The development of a 50 word adaptation

of the UK short form of the MCDI for use with two years olds

in Sure Start Programmes in England

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Overview

This paper reports on the development of the UK adaptation of the existing UK short form of the MacArthur Communicative Development Inventory (MCDI) referred to here as the CDI, for use in the Sure Start programmes in England.

Sure Start is a UK government initiative designed to improve opportunities for the most socially disadvantaged communities in England, many of which have a high promotion of families from immigrant groups. It places special emphasis on children under the age of four years. It is organised on the basis of local programmes which are geographically defined. These programmes have been introduced in a series of rounds since 1999. Sure Start reports directly to the UK Treasury and is required to meet a set of predetermined targets, of which one relates to the language development of two year olds. The Sure Start Language Measure or SSLM was initially made up of the UK short form of the MCDI and a series of questions related to the child's development. However, it has been modified to meet the needs of the Sure Start programmes and it is this process of this modification that it the subject of this paper.

The resulting 50 word modification was derived form the UK short form in a manner similar to that reported for the original derivation of the UK short form from the full MCDI word list. The result is considered more acceptable to those administering the measure and has the potential to have better application to children whose first language is not English.

The sources of data informing the modification to the CDI

There were three stages in the modification process. These are outlined below and elaborated further in the sections below. Further details of the modification process are provided in the appendices to this paper. The three stages were as follows.

Stage 1 – The pilot study
The pilot stage looked at issues of feasibility and validity. Feedback was strongly encouraged from the users.

Stage 2 – The implementation studies
After the pilot stage, the format of the CDI was simplified. There followed two large scale data collections, with Sure Start programmes interviewing families about their two year old. At this stage feedback from programmes was again encouraged. A key concern after the first data collection was the application of the word list to families from mixed language backgrounds, with or without English.

Stage 3 - The process of revision of the word list
Discussions with CDI users, especially from bilingual settings, informed the revision of the word list. It was shortened with two key aims; to improve applicability to bilingual users, and to reduce the time needed for the interview.

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Stage 1 – The pilot study

The format of the version of the CDI used in the pilot stage is provided in Appendix 1.

CDI sections

i.   100 word list. The 100 words come from the US version of the CDI Toddler format. This 100 word list was devised by Dale et al for the UK based twins study known as TEDS. (Dale et al 1998.) Any American English words were anglicised for the TEDS study. The words are designed to cover a range of difficulty, in terms of words that are typically acquired early and some that are usually acquired later. There is a mix of types of words in terms of grammatical category and semantic groups. Parents report which of the words they have heard their child say. Immature speech sounds are disregarded for the purpose of scoring an expressive word. This section is scored out of 100.

ii. 'How children use words'. A set of 6 questions about grammatical functions, invites a three-way response *yes (score 2), sometimes (score 1), not at all (score 0)* as parents note whether or not their child displays a particular language function. The last of the six questions is about word combining into 2+ word sentences. Parents of children combining words also answer part iii. This section is scored out of 12.

iii. Sentence complexity. Over a set of 12 sentence pairs, the parents are asked to mark which type of sentence their child is more likely to use.

Method

36 Sure Start local programmes took part in the pilot stage. The CDI form was completed by interview with a Sure Start worker, not by the parent unaided. For bilingual families, programmes could use the CDI with a bilingual co-worker to translate the word list orally. (There were no available resources to produce written translated copies of the word list. Also this is a significant task given the rich diversity of some language communities.) Words were then credited in any language spoken by the child. After this, within two weeks, a speech and language therapist assessed the two year old using a standardised measure of language development, namely the Reynell Developmental Language Scales (RDLS III). Wherever possible the speech and language therapist giving the RDLS III was a different person to the CDI interviewer, with the therapist unaware of the CDI result. The RDLS III was scored according to the instructions provided in the manual, to give a raw score for expressive language and for comprehension of language. The RDLS III was not administered to children from bilingual backgrounds. In addition, basic child detail about gender, date of birth, family language use was recorded, together with a descriptive question about education of the main carer (usually the mother).

Results

CDI data was collected on 262 children, of which 209 (79.7%) were from families using only English. There was a balance of boys and girls (49% girls) and a mean test age of 23.9 months. 70% of the carers left school either before or at the UK school statutory leaving age of 16 years. Only 10% of the carers (usually mothers) had moved into tertiary education.
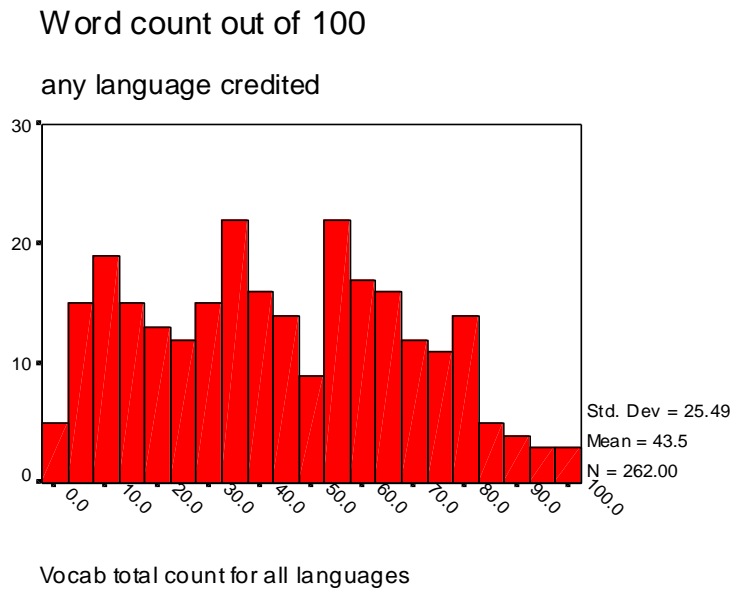
CDI sections

i.   100 word list

The mean score was 43.5 out of 100 (sd 25.5). The spread of scores is shown in Figure 1 (all cases) and Figure 2 (bilingual cases).

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Figure 1: Pilot stage CDI word count scores out of 100; all cases

Word count out of 100

any language credited

Std. Dev = 25.49
Mean = 43.5
N = 262.00

Vocab total count for all languages

The 55 bilingual cases had an uneven distribution, as shown below.

Figure 2: Pilot stage: Word count scores out of 100; bilingual cases only

Word count out of 100

Bilinguals

any language credited

Std. Dev = 25.77
Mean = 43.1
N = 55.00

Vocab total count for all languages

ii.   'How children use words'

The rate of combining words (sometimes or often) was 77.1% across the whole sample. The rate for English speaking children only was 79% and for bilingual children only it was 69%.

iii.   Sentence complexity

This section had a poor response rate. Many interviewers said that it was a difficult section to use. In particular it was awkward to translate verbally and the essence of the exercise was usually lost in translation. The lack of response meant that this section was not analysed.
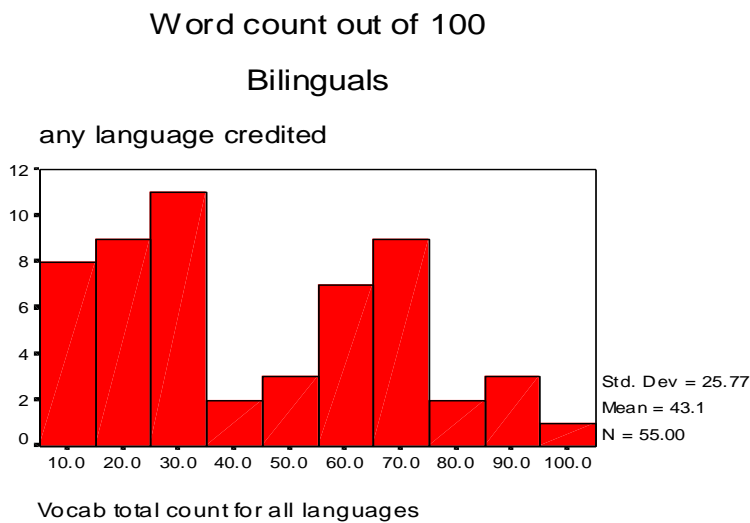
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RDLS III

There were some difficulties in administering this assessment to the children concerned. For example only 148 of the 209 children achieved a score more than zero for their expressive language skills and the equivalent figure for verbal comprehension was 179. The mean standard score for the test is 50 with a standard deviation of 10. See Figures 3 and 4.

Figure 3: Expressive standard scores for RDLS III on 148 two year old children (pilot stage)

RDLS expressive std score

english speaking children

RDLS expression standard score
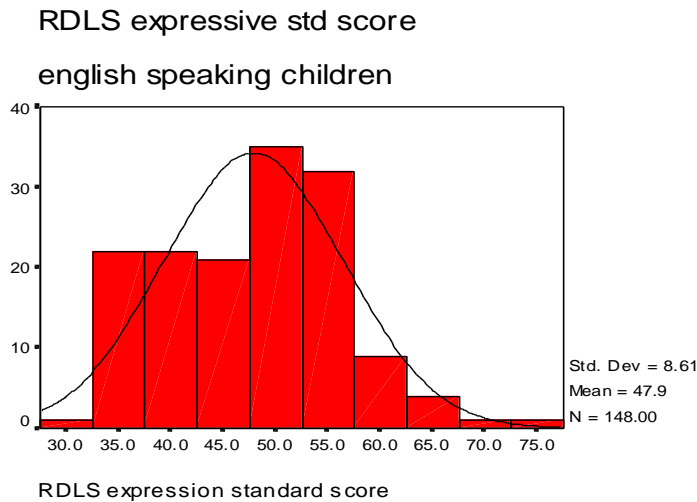
Figure 4: Comprehension standard scores for RDLS III on 148 two year old children (pilot stage)

RDLS comprehension std score

english speaking children

RDLS comprehension standard score
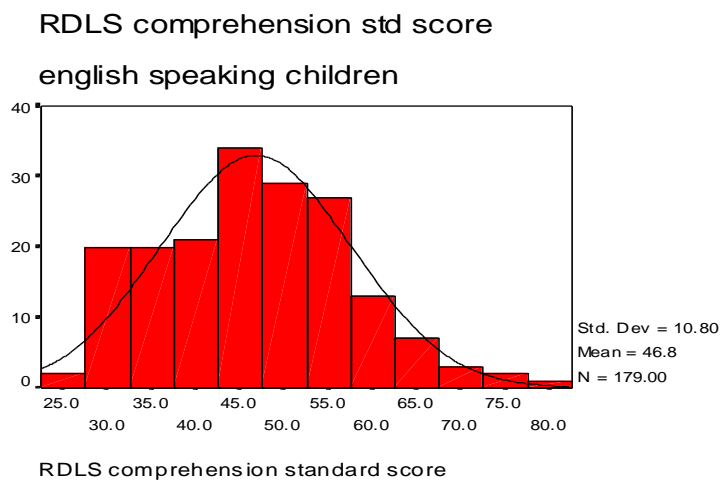
For the English-speaking children only, the relationship between the RDLS III scores and the CDI word counts was then explored. In general the children with the lower RDLS III scores were the ones with the lower word count. (There was no effect for test condition on the correlations below.)

Table 1: Correlations between the RDLS III and the CDI 100 word list

	RDLS comprehension standard score	RDLS expression standard score	Combining words (sometimes or often)
MCDI vocabulary count	.644**	.615**	.582*
n	177	146	262

*** Correlation is statistically significant at the 0.01 level (2-tailed). * at the 0.05 level.*

Summary of Stage 1

The pilot stage established that the CDI had acceptable criterion validity, based on the correlation of the CDI word count scores to the RDLS III. Further, the pilot stage gave useful feedback about parts of the CDI that were less workable.

Stage 2 – The implementation studies

After the pilot stage, there were two large-scale data collections, in 2001 (phase 1) and in 2003 (phase 2). The version of the CDI used for these data collections was modified slightly in response to the feedback from the users of the measure In this version the CDI sentence complexity section was removed, due to the poor response rate noted in stage 1. The word list remained the same.

Method

Each Sure Start local programme was asked to collect CDI data on 15 children aged 23 to 25 months. The intention was to interview a spread of families, not specifically those using Sure Start services, or those with particular social disadvantage or advantage. The time frame for data collection was a six week span. Programmes used a variety of personnel to interview families, including speech and language therapists, therapy assistants, language development workers, family workers, health visitors or a parent volunteer. Bilingual workers were also encouraged to conduct or assist the interview in multilingual communities.

The information cover sheet for the CDI gave space to record the languages used by the family, the child's position in the family birth order, the age of the mother at the birth of her first child and the presence of any special needs in the child or parent.There was one accommodation made on the scoring as the data collection moved from phase 1 into phase 2. In phase 2, recognised regional variations on a word in the word list were accepted, as long as the word was a consistent substitute for that child. For example, 'mammy' was scored correct for 'mummy' in some regions of England.

Results

The mean word counts by language background are provided in Table 2. Language background was classified in three ways – monolingual English, bilingual with English and monolingual in a language other than English. It was not thought appropriate to collect language specific data in the main because of the complexity of the coding of language groups. Of note is that bilingual children scored significantly lower than English only children, despite a scoring approach in which an expressive word could be credited in any language spoken by the child. At the same time, those interviewing bilingual families reported that there were problems using the word list, such as cultural inappropriateness of some items, or

words hard to translate into another language. As Patterson (2004) notes, a lower mean score for bilingual groups does not have to mean that bilinguals have lower vocabularies. Rather it was more likely from the feedback that the bilingual respondents were disadvantaged by the more complex task (translate and report word use), and by the selection of words.

Table 2: Mean word counts by language background in Stage 2

LANGUAGE BACKGROUND	Monolingual English	Bilingual with English	Mono-lingual/ bilingual without English
PHASE 1 Mean word count out of 100 (sd) n= number of children	47.6 (25.9) n=1329	40.8 (24.5) n=223	37.4 (26.4) n=61
PHASE 2 Mean word count out of 100 (sd) n= number of children	48.6 (25.8) n=2282	42.3 (26.2) n=479	39.5 (28.0) n=102

The differences between the language backgrounds for both phases 1 and 2 reached statistical significance. Harris (2002) and Harris. Law, Roy and Kermani (2004) gives a full account of these data sets.

Summary of Stage 2

The first two data collections demonstrated that the MCDI could be used across a variety of settings to record the language skills of two year olds. The principal feedback from this large scale implementation concerned bilingual users of the MCDI, which led to the word list revision stage.

Stage 3 - The process of revision of the word list

Method

The aim was that the reduced word list would be similar in many respects to the 100 word list, especially with regard to
- Overall spread of difficulty (early and late acquired items represented)
- Spread of grammatical categories
- Spread of semantic categories
- Validity of simulated scores, as expressed by correlations with the RDLS III
- Distribution of word count scores

Three sources of data were used in the modification process as follows:-
1. linguistic analysis
2. response rate analysis
3. synthesis of linguistic, statistical and grammatical considerations

Data sources

The word list revision used these sources of information:
- The pilot stage data (n=262), with responses on the word list recorded item by item;
- Feedback from Sure Start Local Programmes (SSLPs) regarding
  i. words on the list they had difficulty with, and why

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     ii.   languages spoken in their Sure Start communities

- Forum of representatives made of people working in Sure Start programmes with specific responsibility for the language target and in particular those with an interest in the assessment of bilingual children. In the main these were speech and language therapists (June 2002)
- Advice from native speakers of other languages (Urdu, Gujerati, Punjabi, Turkish, Twi)
- Data on average age of acquisition of each item (Fenson et al 1994).

The approach also looked to the account of the reduction of the MCDI US long version to its short forms (Fenson et al 2000).

1. Linguistic analysis

The following linguistic reasons were considered for dropping an item:
1. the item could not be translated due to lack of concept match: term too generic or too specific
2. cultural aspects; item insulting, or inappropriate for use by children
3. not translated by a single lexical item in another language
4. no native word; English term usually borrowed
5. noun/verb potential confusion(or other parts of speech)

The word list in Table 3 shows items greyed out with a code denoting one of the above linguistic considerations. The languages are denoted by the letter suffix. 56 items were noted as having some element of difficulty for users of other languages.

Table 3: Linguistic notes on the MCDI word list

Baa baa 2c	Hat	Sky a	All gone 2c
Meow 2c	Necklace a	Zoo 4c	Cold
Woof woof 2c	Shoe	Friend	Fast
Ouch/ow	Sock 4c	Mummy/mum	Happy
Uh-oh/ oh dear 2c	Chin 1c; a	Person 2a	Hot
Bear	Ear	Bye /bye bye 4c	Last a
Bird	Hand 1c	Hi/hello 4c	Tiny
Cat	Leg	Thank you 4a	Wet
Dog	Pillow	No	After
Duck	Comb	Shopping	Day a
Horse	Lamp/torch 1c; 4c;a	Chase a	Tonight a
Aeroplane 4c	Rubbish	Carry	Them 1c;a
Boat	Tray 4c;a	Pour a	This
Car 4c	Plate	Finish	Our 3c
Ball 4c	Towel	Fit	Us 3c;a
Book	Bed	Hug/cuddle	Where
Game 1c	Bedroom a	Listen a	Beside 3b;a
Sandwich 4c; 4b; 4a	Settee/sofa 1c	Like	Down 3b
Fish 1c	Oven/cooker 4c	Pretend 1c;a;1b	Under 3b
Sauce 1c, 4c	Stairs	Rip/tear	All
Cream cracker 4b;4c	Flag a	Shake	Much 1c; a
Meat 1c ; a	Rain 1c	Taste a	Could 1c; a; 3b
Peas 4c; a	Star	Think	Need to 3b
Juice 4c	Swing 4c	Wish 2a;5a	Would 1c; 1b;a
Milk 4c	School	Gentle 1b	If 3b;a

1. the item could not be translated due to lack of concept match: term too generic or too specific
2. cultural aspects; item insulting, or inappropriate for use by children
3. not translated by a single lexical item in another language
4. no native word; English term usually borrowed
5. noun/verb potential confusion(or other parts of speech)

Languages a. Urdu/Punjabi/Gujerati b. Turkish c. Twi

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2. Response rate analysis

Further to this, the pilot data was examined to see which words had a differing response rate when the 207 English speaking children were compared to the 55 bilingual speakers. The difference in frequency of response for each item was calculated using [item frequency for English speakers – item frequency for bilingual speakers]. A negative response frequency difference indicates that bilinguals responded to the item more frequently. The range of differences was –40.40 to +32.9. The word list is shown again in Appendix 2, noting the frequency differences. 29 words are highlighted, being those with a response frequency difference of more than 15, or less than –15.

3.Synthesis of linguistic, statistical and grammatical considerations

After stages A and B, there remained 31 words on the list, which were free of linguistic comments and which also showed similarity of response from the different language groups. These words are listed in Appendix 3. [Appendix 3 is constructed from the tables in first two sources of data identified above by overlaying the linguistic comments and the response rate information.]

Also of interest at this stage was the difficulty of each item, (as indexed by the age in months at which 50% of the US sample had achieved that item; Fenson et al 1994) and the grammatical category of the words. Additional words then were selected back in to the list, in order to achieve a spread of difficulty of items and a spread of grammatical categories. [Listing of these reasons in appendix 4.] The fifty word list so created is shown in Appendix 5. The 50 and 100 word lists compare for their spread of difficulty, as indexed by the five age bands for month at which 50% of the US sample achieved that item (see Table 4). The 50 and 100 word lists also compare for their spread of grammatical items and these are provided in Table 5.

Table 4: Age bands for reaching 50% reporting level; 50 and 100 word lists

Age band	100 word list number of items*	50 word list percentage	50 word list number of items
12 to 18 months	23	22	11
19 to 22 months	20	20	10
23 to 26 months	20	20	10
27 to 30 months	20	20	10
31 months or more	16	18	9
TOTALS	99	100%	50

* missing data for item 'sock'

Table 5:Grammar type of items in 50 and 100 word lists

Grammatical category	100 word list percentage	50 word list percentage	50 word list number of items
adjective	9	14	7
noun	51	42	21
other	21	26	13
sound effect	5	2	1
verb	14	16	8

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Results

Comparisons of the 100 and 50 word lists: pilot data

The pilot data set generated a set of simulated scores out of 50. As with the full CDI it is technically possible to score words leniently – allowing slight deviations on the part of the child – or strictly making no such allowances. Both interpretations are provided here in Figures 5 and 6 below.

Figure 5: Pilot data: simulated scores out of 50

Simulated score out of 50

pilot data

some substitutes accepted; any language

Std. Dev = 13.03
Mean = 23.6
N = 264.00

lenient word count out of 50

Figure 6: Pilot data: simulated scores out of 50

Simulated score out of 50

pilot data

exact word reported; any language

Std. Dev = 13.04
Mean = 23.2
N = 264.00

strict word count out of 50

The reduced word list of 50 correlates 0.99 with the scores on the 100 word list. (p<0.01, 2 tailed.)The impact of using either a strict or lenient scoring approach to the word list is negligible. Moreover the levels of correlations of the new 50 word list with the RDLS III are preserved. (Using simulated scores out of 50 and pilot data for RDLS III.) See Table 6.

Table 6. Correlations between RDLS III scores and simulated word counts out of 50.

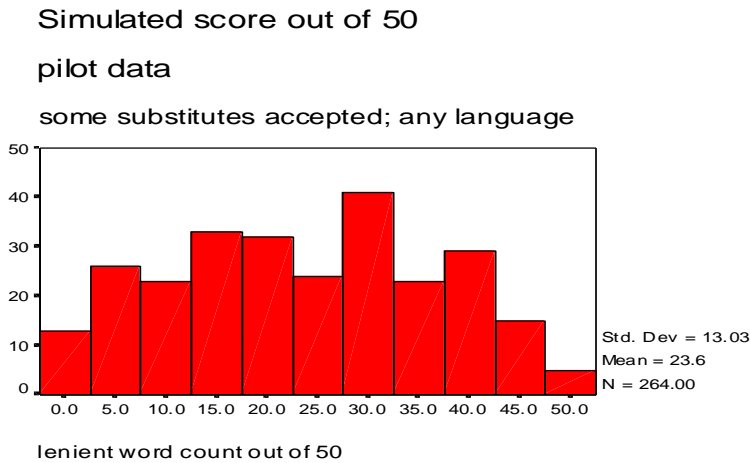|	Word count out of 50 (lenient scoring)	Word count out of 100
RDLS 3 expression std score	0.64	0.62
RDLS 3 comprehension std score	0.59	0.64

(p<0.01, 2 tailed.)

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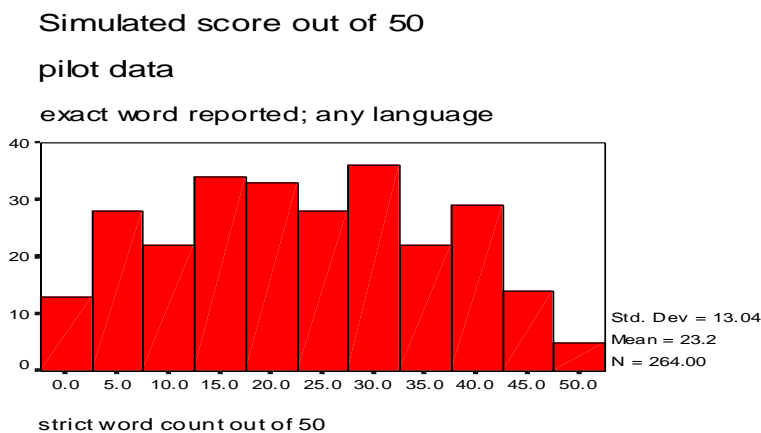
Comparisons of the 100 and 50 word list: wider programme data

Data from 2001 and from 2003 (phases 1 and 2) was collected in the 100 word list format. A substantial subset of this data was also recounted as if the data had been collected using the 50 word format of the MCDI. This recounted subset of data allows a full comparison of the 100 and the 50 word formats. Comparisons were then made between the two large scale implementations of the SSLM described above. The twp data sets were comparable on all demographic indicators. The pooled sample was from 72 programmes across a wide range of regions across England, with each phase having the same spread across regions.

Distribution characteristics for recounted data

Taking both phases together, the distribution of the 100 word scores is uneven with a slight left hand skew (standardised skew statistic + 1.90). This skew is less evident when looking at the 50 word scores (standardised skew statistic +0.11). This can also be demonstrated pictorially. Figures 7 and 8 indicate the spread of the distribution and Table 7 provides the skew statistic. The different word list appears to have reduced the degree of skew, in that there is less evidence of a cluster of low-scoring children.

Figure 7: Word count scores out of 100: phases 1 and 2

word count out of 100

all cases

Std. Dev = 25.75
Mean = 47.7
N = 1843.00

Vocabulary count out of 100

Figure 8: Word count scores out of 50: phases 1 and 2
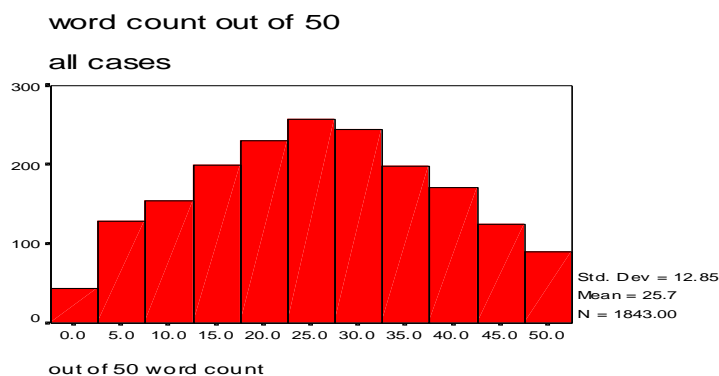
word count out of 50

all cases

Std. Dev = 12.85
Mean = 25.7
N = 1843.00

out of 50 word count

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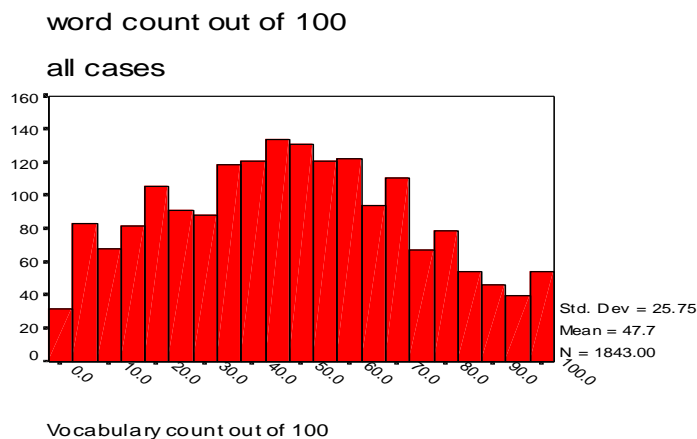
Table 7: Mean word counts on the 100 and 50 word formats.

	100 word format n= 1843	50 word format n=1843
Mean word count (sd)	47.75 (25.75)	25.71 (12.85)
Median	47.00	26.00
Std skew	+1.90	+0.11
Std kurtosis	-2.69	-2.73

Bilingual respondents

The language background of the child was coded as English speaking only, bilingual with English, or non-English speaking. The last of these groups had only 52 cases, and the distribution of scores was very spread. The shift from a left hand skew to a more centrally peaked distribution (as noted above) was seen separately in both the main language groups. In other words the overall distribution shape was similar for the two main language groups, and the change to the 50 word format resulted in a shift of distribution for both types of language background. Figures 9 and 10 show the distributions for the 100 word list, and Figures 11 and 12 for the 50 word list, by language background.

Figure 9: Word count scores out of 100: English speaking children only

Word count out of 100
by language background

Std. Dev = 25.64
Mean = 48.2
N = 1568.00

Vocabulary count out of 100
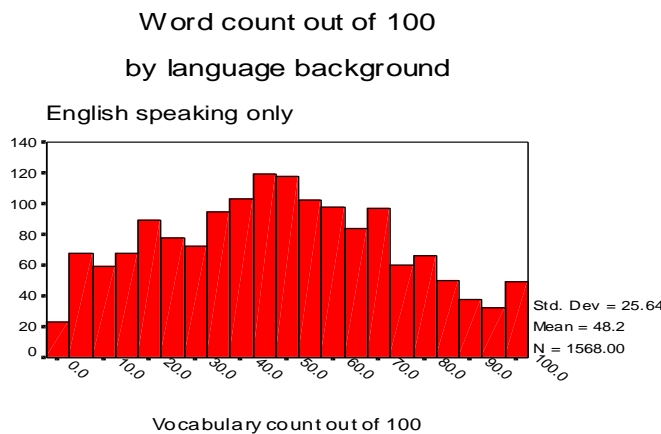
Figure 10: Word count scores out of 100: Bilingual with English children only

Word count out of 100
by language background

Std. Dev = 25.31
Mean = 44.8
N = 221.00

Vocabulary count out of 100

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Figure 11: Word count scores out of 50: English speaking children only

Word count out of 50

by language background

English speaking only

Std. Dev = 12.79
Mean = 25.8
N = 1568.00
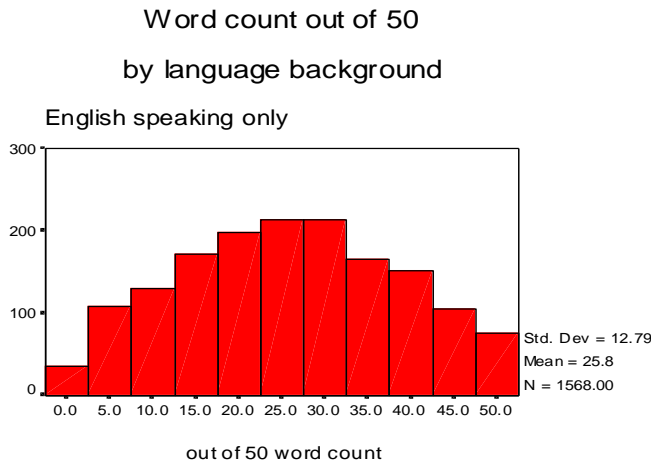
out of 50 word count

Figure 12: Word count scores out of 50: Bilingual with English children only

Word count out of 50

by language background

Bilingual with English

Std. Dev = 12.64
Mean = 25.2
N = 221.00
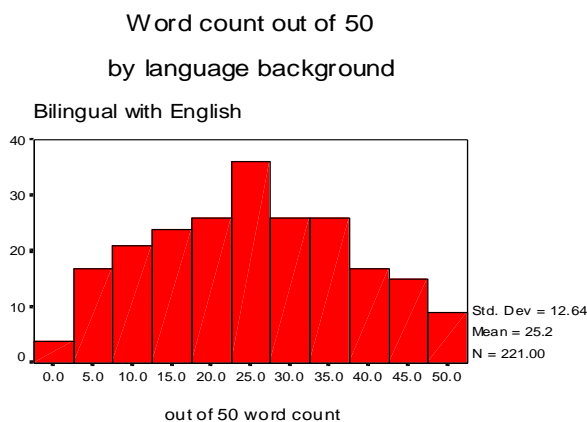
out of 50 word count

The mean word counts out of 100 showed greater disparity between language backgrounds than for the mean word counts out of 50. (Recall that for the full sets of data (scored out of 100) the bilingual children's scores were significantly lower than those of the English-speaking children). However for this recounted subset, the differences in mean scores between language backgrounds did not reach statistical significance for the 100 word format. See Figures 13 and 14 and Table 8 below.

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Figure 13: Mean word count scores by language background: scores out of 100

Mean word counts out of 100

by language background

phases 1 and 2 together

Language background by 3 groups
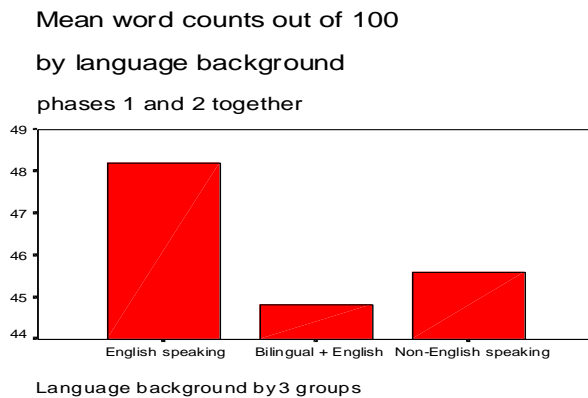
Figure 14: Mean word count scores by language background: scores out of 50

Mean word counts out of 50

by language background

phases 1 and 2 together

Language background by 3 groups
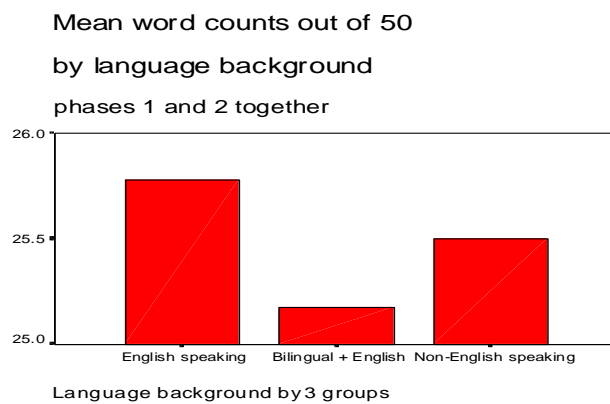
Table 8: Mean word count scores out of 100 and 50; by language background

	Mean word count out of 100 (sd)	Mean word count out of 50 (sd)
English speaking only (n= 1568)	48.2 (25.6)	25.8 (12.8)
Bilingual with English (n=221)	44.8 (25.3)	25.2 (12.6)
Non-English speaking	45.6 (29.7)	25.5 (15.4)
All language backgrounds	47.75 (25.75)	25.71 (12.85)

Summary of Stage 3

The word list revision used linguistic and statistical considerations to reduce the CDI word list from 100 to 50 words. The characteristics of the list (its range, type of words, difficulty) were preserved. A substantial set of data allows comparison of the 100 and 50 word formats for their distribution of scores. Bilingual respondents showed less disparity of scores from the English-speaking children when using the shorter word list format. This suggests that the revised 50 word list may have better applicability to families with mixed language backgrounds.

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Appendix 1: Pilot CDI format

WORDS CHILDREN SAY:

Please tick all the words you have heard your child use. If your child uses a different pronunciation of a word, tick it anyway.

Baa baa	Hat	Sky	All gone
Meow	Necklace	Zoo	Cold
Ouch/ow	Shoe	Friend	Fast
Uh-oh/ oh dear	Sock	Mummy/mum	Happy
Woof woof	Chin	Person	Hot
Bear	Ear	Bye /bye bye	Last
Bird	Hand	Hi/hello	Tiny
Cat	Leg	No	Wet
Dog	Pillow	Shopping	After
Duck	Comb	Thank you	Day
Horse	Lamp/torch	Carry	Tonight
Aeroplane	Chase	Plate	Our
Boat	Rubbish	Pour	Them
Car	Tray	Finish	This
Ball	Towel	Fit	Us
Book	Bed	Hug/cuddle	Where
Game	Bedroom	Listen	Beside
Sandwich	Settee/sofa	Like	Down
Fish	Oven/cooker	Pretend	Under
Sauce	Stairs	Rip/tear	All
Cream cracker	Flag	Shake	Much
Juice	Rain	Taste	Could
Meat	Star	Gentle	Need to
Milk	Swing	Think	Would
Peas	School	Wish	If

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HOW CHILDREN USE WORDS

For each of the following questions, answer **OFTEN** , **SOMETIMES** or **NOT AT ALL.**

1. **Does your child ever talk about past events or people who are not present? For example, a child who saw a carnival last week might later say 'carnival', 'clown' , 'band'.**

   OFTEN   SOMETIMES   NOT AT ALL

2. **Does your child ever talk about something that is going to happen in the future, for example, saying 'choo choo' or 'aeroplane' before you leave the house on a trip, or saying swing when you are going to the park?**

   OFTEN   SOMETIMES   NOT AT ALL

3. **Does your child talk about objects that are not present, such as asking about a missing toy, referring to an object out of view, or asking about someone not present?**

   OFTEN   SOMETIMES   NOT AT ALL

4. **Does your child understand if you ask for something that is not in the room? For example, would s/he go to the bedroom to get a teddy bear when you say 'where's the bear?'**

   OFTEN   SOMETIMES   NOT AT ALL

5. **Does your child ever pick up or point to an object and name an absent person to whom the object belongs? For example, a child might point to mummy's shoe and say 'mummy'**

   OFTEN   SOMETIMES   NOT AT ALL

6. **Has your child begun to combine words yet, such as 'nother biscuit' or 'doggie bite'?**

   OFTEN   SOMETIMES   NOT AT ALL

If you answered '**often'** or '**sometimes'** to question 6, please continue.

For EACH PAIR of the sentences below, A and B, tick the one that sounds most like the way your child talks at the moment, even if it is not the exact sentence. If your child is saying sentences even more complicated than the two provided, tick B.

A. I make tower B. I making tower	A. Daddy pick me up B. Daddy picked me up	A. That my truck B. That's my truck
A. Baby crying B. Baby is crying	A. There a doggie B. There's a doggie	A. Coffee hot B. That coffee hot
A. I no do it B. I can't do it	A. I like read stories B. I like to read stories	A. Biscuit mummy B. Biscuit for mummy
A. Don't read book B. Don't want you read that book	A. Baby want eat B. Baby want to eat	A. Look at me B. Look at me dancing

Appendix 2: Response rate differences between English and Bilingual speakers

Baa baa	**-11.90**	**Hat**	**2.6**	Sky	26.3	All gone	31.0
Meow	**9.30**	**Necklace**	**0.6**	**Zoo**	**-0.3**	**Cold**	**1.8**
Woof woof	**10.0**	**Shoe**	**-9.6**	Friend	-21.6	**Fast**	**-1.8**
Ouch/ow	**2.4**	**Sock**	**6.4**	**Mummy/mum**	**-6.9**	**Happy**	**-12.7**
Uh-oh/ oh dear	19.3	**Chin**	**10.2**	Person	-27.1	**Hot**	**-9.7**
Bear	22.0	**Ear**	**5.7**	**Bye /bye bye**	**-9.1**	**Last**	**-6.7**
Bird	16.10	**Hand**	**-0.3**	**Hi/hello**	**-3.6**	**Tiny**	**-8.8**
Cat	15.30	**Leg**	**0.2**	**Thank you**	**0.9**	**Wet**	**10.5**
Dog	17.7	Pillow	-16.6	**No**	**-4.1**	**After**	**-9.8**
Duck	32.9	Comb	-20.9	**Shopping**	**6.2**	**Day**	**11.1**
Horse	22.2	**Lamp/torch**	**-8.5**	Chase	-18.0	**Tonight**	**-7.3**
Aeroplane	**10.5**	**Rubbish**	**-14.3**	**Carry**	**-11.5**	**Them**	**-9.2**
Boat	27.6	**Tray**	**-6.0**	Pour	-29.8	**This**	**-7.1**
Car	**2.4**	**Plate**	**-1.6**	Finish	-40.4	Our	-20.9
Ball	**-4.0**	**Towel**	**-4.4**	**Fit**	**-7.2**	Us	-19.8
Book	**-5.5**	**Bed**	**7.6**	**Hug/cuddle**	**8.4**	Where	-16.2
Game	-24.7	**Bedroom**	**-5.4**	Listen	-23.9	**Beside**	**-8.3**
Sandwich	22.4	**Settee/sofa**	**-3.3**	**Like**	**-2.9**	**Down**	**5.8**
Fish	18.8	**Oven/cooker**	**13.1**	**Pretend**	**-2.9**	**Under**	**2.4**
Sauce	**-1.1**	Stairs	28.4	Rip/tear	-21.3	**All**	**6.5**
Cream cracker	**5.5**	**Flag**	**5.3**	**Shake**	**-5.4**	**Much**	**0.8**
Meat	**-14.1**	Rain	12.0	**Taste**	**-10.9**	**Could**	**-4.1**
Peas	18.7	Star	25.8	**Think**	**1.5**	**Need to**	**0.7**
Juice	**0.6**	Swing	23.2	**Wish**	**-0.6**	**Would**	**2.7**
Milk	**-11.2**	**School**	**1.4**	**Gentle**	**-11.4**	**If**	**1.1**

The response rate difference is calculated as:
(Item frequency of response for English speakers) – (item frequency response for bilingual speakers). Negative rates show that bilingual speakers responded more often to that item.

Bold items **are those with response rate difference within the range (-15, +15).**

Appendix 3 : 31 words list

Stage C: 31 words remaining after stages A and B

Baa baa	**Hat**	Sky	All gone
Meow	Necklace	Zoo	**Cold**
Woof woof	**Shoe**	Friend	**Fast**
Ouch/ow	Sock	**Mummy/mum**	**Happy**
Uh-oh/ oh dear	Chin	Person	**Hot**
Bear	**Ear**	Bye /bye bye	**Last**
Bird	Hand	Hi/hello	**Tiny**
Cat	**Leg**	Thank you	**Wet**
Dog	Pillow	**No**	**After**
Duck	Comb	**Shopping**	**Day**
Horse	Lamp/torch	Chase	Tonight
Aeroplane	**Rubbish**	**Carry**	Them
Boat	Tray	Pour	**This**
Car	**Plate**	Finish	Our
Ball	**Towel**	**Fit**	Us
Book	**Bed**	**Hug/cuddle**	Where
Game	Bedroom	Listen	Beside
Sandwich	Settee/sofa	**Like**	Down
Fish	Oven/cooker	Pretend	Under
Sauce	Stairs	Rip/tear	**All**
Cream cracker	Flag	**Shake**	Much
Meat	Rain	Taste	Could
Peas	Star	**Think**	Need to
Juice	Swing	Wish	Would
Milk	**School**	Gentle	If

Appendix 4: Reasons for selecting a word back into list

1. Words were within the range of (-15, +15) for response rate differences between language groups, and the term was usually borrowed from English into the family language. Ie noted by Stage A reason '4' in Table X.
2. Words were within the range of (-15, +15) for response rate differences between language groups, and the language considerations were minor.
3. Words were within the range of (-20, +20)
4. Words were outside the range of (-20, +20) but were needed to improve the spread of difficulty of items.

Reason 1

Item	Age band group 1=12-18mths; 5=31 mths plus
Aeroplane	2
Car	3
Ball	1
Juice	1
Milk	2
Bye	1
Hi/hello	2
Thankyou	1

Reason 2

Item	Language comment (minor)	Age band group 1=12-18mths; 5=31 mths plus
Settee / sofa	Twi: same word as chair	5
Gentle	Turkish; not easy to translate	4
Much	Twi; same word as 'many'	5
Need to	Turkish; not a single lexical item	4
If	Turkish; not a single lexical item	5

Reason 3

Item	Response rate difference	Age band group 1=12-18mths; 5=31 mths plus
Cat	15.3%	1
Pillow	16.6%	2
Our	-20.90; Twi; same word as 'us'	5
Where	-16.2	3

Reason 4

Item	Response rate difference	Age band group 1=12-18mths; 5=31 mths plus
Friend	-21.60	4
Person	-27.10	5
Finish	-40.40	4
Rip/tear	-21.30	5

Note that the negative response rate difference favours the bilingual speakers, so they are not disadvantaged by the selection of these items.

The words 'ear and 'hot' were dropped from the initial list of 31. They are both age band 1 words (acquired early). Instead they were replaced by another noun and adjective from later age bands.

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Appendix 5: Final 50 word list

WORD LIST: WORDS CHILDREN SAY

Children can understand words before they start to speak. We are interested in the words your child can SAY. This list does not have all the possible words children use, just some of those words.
Please tick the words your child can SAY. If your child says the word differently (e.g. they say 'tar' instead of 'car') then tick the word anyway.

FIRST WORDS

1.	Mummy / mum		5.	Juice		9.	Cold	
2.	Bye / bye bye		6.	Ouch /ow		10.	Hug / cuddle	
3.	No		7.	Cat				
4.	Ball		8.	Thank you			**TOTAL**	

OTHER WORDS

11.	Aeroplane		21.	Towel		31.	Fit		41.	Wet	
12.	Car		22.	Bed		32.	Like		42.	After	
13.	Book		23.	Settee / sofa		33.	Rip / tear		43.	Day	
14.	Milk		24.	School		34.	Shake		44.	This	
15.	Hat		25.	Friend		35.	Think		45.	Our	
16.	Shoe		26.	Person		36.	Gentle		46.	Where	
17.	Leg		27.	Hello / hi		37.	Fast		47.	All	
18.	Pillow		28.	Shopping		38.	Happy		48.	Much	
19.	Rubbish		29.	Carry		39.	Last		49.	Need to	
20.	Plate		30.	Finish		40.	Tiny		50.	If	
COLUMN TOTAL			**COLUMN TOTAL**			**COLUMN TOTAL**			**COLUMN TOTAL**	

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