

# **Footprints in Time**

**Who Am I?**

**and**

**Renfrew Word Finding Vocabulary Test**

**Report on Wave 2 Data**



**The Australian Council for Educational Research**

## Who Am I? and Renfrew Word Finding Vocabulary Test

Report prepared by

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for:

Footprints in Time: Longitudinal Study of Indigenous Children (LSIC)  
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### BACKGROUND

This report presents the results of administration of the *Who Am I?* and the *Renfrew Word Finding Vocabulary Test* for the LSIC Wave 2 data collection in 2009.

*Who am I?* is a developmental assessment that requires the child to write their name, copy shapes, write letters, numbers and words in a small booklet, with simple instructions and encouragement from the interviewer. *Who am I?* is not language dependent and is suitable for children with limited English. The assessment takes about 10 minutes to complete and is suitable for preschool children and children in the first two years of school.

The *Renfrew Word Finding Vocabulary Test* assesses children's expressive vocabulary (compared, for instance, with the *Peabody Picture Vocabulary Test*, which is a test of receptive vocabulary). It assesses the extent to which pictures of objects, arranged in order of difficulty, can be named correctly. Most of the objects illustrated have no alternative names, so the responses of children can be quickly measured. The assessment contains 50 line-drawn pictures and is suitable for children aged 3-9 years.

The assessments are being used as part of *Footprints in Time*, which is the name given to the *Longitudinal Study of Indigenous Children* managed by FaHCSIA.. *Footprints in Time* works with Aboriginal and Torres Strait Islander families from sites in Australia seeking their consent to participate in annual interviews to help better understand what impacts on their children's lives over time. LSIC especially explores how Aboriginal and Torres Strait Islander children can be better supported to grow up strong and resilient, regardless of location.

The study is overseen by a specially formed Steering Committee chaired by Professor Mick Dodson (Chair of Indigenous Studies, Australian National University), which has mandated that LSIC must be designed and conducted so that it has the acceptance and support of Aboriginal and Torres Strait Islander communities and of participating families.

LSIC uses a number of assessments of children's development. In the cognitive domain, *Who Am I?* and the *Renfrew Word Finding Vocabulary Test* are being used to assess processes that underlie the learning of early literacy and numeracy skills.

*Who Am I?* and the *Renfrew Word Finding Vocabulary Test* were administered to an intended sample of 4½-5½ year olds, although data were collected from some children who fell outside of this age range.

A trial to assess the usefulness of *Who Am I?* for administration to Aboriginal and Torres Strait Islander children was conducted in 2007. The instrument was found to be satisfactory, although some modifications were made to it. In particular, trial sample results suggested that it would be wise to delete some of the items (Numbers, Letters, Words, Sentence) in *Who Am I?* for the Wave 1 stage.

Retention of the copying items (Name, Circle, Cross, Square, Triangle, Diamond) was recommended and this recommendation was adopted. In Wave 2, Numbers, Letters, Words and Sentences were incorporated in administered to children.

For both Wave 1 and Wave 2 of data collection, *Who Am I?* and the *Renfrew Word Finding Vocabulary Test* were administered to children primarily by Aboriginal and Torres Strait Islander Research Administration Officers (RAOs).

*Who Am I?* was scored by one person at ACER who is experienced in marking this developmental assessment. Children's responses to the *Renfrew Word Finding Vocabulary Test* were recorded in situ in an electronic database by the RAOs. Subsequently, researchers at ACER recoded responses so that articulation errors or minor corruptions or substitutions were scored as correct.

## SAMPLE CHARACTERISTICS

Table 1 provides a breakdown of age, gender, and Level of Relative Isolation (LORI) characteristics for the Wave 2 LSIC group of children who completed the *Who Am I?* and/or the *Renfrew Word Finding Vocabulary Test*.

**Table 1 LSIC Wave 2: Numbers of children by age, gender, and region who attempted *Who Am I?* and the *Renfrew Word Finding Vocabulary Test***

	Who Am I		Renfrew	
	No.	%	No.	%
<b>Age (months)</b>				
36-41	1	0.2	4	0.7
42-44	2	0.4	2	0.3
45-47	3	0.6	6	1.0
48-51	12	2.4	16	2.7
52-54	40	7.9	45	7.7
55-57	93	18.4	102	17.4
58-60	102	20.2	113	19.3
61-69	226	44.8	263	44.8
70-72	22	4.4	28	4.8
73-79	4	0.8	8	1.4
<b>Gender</b>				
Male	263	52.1	300	51.1
Female	242	47.9	287	48.9
<b>LORI<sup>1</sup></b>				
None	130	25.7	147	25.0
Low/Moderate	308	61.0	246	59.0
High/Extreme	67	13.3	93	15.8
<b>Total</b>	<b>505</b>	<b>100</b>	<b>587</b>	<b>100</b>

<sup>1</sup> An indicator developed in the Western Australian Aboriginal Child Health Survey. The level of relative isolation (LORI) is an extension of the 18-point ARIA (Accessibility/Remoteness Index of Australia) called ARIA++. Note for the Renfrew results, there was one child with missing data on the LORI variable.

## WHO AM I?

The overall reliability (Cronbach's Alpha)<sup>2</sup> for the *Who Am I?* items was .88. This compares favourably with the reliability reported for the Longitudinal Study of Australian Children (LSAC) cohort of children aged four years in 2003/4, which was .87.

Age groupings were created to allow comparison of the LSIC Wave 2 results with results of the LSAC cohort of children aged four years in 2003/4. Comparison with the Draw Me item was not possible because this was not part of the 2003/4 LSAC test administration.

Table 2 shows descriptive statistics for the five hundred and five children who attempted the *Who Am I?*. The table shows the basic statistics for the six age groups of children that were created for the LSIC Wave 2 sample.

The maximum possible score on the *Who Am I?* is 44.

**Table 2 Basic statistics on the *Who Am I?* LSIC Wave 1**

Age (months)	Number of Children	Mean Score	Standard Deviation <sup>3</sup>	Std Error of Mean <sup>4</sup>
36-47	6	15.3	4.1	1.7
48-54	52	19.2	5.8	0.8
55-57	93	21.0	6.5	0.7
58-60	102	22.9	6.7	0.7
61-69	227	26.6	7.4	0.5
70-79	26	32.1	6.0	1.2

Table 2 demonstrates the developmental nature of the *Who Am I?* tasks – as age increased, mean score on the tasks also increased.

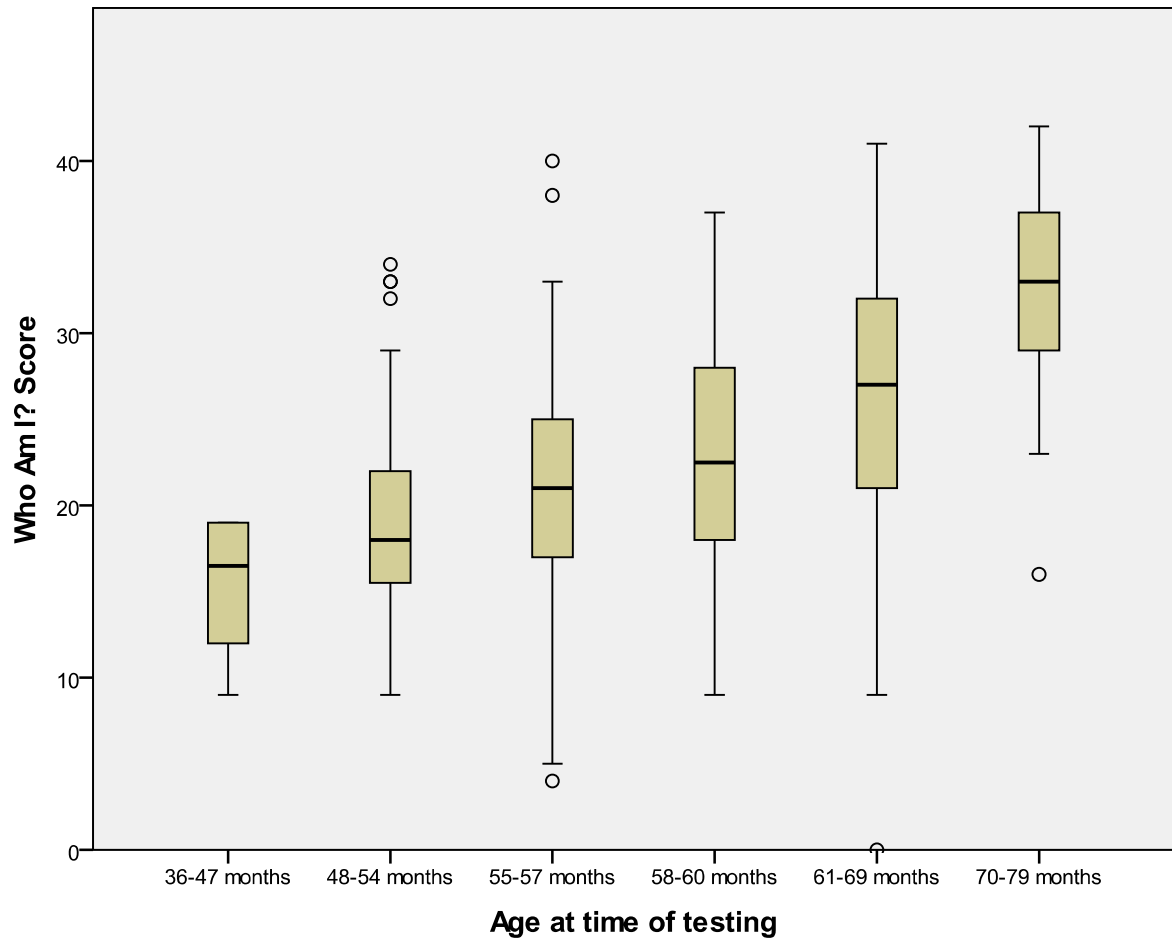
Figure 1 (box plot<sup>5</sup>) shows the spread of scores for the six age groups. Discounting outlier scores, the spread of scores was smallest for the youngest age group wherein the majority of children scored between 10 and 19. The largest spread was represented by the 55-57 months age group where the scores ranged from 4 to 38. One child had an outlier score of zero and one child scored the sample maximum of 42.

<sup>2</sup> Cronbach's Alpha is a measure of the reliability of a test, based on its internal consistency.

<sup>3</sup> The standard deviation (SD) is a measure of the distribution of the scores.

<sup>4</sup> The standard error of the mean is a measure of how far the sample mean is likely to be from the true population mean. The standard error is related to the sample size. As sample size increases, the standard error tends to decrease.

<sup>5</sup> The box plot graphically depicts groups of numerical data through five number summaries: the smallest observation (sample minimum), lower quartile, median, upper quartile, and largest observation (sample maximum). The box plot also indicates which observations might be considered outliers.



**Figure 1** Box plot of *Who Am I?* scores for six age groups, LSIC Wave 2

Table 3 shows the individual item results for the LSIC Wave 2 sample. The maximum possible score for each item was four. The four new *WAI?* items incorporated into the LSIC Wave 2 assessment – Numbers, Letters, Words and Sentence – were the four most difficult for children to complete along with the item that asked children to draw a picture of themselves. The easiest tasks, as indicated by the mean scores, required the children to draw a circle and a cross.

**Table 3** LSIC Wave 2 results on individual items in *Who Am I?*

Task	Mean Statistic	Std. Deviation	Std Error of Mean
Name	2.3	1.2	0.05
Circle	3.4	0.7	0.03
Cross	3.3	0.8	0.04
Square	3.1	0.9	0.04
Triangle	2.7	0.9	0.04
Diamond	2.2	0.9	0.04
Draw Me	1.9	0.7	0.03
Numbers	1.9	1.2	0.05
Letters	1.8	1.3	0.06
Words	1.0	1.3	0.06
Sentence	0.6	1.1	0.05

The possible range of scores for each item was 0 to 4. Table 4 provides information about the percentage of children who scored 0, 1, 2, 3, or 4 on each item. Scores in the upper range (3-4) were obtained by more than fifty percent of the children on Circle, Cross, Square and Triangle. For Name, Diamond, Numbers, Letters and Draw Me, the majority of children scored in the mid range of scores (2-3). The majority of children scored 1 or were incorrect for Sentence and Words.

**Table 4 LSIC Wave 2 frequencies (%)<sup>6</sup> of scores (0-4) for individual items in *Who Am I?***

Task	Score				
	0	1	2	3	4
Name	10	16	26	35	13
Circle	0*	2	3	48	47
Cross	1	3	6	41	48
Square	1	3	21	33	42
Triangle	1	6	36	33	24
Diamond	5	9	54	21	11
Draw Me	5	15	67	12	0*
Numbers	16	19	30	26	9
Letters	26	12	28	25	9
Words	54	14	18	10	5
Sentence	72	10	9	7	2

\*Rounded value equals zero (exact percentage = 0.4)

By way of comparison, Table 5 presents results for four groupings of children for the eleven individual items in the *Who Am I?* Table 5 shows the percentage of children who achieved the highest level (a score of 4) by 426 LSIC Wave 2 children and 4,367 children from the LSAC cohort of children who were aged four years in 2003/4. The Draw Me item is not included in Table 4 as it was not completed by the LSAC cohort. Using information provided in a paper by Gray and Smart (2008), it is estimated that approximately 196 children of the 4,367 LSAC sample were Indigenous children.

For the majority of the items forming the *Who Am I?*, there were a higher proportion of LSAC children who achieved the highest score. A slightly higher percentage of LSIC children in the 48-54 months age group achieved a score of 4 for the Numbers item. Also, in the 61-66 months age group for the Sentences and Letters tasks, and for the 55-57 months age group in the Sentences task, the proportion of LSIC children who scored a 4 was slightly higher. It should be noted that for these trends in the Sentences task, the absolute number of LSIC children who scored a 4 was relatively small.

**Table 5 Percentage achieving highest level on *Who Am I?* tasks: LSIC (n=426) and LSAC (n=4,367) cohorts**

Task	Percentage achieving highest level, by age group							
	48-54 months		55-57 months		58-60 months		61-66 months	
	LSIC	LSAC	LSIC	LSAC	LSIC	LSAC	LSIC	LSAC
Name	5.8	13.4	3.1	21.6	7.8	30.0	17.3	43.0
Circle	32.7	68.3	43.0	69.5	39.2	70.1	52.5	81.1
Cross	34.6	52.1	41.9	60.0	46.1	64.5	50.8	76.7
Square	23.1	31.9	23.7	40.3	37.3	48.4	47.5	60.8
Triangle	9.6	11.5	8.6	19.0	18.6	28.2	29.1	42.8
Diamond	3.8	3.8	5.4	5.8	4.9	10.4	12.8	18.9
Numbers	3.8	2.4	2.2	3.0	3.9	7.8	11.2	17.2
Letters	0.0	2.2	1.1	4.0	3.9	6.4	14.0	11.1
Words	0.0	1.1	0.0	1.8	2.0	2.9	6.1	6.7
Sentence	0.0	0.2	1.1	0.0	0.0	0.1	2.2	1.2

<sup>6</sup> Note: all percentages were rounded to the nearest whole number therefore some cumulative percentages for a task do not equal 100.

Table 6 shows the basic statistics for children who attempted the *Who Am I?* developmental assessment by Level of Relative Isolation (LORI). The highest proportion of children lived in regional areas.

**Table 6 Basic statistics on *Who Am I?* by Level of Relative Isolation, LSIC Wave 1**

Level of Isolation	Number of Children	Mean Score	Standard Deviation	Std Error of Mean
None	130	26.0	7.7	0.7
Low/Moderate	309	23.7	7.8	0.4
High/Extreme	67	22.8	5.8	0.7

A One-Way Independent Samples Analysis of Variance (ANOVA)<sup>7</sup> was conducted to see if there was a statistically significant difference between children's performance on the *Who Am I?* according to their level of isolation. The results showed there was a statistically significant effect of this factor on performance,  $F(2, 503) = 5.40, p < 0.01$ . Neuman Keuls post hoc comparisons showed that children living in easily accessible areas (that is, children in the first category, 'None') had significantly higher scores than children in low/moderate and high/extreme areas.

### RENFREW WORD FINDING VOCABULARY TEST

Table 7 shows the basic statistics for the five hundred and thirty nine children who attempted the *Renfrew Word Finding Vocabulary Test*. The table shows the basic statistics for the six age groups of children within the sample.

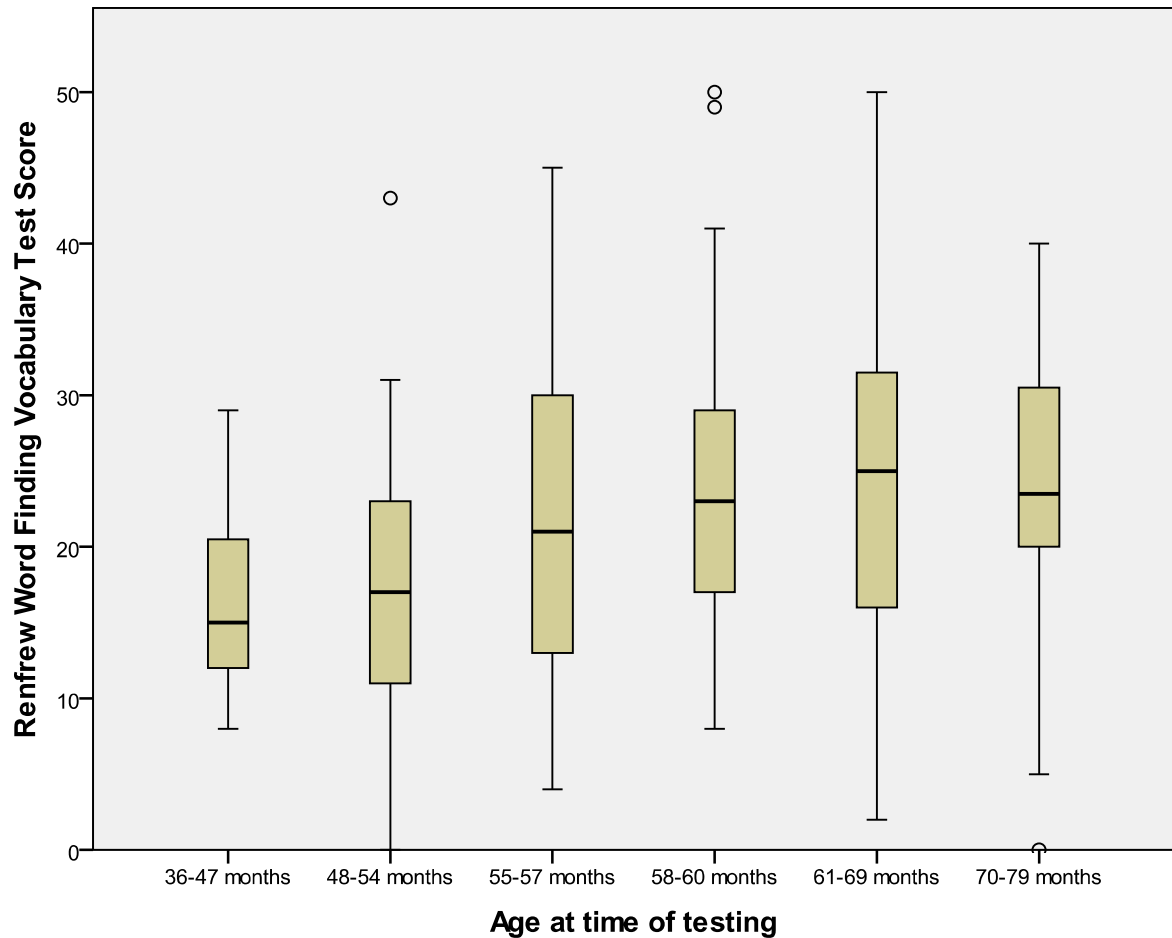
**Table 7 Basic statistics on the *Renfrew Word Finding Vocabulary Test* for age groups, LSIC Wave 2**

Age (months)	Number of Children	Mean Score	Standard Deviation	Std Error of Mean
36-47	12	16.2	6.2	1.8
48-54	61	18.0	7.9	1.0
55-57	102	22.1	10.1	1.0
58-60	113	22.9	8.7	0.8
61-69	263	24.6	10.5	0.7
70-79	36	23.6	9.0	1.5

The maximum possible score on the *Renfrew Word Finding Vocabulary Test* is 50.

Figure 2 (box plot) shows the spread of scores (with outliers) for the six age groups. The spread of scores within each age group was considerable for all groups except the youngest. This was particularly the case for children in the 61-69 months category where scores ranged from 6 to 50. Two children scored zero and two children scored the maximum of 50.

<sup>7</sup> ANOVA is a statistical test that measures whether or not the means of several groups are all equal.



**Figure 2** Box plot of *Renfrew Word Finding Vocabulary Test* scores for six age groups, LSIC Wave 2

By way of comparison, Table 8 shows means as presented on page 8 of the *Renfrew Word Finding Vocabulary Test* booklet (Renfrew, 1998) for five age groups of boys and girls, and also for LSIC Wave 2 boys and girls. LSIC boys and girls had an average score consistently lower than the norm group in all age brackets.

**Table 8** Boys and girls age equivalents for the *Renfrew Word Finding Vocabulary Test*

Age (months)	Means (SD) Boys	<u>LSIC</u> Mean (SD) Boys	Means (SD) Girls	<u>LSIC</u> Mean (SD) Girls
42-47	18.3 (7.20)	15.3 (7.10)	20.3 (5.78)	16.2 (4.09)
48-53	24.1 (5.91)	17.0 (7.91)	23.4 (5.38)	20.1 (8.16)
54-59	27.1 (7.38)	22.3 (9.39)	27.3 (7.12)	21.5 (9.67)
60-65	30.6 (6.56)	24.1 (11.07)	31.0 (5.83)	23.7 (9.55)
66-71	31.5 (4.32)	24.5 (10.30)	34.0 (4.98)	25.7 (9.21)

Table 9 shows the basic statistics for children who attempted the *Renfrew Word Finding Vocabulary Test* by level of isolation. The highest proportion of children lived in areas of low/moderate isolation. A One-way Analysis of Variance (ANOVA) was conducted to establish whether differences between mean scores were statistically significant. The results showed there was a statistically significant effect of level of isolation on performance,  $F(2, 583) = 31.59, p < 0.001$ . Neuman Keuls post hoc comparisons showed that children who lived in easily accessible areas scored significantly higher, on average, than children who lived in areas rated as low/moderate and high/extreme on the isolation



scale. Furthermore, children in low to moderately isolated areas scored significantly higher than children in high or extremely isolated areas.

**Table 9 Basic statistics on the *Renfrew Word Finding Vocabulary Test* by Level of Relative Isolation, LSIC Wave 2**

<b>Level of Isolation</b>	<b>Number of Children</b>	<b>Mean Score</b>	<b>Standard Deviation</b>	<b>Std Error of Mean</b>
None	147	25.7	7.6	0.6
Low/Moderate	346	23.5	10.4	0.6
High/Extreme	93	16.1	7.8	0.8

Table 10 provides frequency information (percentages) for responses for each picture that formed part of the Renfrew test. Column 2 of the table shows words that were scored as correct despite articulation errors or minor corruptions or substitutions. Column 3 of the table provides examples of words that were not scored as correct with their response frequency given in parentheses. In general, more correct responses were recorded for the naming of pictures earlier in the sequence, which is in keeping with the arrangement of pictures in order of difficulty.

**Table 10 Responses (frequencies) for items in the *Renfrew Word Finding Vocabulary Test***

Picture	Alternative Correct Word	Alternative Incorrect Word	Total Correct %	Alternative Word (Another Language) %
Cup	tea cup, mug	drink (3), coffee (2), tea (2)	95.7	0.5
Key	--	--	99.5	0.5
Window	--	house (13), square (1)	94.0	0.5
Moon	--	stars (4), banana (2)	91.5	5.4
Finger	pointing	hand (35), arm (1)	84.3	6.3
Snake	--	lizard (1), monster (1)	96.6	6.8
Kite	kitey	flying thing (3), balloon (2)	68.3	--
Duck	--	bird (12), goose (1)	93.0	1.5
Clown	--	man (17), head (5), funny man (3)	70.0	1.5
Alligator/Crocodile	--	lizard (2) dinosaur (3)	93.4	6.4
Helicopter	chopper, alicopper	air plane/aeroplane/plane (51)	85.7	0.5
Kangaroo	joey	rabbit (2), jumping (1)	93.5	5.4
Dice	deece	blocks (20), game (9)	49.1	--
Snail	--	shell (13), worm (5)	65.9	3.0
Scarecrow	squarecrow	man (26), clown (5), scary man (4)	48.4	--
(Coat)hanger	clothes hanger, hang clothes up	hook (7), for clothes (4), clothes line (3), hanging (2)	41.1	0.5
Owl	mook mook, mopoke	bird (65), kookaburra (11)	49.6	4.6
Arrow	--	spear (21), stick (4), knife (3)	33.6	1.5
Guitar	--	song (2), for songs (1)	83.3	0.6
Camel	lamel	horse (8), cow (3), animal (3), emu (2)	57.8	--
Watering can	garden can	bucket (7), pot (4)	37.3	--
Mermaid	--	fish (13), girl (11)	63.4	1.2
Caterpillar	spitfire, centipeed	bug (4), snail (4)	64.1	6.5

*Continued*

<b>Picture</b>	<b>Alternative Correct Word</b>	<b>Alternative Incorrect Word</b>	<b>Total Correct %</b>	<b>Alternative Word (Another Language) %</b>
Map	--	picture (17), Australia (14), earth (6), the world (6)	21.5	--
Drill	--	screwdriver (24), tool (3)	19.9	1.2
Necklace	chain	bracelet (4), rope (2), stones (2)	66.1	0.6
Jewels/Jewellery	--	earrings (10), necklace (4)	25.2	--
Sleeve	--	jumper (41), shirt (27)	27.3	0.6
Cuff	--	jumper (16)	5.1	--
Violin	fiddle	guitar (63)	27.8	--
Bow	--	stick(32), string (4)	7.7	--
Binoculars	--	telescope (19), camera (5)	32.9	2.0
Pineapple	--	fruit (8), plant (6), tree (3)	51.1	--
Lighthouse	light castle, light tower	castle (48), house (28), tower (12)	25.4	1.5
Vegetables	fruit and vegetables, carrot and vegies	carrots (8), fruit (12)	46.5	0.7
Parachute	--	balloon (33), kite (17)	19.1	0.7
Magnet	--	nail (3), sticker (2)	19.4	--
Anchor	--	hook (15), knife (2)	19.3	--
Beehive	bee house, bee home	house (20), bird house (7)	38.7	--
Igloo	ice house, snow house, snow home	cave (4), polar bear house (3)	18.7	--
Screw	--	nail (81), screwdriver (6)	29.5	--
Microphone	mike	shower (13), singing (6)	33.9	--
Saddle	--	horse (47), seat (19)	15.8	0.8
Spanner	wrench, drench, shifter	hammer (4) screwdriver (22)	13.1	--
Aerial	antenna	chimney (7), roof (4), tv thing (3)	8.0	--
Racquet	tennis racket	bat (25), tennis (10)	37.8	0.8
Sling	--	broken arm (16), bandage (15), sore arm (15)	4.3	--
Compass	--	clock (169), watch (6)	7.0	1.6
Thermometer	--	temperature (6), time (5), ruler (3)	5.3	--
Steeple/Spire	--	castle (45), house (35), church (25), tower (10)	2.4	0.8

### **Relationship between scores on *Who Am I?* and the *Renfrew Word Finding Vocabulary Test***

Four hundred and seventy-seven children had scores on both *Who Am I?* and the *Renfrew Word Finding Vocabulary Test*. There was a positive, moderate correlation between these two scores ( $r = .48, p < .001$ ).

Separate correlation coefficients were computed for the three levels of isolation for children who had scores on both *Who Am I?* and the *Renfrew Word Finding Vocabulary Test*. There were moderate and positive correlations between the two scores for children in easily accessible areas ( $r = .53, p < .001$ ), in areas of low/moderate isolation ( $r = .47, p < .001$ ) and in areas of high/extreme isolation ( $r = .34, p < .01$ ). Interestingly, the association between the two scores became weaker as the level of isolation increased.

### **Comments**

The results on the *Who Am I?* and the *Renfrew Word Finding Vocabulary Test* indicate that the LSIC Wave 2 cohort of children are following a similar pattern of development to children on whom both assessments were normed. That is, in general they were more able to perform the developmentally simpler tasks (e.g., copying circle) than the developmentally more difficult tasks; and they were better able to name the pictures at the beginning of the sequence of pictures than pictures later in the sequence. The impact of practice effects on the performance of the LSIC Wave 2 children should be considered when interpreting results in this report.

Repeating these assessments (within the age parameters of the assessments) can provide a valuable picture of a child's development over time. For instance, the *Who Am I?* tasks focus on aspects of children's development that have been shown to be directly related to the early years of school curriculum. A child's ability to write their own name, and to differentiate between shapes and to copy them are important key objectives of the early years programs. Copying tasks have been shown to be strongly associated with subsequent progress at school, are valid across different cultural groups, and provide a reliable measure of developmental level at the time of the assessment.

The *Renfrew Word Finding Vocabulary Test* assesses a child's ability to accurately describe images as portrayed in the 50 pictures contained in the assessment. This ability is one aspect of the general ability to communicate one's ideas clearly and to understand the communication of others, which are vital pre-requisite skills to learning in the classroom. A child's strength or weakness in expressive language can be identified when we ask the child to ask and answer questions, describe images, articulate thoughts and ideas and respond appropriately to the communication of other people.

Results on both of the assessments can provide teachers and parents with information about the extent to which a child is ready to tackle the early years classroom tasks that are associated with subsequent literacy and numeracy development at school. Results can provide parents and communities with information needed to assist their children with successful transition from the home learning environment to the school learning environment.

Some test administrators recorded that help was given to some children by other people present in the room (e.g., parent or sibling). Note was also made that some children did not participate well because they were distracted by other people in the room or were very shy.

These comments emphasize the importance of providing appropriate training for administrators of *Who Am I?* Such training will ensure greater consistency in data collection procedures, thereby maximising data integrity and allowing for better examination of children's development over time.

**Acknowledgements**

*Who am I?* assessments were scored and coded by Catherine Underwood of ACER.

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