

Footprints in Time

Who Am I?

and

Renfrew Word Finding Vocabulary Test

Report on Wave 5 Data

B cohort



The Australian Council for Educational Research

Who Am I? and Renfrew Word Finding Vocabulary Test

Report prepared by

Sarah Buckley, Cathy Underwood and Nola Purdie
Australian Council for Educational Research

for:

Annette Neuendorf, LSIC Section Manager
Department of Families, Housing, Community Services and Indigenous Affairs
(FaHCSIA)

BACKGROUND

This report presents the results of administration of the *Who Am I?* and the *Renfrew Word Finding Vocabulary Test* for the LSIC Wave 5 data collection in 2012.

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 *Renfrew Word Finding Vocabulary Test* and *Who Am I?* assessments are being used as part of *Footprints in Time*, which is the name given to the *Longitudinal Study of Indigenous Children* (LSIC) managed by FaHCSIA. LSIC 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.

The K cohort of the LSIC sample were administered the *Who Am I?* and *Renfrew* tests in 2008, 2009 and 2010 (Waves 1-3) to monitor early literacy and numeracy. However, at Wave 4 (2011), they had reached an age that required different assessments to investigate these skills. In Wave 4, the *Who Am I?* and *Renfrew* tests were introduced to the B cohort with the intention of replicating the administration process that was implemented with the K cohort. This report describes results of the second administration of the *Who Am I?* and *Renfrew* tests to the B cohort. The cohort primarily

included 4½-5½ year olds in Wave 5, although data were collected from some children who fell outside of this age range.

Modifications were made to the *Who Am I?* for the purposes of LSIC following a trial in 2007 to assess its usefulness for Aboriginal and Torres Strait Islander children. 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. The same modifications were implemented for the first use of the *Who Am I?* for the B cohort. Replicating the process followed with the K cohort (i.e. as happened in Wave 2), the Numbers, Letters, Words and Sentences items were incorporated back into the second administration of the *Who Am I?* test to the B cohort.

The *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). The *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, a researcher 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 children in the LSIC B cohort in Wave 5 that completed the *Who Am I?* and/or the *Renfrew Word Finding Vocabulary Test*. Age groupings were designed, where possible, to match those created for the K cohort in Wave 2; however, this was not possible with the youngest age bracket as there were too few children in this group in the B cohort in Wave 5. Instead, a combined 46-51 months group was created.

Table 1 LSIC Wave 5 (B cohort): 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.	%
Age (months)				
46-51 ¹	15	2.3	16	2.3
52-54	63	9.6	67	9.5
55-57	109	16.7	119	16.9
58-60	125	19.1	133	18.9
61-64	171	26.2	178	25.3
65-69	123	18.8	138	19.6
70-72	29	4.4	32	4.5
73-81 ²	18	2.8	21	3.0
Gender				
Male	316	48.4	345	49.0
Female	337	51.6	359	51.0
LORI³				
None	209	32.1	212	30.2
Low	299	60.2	334	61.8
Moderate/High/Extreme	143	7.7	155	8.0
Total	653	100	704	100

WHO AM I?

The overall reliability (Cronbach's Alpha)⁴ for the *Who Am I?* items was .89. This coefficient rating was similar to the .87 reliability reported for the Longitudinal Study of Australian Children (LSAC) cohort of children aged four years in 2003/4. It was also similar to the rating obtained for the K cohort in wave 2 (.88).

Table 2 shows descriptive statistics for the six hundred and fifty three 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 B cohort, Wave 5 sample.

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

¹ The youngest child in the sample was 46 months so the youngest group began at this age level rather than at 45 months as it had in previous reports.

² The last age grouping was modified as the oldest child in the sample fell outside the age bracket of the age groupings created for the K cohort Wave 2 report.

³ 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++. Please note that two children that attempted the *Who Am I?* and three children that attempted the *Renfrew* had missing LORI data.

⁴ Cronbach's Alpha is a measure of the reliability of a test, based on its internal consistency.

Table 2 Basic statistics on the *Who Am I?* LSIC Wave 5 (B cohort)

Age (months)	Number of Children	Mean Score	Standard Deviation ⁵	Std Error of Mean ⁶
46-54	78	18.3	6.0	0.7
55-57	109	21.5	5.9	0.6
58-60	125	21.9	6.3	0.6
61-64	171	25.9	6.5	0.5
65-69	123	30.0	7.0	0.6
70-81	47	31.9	7.0	1.0

Results in Table 2 clearly show the developmental progression associated with the *Who Am I?* tasks – older children had higher mean scores.

Figure 1 (box plot⁷) shows the spread of scores for the six age groups and replicated the trend evident in Table 2 – as age increased, so did proficiency on the task. The spread of scores was similar for most age groups but slightly smaller for the 46-54 month group, discounting outliers. While no child scored the maximum of 44, three children scored 43. Four children scored zero.

⁵ The standard deviation (SD) is a measure of the distribution of the scores.

⁶ 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.

⁷ 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.

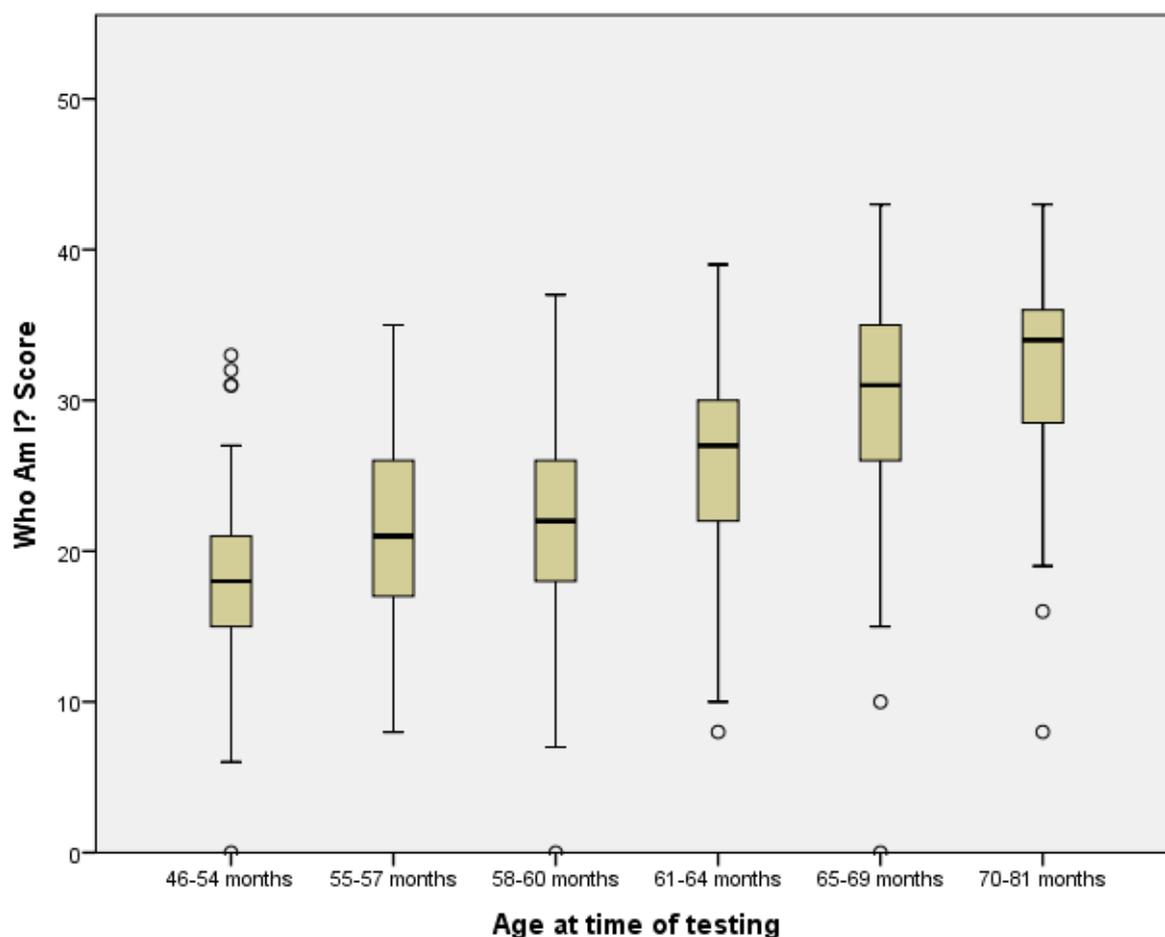


Figure 1 Box plot of *Who Am I?* scores for six age groups, LSIC Wave 5 (B cohort)

Table 3 shows the individual item results for the B cohort, Wave 5 sample. The maximum possible score for each item was four. Scores show that children found drawing a circle and a cross to be easier tasks, as well as drawing a square. Two of the new *Who Am I?* items added to the administration in Wave 5, Words and Sentence, were more difficult for children to complete followed by the Draw Me and Letters tasks.

Table 3 LSIC Wave 5 (B cohort) results on individual items in *Who Am I?*

Task	Mean Statistic	Std. Deviation	Std Error of Mean
Name	2.2	1.2	0.05
Circle	3.4	0.7	0.03
Cross	3.4	0.8	0.03
Square	3.1	1.0	0.04
Triangle	2.8	1.0	0.04
Diamond	2.2	1.0	0.04
Draw Me	1.9	0.7	0.03
Numbers	2.2	1.1	0.04
Letters	2.0	1.3	0.05
Words	1.0	1.2	0.05
Sentence	0.5	1.0	0.04

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 for the Circle, Cross, Square and Triangle items. For the Name, Diamond, Draw Me and Letters tasks, scores tended to be in the mid range (2-3). More than one tenth of the sample of children had difficulty writing their name and more than three quarters had difficulty writing a sentence.

Table 4 LSIC Wave 5 frequencies (%)⁸ of scores (0-4) for individual items in *Who Am I?*

Task	Score				
	0	1	2	3	4
Name	11	15	25	36	13
Circle	1	2	6	39	53
Cross	1	4	4	35	56
Square	1	4	23	29	42
Triangle	2	8	32	27	31
Diamond	6	12	50	20	12
Draw Me	7	9	74	10	1
Numbers	9	15	34	34	8
Letters	20	13	25	33	9
Words	49	19	16	12	5
Sentence	78	6	6	9	1

Table 5 presents a comparison of four age groups of LSIC children with LSAC children on six of the individual items in the *Who Am I?* The Draw Me item is not included as it was not completed by the LSAC cohort. Table 5 compares the percentage of 541 B cohort, Wave 5 children and 4,367 LSAC children that achieved the highest level on these six *Who Am I?* items (i.e. a score of 4). Estimations approximate that 196 children of the 4,367 children in the LSAC sample were Indigenous (Gray & Smart, 2008). There was a higher proportion of LSAC children who achieved the highest score for all the *Who Am I?* items except the Letters task for the 48-54 month age group.

Table 5 Percentage achieving highest level on *Who Am I?* tasks: LSIC (n=541) 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	1.3	13.4	2.8	21.6	4.0	30.0	14.7	43.0
Circle	36.0	68.3	47.7	69.5	49.6	70.1	56.5	81.1
Cross	26.7	52.1	47.7	60.0	51.2	64.5	63.8	76.7
Square	18.7	31.9	27.5	40.3	32.8	48.4	50.0	60.8
Triangle	8.0	11.5	13.8	19.0	20.8	28.2	36.2	42.8
Diamond	0.0	3.8	1.8	5.8	5.6	10.4	15.1	18.9
Numbers	0.0	2.4	0.0	3.0	2.4	7.8	6.9	17.2
Letters	2.7	2.2	0.0	4.0	3.2	6.4	7.3	11.1
Words	0.0	1.1	0.0	1.8	1.6	2.9	3.0	6.7
Sentence	0.0	0.2	0.0	0.0	0.0	0.1	0.9	1.2

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 areas of low to moderate isolation.

⁸ Note: all percentages were rounded to the nearest whole number therefore some cumulative percentages for a task do not equal 100.

Table 6 Basic statistics on *Who Am I?* by Level of Relative Isolation, LSIC Wave 5

Level of Isolation	Number of Children	Mean Score	Standard Deviation	Std Error of Mean
None	209	26.1	7.7	0.5
Low	299	24.5	7.5	0.4
Moderate/High/Extreme	143	23.0	7.6	0.6

Children living in areas of no isolation had the highest scores on the *Who Am I?* A One-Way Independent Samples Analysis of Variance (ANOVA)⁹ 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 that there was a statistically significant main effect of this factor on performance, $F(2, 648) = 7.25, p < .01$ ¹⁰.

RENFREW WORD FINDING VOCABULARY TEST

Table 7 shows the basic statistics for the seven hundred and four 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 5

Age (months)	Number of Children	Mean Score	Standard Deviation	Std Error of Mean
46-54	83	20.5	7.6	0.8
55-57	119	23.9	9.2	0.8
58-60	133	22.7	8.9	0.8
61-64	178	26.1	9.0	0.7
65-69	138	26.6	9.6	0.8
70-81	53	27.3	9.4	1.3

The maximum possible score on the *Renfrew Word Finding Vocabulary Test* is 50. As they had for the *Who Am I?*, scores showed that older children were more proficient on the *Renfrew Word Finding Vocabulary Test* with the exception of the 58-60 months age group who had a mean slightly lower than the preceding age group. Figure 2 shows the spread of scores across the six age groups. Even discounting outliers, the spread of scores within each age group was quite large, particularly for the 58-60 months, 61-64 months and 65-69 months groups. One child scored the sample maximum of 49 and seven children scored zero.

⁹ ANOVA is a statistical test that measures whether or not the means of several groups are all equal.

¹⁰ As the LORI group sizes are unequal, this finding should be interpreted with caution.

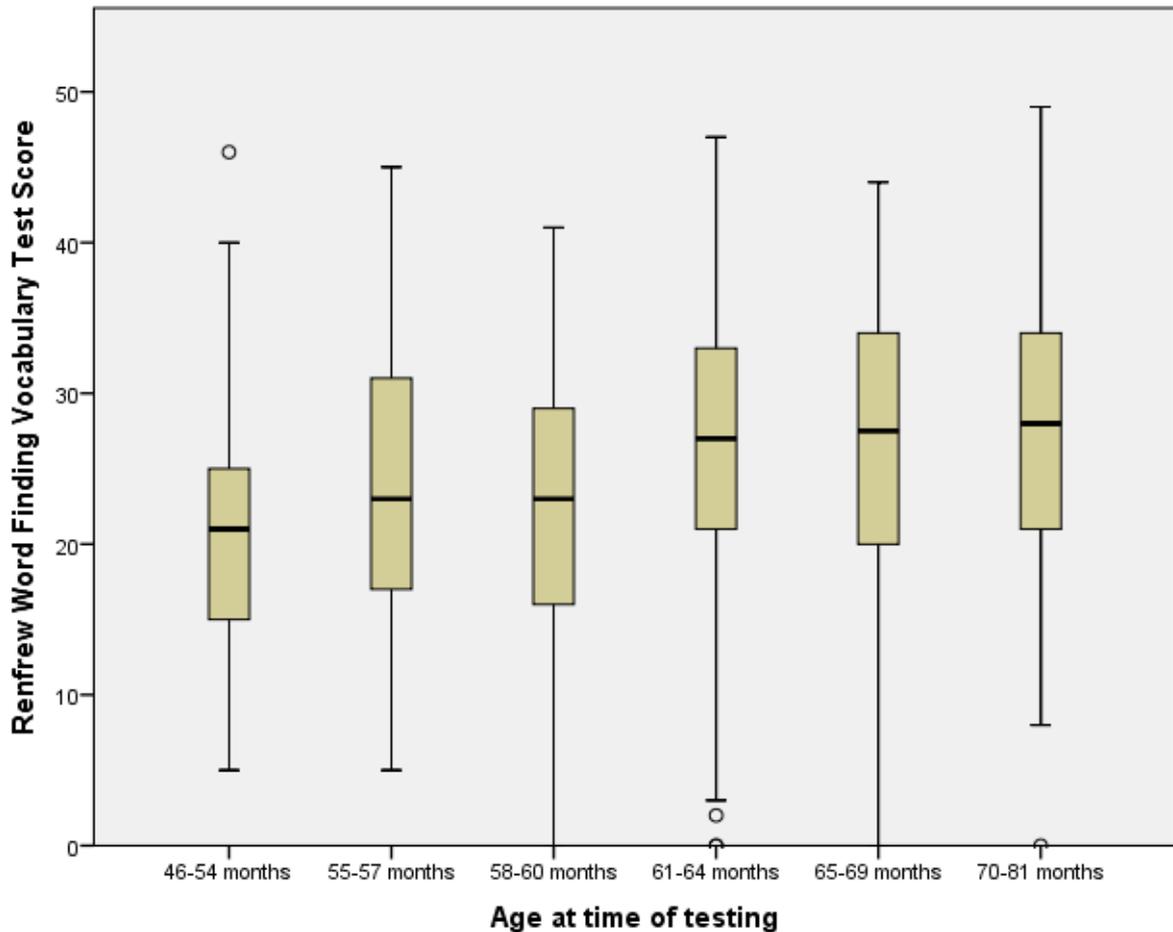


Figure 2 Box plot of *Renfrew Word Finding Vocabulary Test* scores for six age groups, LSIC Wave 5 (B cohort)

Age groupings were constructed so that a comparison could be made between the LSIC sample and means presented in the *Renfrew Word Finding Vocabulary Test* booklet (Renfrew, 1998). Table 8 shows these results for four age groups of boys and girls, and also for LSIC B cohort Wave 5 boys and girls. Norm group data was consistently higher than the average scores achieved by LSIC boys and girls in the age groups created. LSIC scores consistently showed a greater spread around the mean.

Table 8 Boys and girls age equivalents for the *Renfrew Word Finding Vocabulary Test* – Wave 5 (B cohort)

Age (months)	Means (SD)	<u>LSIC</u> Mean (SD)	Means (SD)	<u>LSIC</u> Mean (SD)
	Boys	Boys	Girls	Girls
48-53	24.1 (5.91)	19.3 (5.4)	23.4 (5.38)	20.4 (9.0)
54-59	27.1 (7.38)	23.2 (8.8)	27.3 (7.12)	23.9 (8.7)
60-65	30.6 (6.56)	25.0 (9.7)	31.0 (5.83)	25.5 (8.7)
66-71	31.5 (4.32)	27.1 (9.0)	34.0 (4.98)	27.6 (10.6)

Note: Less than five boys and girls fell into the youngest age grouping available for the standardised Renfrew comparison (42-47 months) so data for these children are not published.

In Table 9, results for the *Renfrew Word Finding Vocabulary Test* are presented according to children's level of isolation. A One-way Analysis of Variance (ANOVA) was conducted to establish

whether differences between mean scores for children living in these areas were statistically significant. The results showed there was a statistically significant effect of level of isolation on performance, $F(2, 698) = 52.47, p < 0.001^{11}$.

Table 9 Basic statistics on the *Renfrew Word Finding Vocabulary Test* by Level of Relative Isolation, LSIC Wave 5 (B cohort)

Level of Isolation	Number of Children	Mean Score	Standard Deviation	Std Error of Mean
None	212	28.2	8.1	0.6
Low	334	25.1	8.9	0.5
Moderate/High/Extreme	155	18.9	8.8	0.7

Table 10 presents the percentage of correct answers, and correct answers provided in another language, for each picture that formed part of the *Renfrew Word Finding Vocabulary 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. Generally and in keeping with the arrangement of pictures in order of difficulty, the percentage of correct responses was greater for pictures presented earlier in the sequence.

¹¹ As the LORI group sizes are unequal, this finding should be interpreted with caution.

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	coffee (3), tea (2)	96.4	-
Key	--	--	98.4	-
Window	--	house (4)	96.2	-
Moon	--	stars (2), sun (2)	94.2	0.7
Finger	pointer	hand (36)	90.2	0.7
Snake	--	lizard (1)	97.0	0.9
Kite	wind kite	flag (6), diamond (2), flying thing (1)	77.3	-
Duck	ducky ducky	bird (11), goose (3)	92.9	-
Clown	--	man (17), funny man (5)	71.7	-
Alligator/Crocodile	croc	snake (1)	94.9	0.9
Helicopter	chopper, chooper	aeroplane/airplane/plane (21)	89.9	-
Kangaroo	wallaby	rabbit (2)	95.3	0.9
Dice	--	block/blocks (17)/games (7)	61.1	-
Snail	--	shell (6), caterpillar (3)	77.4	0.3
Scarecrow	--	man (15), crow/crow man (9), person (5)	53.4	0.3
(Coat)hanger	hang clothes, cloths hanger	clothes (10), hook (4)	40.2	0.1
Owl	--	bird/birdie (66), hoot (7) kookaburra (5)	61.6	0.4
Arrow	--	spear (29), shoot (4), shooting thing (4)	43.5	-
Guitar	ukelele	music/music thing (2)	90.3	-
Camel	--	emu (3), sheep (3)	54.0	-
Watering can	can of water	water the plants (6), water pot (5), water thing (4)	40.6	-
Mermaid	--	fish (7), girl (5)	68.9	0.1
Caterpillar	itchy grub, moon grub	worm (8), bug (6), snail (6)	72.6	0.3

Continued

Picture	Alternative Correct Word	Alternative Incorrect Word	Total Correct %	Alternative Word (Another Language) %
Map	--	picture (24), Australia (18), island (12)	30.5	0.1
Drill	screwdrill	screwdriver (41), tool (15)	17.6	-
Necklace	--	bracelet (5), neck (2)	76.4	-
Jewels/Jewellery	--	earrings (17), bracelet (14)	29.1	-
Sleeve	long sleeve	shirt (26), jumper (20), arm (11)	35.4	0.1
Cuff	--	stripes (3), jumper (2)	2.6	-
Violin	fiddle, ukulele	guitar (74), music (5)	26.1	-
Bow	--	stick (37), string (5)	3.7	-
Binoculars	--	telescope (20), spy glass (6), goggles (6)	35.5	-
Pineapple	apple fine, pino	fruit (19), apple (5)	58.1	-
Lighthouse	light castle	castle (66), house (26), tower (15)	35.8	0.1
Vegetables	vegies	carrots (24), fruit (23), food (19)	54.4	0.4
Parachute	chute	air balloon/balloon (45), kite (19), hot air balloon (5)	21.9	-
Magnet	--	nails (5), sticky thing (3)	25.7	0.1
Anchor	--	hook (40), fire (4) arrow (3), boat (3)	18.5	0.1
Beehive	bee house, bee home	house (25) , birdhouse (9)	46.2	-
Igloo	ice house, snow house	house (8), cave (8), polar bear house/bear house (6)	25.0	-
Screw	--	nail (83), screwdriver (12)	33.7	-
Microphone	mic, micro speaker	singing/singer (13), shower (9)	42.2	-
Saddle	--	seat (64), horse (42)	10.4	-
Spanner	wrench, shifter	tool (37), screwdriver (19)	13.4	-
Aerial	Antenna	chimney (7), house (4)	6.1	-
Racquet	--	bat/bat and ball (45), tennis (19)	41.6	-
Sling	--	bandage (26), broken arm (25), sore arm/hand (17)	5.3	-
Compass	--	clock (210), watch (11)	4.7	-
Thermometer	thempature, monitor	temperature (15), measure/measurer measuring thing (10)	4.1	-
Steeple/Spire	--	castle (60), house (35), church (27)	0.7	0.1

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

Six hundred and fifty four children had scores on both the *Who Am I?* and the *Renfrew Word Finding Vocabulary Test*. There was a positive, moderate correlation between these two scores ($r = .49, p < .001$). 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 ($r = .43, p < .001$), in areas of low isolation ($r = .50, p < .001$) and in areas of moderate/high/extreme isolation ($r = .45, p < .001$).

Comments

As was the case in Wave 4, the Wave 5 performance of the children in the B cohort on the *Who Am I?* and the *Renfrew Word Finding Vocabulary Test* followed a developmental pattern typical of children of this age. The children were more able to perform the developmentally simpler tasks (e.g., copying circle) than the developmentally more difficult tasks (e.g. writing their name) in the *Who Am I?* and were better able to name the pictures at the beginning of the *Renfrew* sequence of pictures than pictures later in the sequence.

As it did for the K cohort, repeating these assessments for the B cohort over time (within the age parameters of the assessments) provides a valuable picture of children's development over time. For instance, copying tasks (a feature of the *Who Am I?*) 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.

The move from home to school is important for all children and results on the two assessments discussed in this report can provide parents and communities with the information they need to facilitate this transition. Furthermore, the feedback these instruments provide on early literacy and numeracy skills help teachers to understand what strengths children bring to the classroom so that these can be developed further.

Comments recorded by test administrators noted that some children had difficulty engaging with the assessments as they were distracted by their environment, disruptive or introverted. 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. They also demonstrate the complexity associated with conducting these assessments in the home.

Acknowledgements

Who am I? assessments were scored and coded by Catherine Underwood of ACER. Renfrew assessments were coded by Elle Lenard and Sarah Buckley of ACER.

References

- De Lemos, M., & Doig, B. (1999). *Who Am I? Developmental Assessment Manual*. Melbourne: ACER.
- Gray, M., & Smart, D. (2008). Growing Up in Australia: The Longitudinal Study of Australian Children is now walking and talking. *Family Matters*, 79, 5-13. Available online at <http://www.aifs.gov.au/growingup/>
- Renfrew, C. (1998). *The Renfrew Language Scales: Word Finding Vocabulary Test*. Milton Keynes: Speechmark.