra-class Correlation (ICC) of Interviewer-level effect by Subtest

	Model 1 without controls	Model 2 with individual-level controls
Letter-Word Identification	6.5%	8.3%
Applied Problems	13.2%	15.3%
Passage Comprehension	7.6%	9.4%
Calculation	1.3%	2.5%

The intra-class correlation (ICC) of the interviewer-level effect for each subtest is presented in Table 5. As shown in model 2 in Table 5, the interviewer-level effect accounts for 8.3% of the variance observed in the Letter-Word Identification subset, 15.3% for that of the Applied Problems subset, 9.4% in the Passage Comprehension subset and 2.5% in the Calculation subset. Overall, except for the Applied Problems, the interviewer effect is less than 10% for the subsets, which suggests a satisfactory level of standardization of the SG LEADS cognitive assessment.

Appendix A. MLM on the Interviewer-level Effect for Each Subtest

	Letter-Word Identification		Applied Problems		Passage Comprehension		Calculation	
age in months		2.563***		1.651***		2.245***		1.813***
		(0.0460)		(0.0331)		(0.0469)		(0.0307)
boy		-0.0514		-0.464		-0.650		1.198
		(1.309)		(0.942)		(1.335)		(0.872)
Children's race (ref. Chinese)								
Malay		-9.280***		-9.104***		-7.901***		-6.908***
		(1.793)		(1.294)		(1.830)		(1.188)
Indian		-4.916**		-7.806***		-4.161*		-3.735**
		(2.276)		(1.640)		(2.322)		(1.515)
Others		1.066		-3.970		-6.699		-5.785**
		(4.170)		(3.007)		(4.255)		(2.772)
mother's education		1.986***		1.482***		1.824***		1.297***
		(0.455)		(0.328)		(0.464)		(0.302)
father's education		2.680***		1.230***		1.436***		0.698**
		(0.451)		(0.325)		(0.461)		(0.300)
Housing type (ref. HDB 1- and 2-room flats)								
HDB 3-room flats		7.123***		5.622***		0.252		4.044**
		(2.487)		(1.800)		(2.540)		(1.642)
HDB 4-room flats		13.48***		10.26***		5.574**		5.609***
		(2.607)		(1.891)		(2.664)		(1.715)
HDB 5-room flats		15.13***		12.51***		12.18***		5.857***
		(2.938)		(2.132)		(3.002)		(1.930)
Condos and Landed Properties		18.96***		17.20***		11.64***		10.96***
		(3.395)		(2.508)		(3.481)		(2.186)
Constant	369.6***	183.2***	411.8***	292.4***	388.9***	234.9***	399.6***	277.5***
	(1.477)	(4.159)	(1.238)	(3.044)	(1.439)	(4.254)	(0.757)	(2.726)
Observations	2,952	2,885	2,952	2,885	2,952	2,885	2,952	2,885
Number of groups (planning areas)	34	34	34	34	34	34	34	34
ICC planning area	<0.001	<<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
ICC interviewer	0.065	0.083	0.132	0.153	0.076	0.094	0.013	0.025

Standard errors in parentheses *** $p<0.01$, ** $p<0.05$, * $p<0.1$