

Unit C4

Bilingualism and cognitive ability explored

In Unit A4, we traced the research on the relationship between bilingualism and cognition, and examined several studies spanning a few decades which reported both negative and positive effects of bilingualism. By comparing different studies, it is apparent that the differences in findings can be explained by the difference in choice of subjects and tasks used. Our aim was to highlight methodological concerns to do with sampling and instrumentation and discuss how these factors impact on research findings and interpretations. In Unit B4, we continued to examine this issue of methodology in two different studies. In this unit, you will have the opportunity to explore some of the concepts you have been introduced to and to test them out by conducting and designing your own study. As most standard psychological tests (e.g. the Peabody Vocabulary Test, Raven Progressive Matrices) are not available to the public, and some may even require special licences or permits before you can use them, we will not be using them in these tasks.



Task C4.1 - Perceptions of bilinguals

Given that publications about the benefits of bilingualism have dominated the literature on cognitive effects in the last forty years, one would expect some of these opinions to have filtered into public knowledge. Here, we suggest how you can conduct a small-scale study to find out if lay people do indeed have a favourable view of bilingualism.

DESIGN A QUESTIONNAIRE TO CONTAIN QUESTIONS USING A VARIETY OF FORMATS

- open-ended questions, e.g. 'How do you think learning or using another language can affect the way we think?'
- closed questions, e.g. 'Monolinguals speak better because they don't get confused by another language – do you agree?' The responses can be rated on a Likert scale (this was discussed earlier – see Unit C1).
- indirect questions, e.g. 'If you had a son or daughter who had a hearing impairment, would you encourage him or her to learn a second language?'

LENGTH OF QUESTIONNAIRE

Limit your questionnaire to 15 questions.

SELECTION OF PARTICIPANTS

Find ten to twelve adult monolinguals or bilinguals (or both, if you can work with someone else as a team). The usual guidelines set out for selection of participants in Unit C1 apply here. You may want to include questions to investigate the friendship circle of your participants. For example, monolinguals who have a wide circle of bilingual friends may be more likely to be aware of issues related to bilingualism. Try to avoid using linguistics students, who may have already been primed about the debate.

Task C4.2 – Torrance test of creativity



This is a divergent thinking task which has been used to measure cognitive flexibility in many studies. Find five bilingual and five monolingual children. Form two groups, one monolingual and the other bilingual. (You can choose children between five and eight years of age but children in each group have to be in the same age group.)

- Do this task in one language only.
- Ask your participants how many uses they can think of for a *shoebox*.
- Record the answers in writing.
- What types of skills do you think are required for this type of task?
- Analyse your findings and then summarize them.
- Can you think of other ways in which you could have done the analysis?

Task C4.3 – Semantic and phonetic preference study (data collection)



This is a simple replication of the semantic and phonetic preference study by Ben-Zeev (1977). Choose one of the three objectives below. Your choice of participants will depend on which objective you have chosen. As the types of task involved are very easy, you will need to start with participants younger than eight years of age.

OBJECTIVES OF THE STUDY

- to examine whether different age groups differ in their responses
- to examine whether bilinguals differ from monolinguals in their responses
- to see whether onset of literacy has an impact on the responses of both monolinguals and bilinguals.

TARGET PARTICIPANTS

- 1 Preliterate five-year-old bilinguals and preliterate five-year-old monolinguals
 - 2 Seven-year-old bilinguals and seven-year-old monolinguals
- Try to have at least eight to ten participants in each age group. The bigger the number of participants you have in each group, the more reliable your findings will be.
 - All participants should be carefully screened following the guidelines discussed in Unit C1. The questionnaire should be modified for the children and it should be administered orally.

STIMULI AND INSTRUCTIONS FOR SEMANTIC-PHONETIC PREFERENCE TASK

The list (Table C4.1) contains eight sets of words. In each set, one word is phonetically similar to the target and one word is semantically similar to the target. For example, for the first set, *Can* is phonetically similar to the target, *Cap*, but *Hat* is semantically closer to the target, *Cap*. The first four sets of words (*cap/can*, *book/boot*, *lamp/lamb*, *bag/bat*) are minimal pairs. That is, they are phonetically similar except for the last phoneme. Similarly, the last four set of words (*mouse/house*, *mug/bug*, *dish/fish*, *hen/pen*) are phonetically similar except for the first phoneme.

Table C4.1 List of stimuli

<i>Target</i>	<i>Phonetically similar</i>	<i>Semantically similar</i>
Cap	Can	Hat
Boot	Book	Shoe
Lamp	Lamb	Light
Bag	Bat	Purse
Mouse	House	Rat
Mug	Bug	Cup
Dish	Fish	Plate
Hen	Pen	Chick

METHOD

The task should be administered individually to all the participants and the instructions read out clearly and in the same way for each of the participants. The instructions should be modelled on the following pattern:

I have three words *Cap*, *Can* and *Hat*. Which is more like *Cap* – *Can* or *Hat*?

Make sure that you randomize the presentation of the phonetically similar and semantically similar words. That is, do not present the phonetically similar words first in all trials. The trials should also be randomized. (Suggestion: write each set of words on a separate card and shuffle the card for each child to randomize the presentation.)

If you are working with a partner in the data collection, it is better to pre-record the word list and the instructions to ensure that they are consistently presented.

You can either have a score sheet (see Table C4.2) ready to note down the responses or tape the session and transcribe the answers later.

Table C4.2 Sample score sheet for semantic and phonetic preference test

Participant	1	2	3	4	5	6	7	8	9	10	Total number of semantic responses
Trials											
1											
2											
3											
4											
5											
6											
7											
8											

RESULTS

Add up the number of semantic and phonetic responses for each participant using a spreadsheet. This should generate frequency counts for you to compare the percentage of phonetic and semantic preferences across all the groups.

Can you see any trend in the response pattern or is the response pattern random?

DISCUSSION

As discussed in Unit A4, semantic preference is not necessarily a good indicator of metalinguistic awareness. Looking at your own results, can you see whether semantic preference is clearly associated with any particular group? What inferences might you draw for a group that has higher phonetic preference responses?

WRITE-UP REPORT

Write up the study in the form of a research report by following the sections of report writing indicated in the preface to section C.



Task C4.4 – The Wug Test

The Wug Test, designed by Berko (1958), is used to test simple morphological productive rules in English. Information and jpeg versions of the Wug Test can be downloaded from *Wugs-Online* on <http://childes.psy.cmu.edu/topics/>. The simple Wug Test is an engaging task, well liked by children and, therefore, a good way to get the feel of how children extend morphological rules to novel instances.

STEP 1

Compare the abilities of (two to three) four-year-old bilingual children and monolingual children in their performance in the Wug test in English designed by Berko (1958).

STEP 2

Can you design a similar task for the other language of your bilingual sample?

- What conclusions can you draw about the language competence of bilinguals compared to monolinguals?

- What conclusions can you draw about the language competence of bilinguals in each of their two languages?

Task C4.5 – Metalinguistic awareness



A number of phonological awareness tests are available on the Internet which can be found by typing 'phonological awareness test' into a search engine. <http://www.elr.com.au/apar/index.htm> and <http://ca.geocities.com/phonological/childtest.htm> are two examples. Have a look at the tests you find (you can even take some of them yourself, and submit them on-line and you will be sent your results!) so that you get an impression of the types of items these tests include. What are the skills these items test? What aspect of language knowledge do they relate to?

Alternatively, you can use some of the tasks discussed in Unit A4 on phoneme awareness, word awareness or sentence awareness. Some of the tasks on counting phonemes and syllables are fairly simple to design, as is the task involving counting words in a meaningful or non-meaningful string. Here is an example of a more complicated word awareness task used in Yelland et al. (1993).

WORD AWARENESS: THE BIG WORD–SMALL WORD TASK

In this task, the children were asked to make judgements on word size. In this rather charming task, the children were asked to indicate the bigger word in word pairs of two types:

- the bigger word referred to the bigger object (e.g. *hippopotamus/skunk*)
- the bigger word referred to the smaller object (e.g. *train/caterpillar*)

Making correct judgements on the incongruent (*train/caterpillar*) pairs requires considerable word awareness. The child has to deliberately attend to the size of the word and not the object. In other words, the child has to separate word attributes from object attributes. Little words were monosyllabic and big words were multisyllabic. There were four stimuli types. They were:

- little objects whose name is a little word (e.g. *ant, pin*)
- little objects whose name is a big word (*caterpillar, thermometer*)
- big objects whose name is a big word (e.g. *hippopotamus, aeroplane*)
- big objects whose name is a little word (*whale, car*).

For this task, you will need to prepare pictures to use as stimuli. Ensure that stimuli are all the same size. Table C4.3 is a complete list of words you can use in this task (adapted from Yelland et al. 1993: 441). You do not have to use the entire list. Instead, you can choose to do four 'little words' and four 'big words' instead of the entire list.

Table C4.3 Items for the big word/little word test

Little word		Big word	
<i>Little object</i>	<i>Big object</i>	<i>Little object</i>	<i>Big object</i>
Ant	Bed	Butterfly	Aeroplane
Bee	Car	Button	Crocodile
Frog	Horse	Caterpillar	Elephant
Keys	Sun	Cigarette	Giraffe
Leaf	Train	Envelope	Hippopotamus
Mouse	Tree	Mushroom	Policeman
Pin	Truck	Strawberry	Skeleton
Snail	Whale	Thermometer	Stegosaurus

PARTICIPANTS

Ten to twelve six- to seven-year-old bilinguals and monolinguals who all speak English.

METHOD

- 1 Familiarize the children with the idea of word size by explaining that big words take a 'long time to say' (for example *hurricane*) and little words take 'very little time' (for example *cat*).
- 2 Administer the task to each child individually. Present the stimuli (randomized) for each child and ask the child to name each object to make sure that the child knows the object. After the child has successfully named the object, ask the child 'Is this a big word or a little word?'
- 3 Record the answer on a score sheet.
- 4 In your analysis, focus on the responses to congruent and incongruent pairs. High scores on incongruent pairs are indicative of word awareness.