

Cognitive aspects of bilingualism

Divergent thinking

As mentioned earlier, more recent research has focused on specific aspects of cognition rather than general IQ so that, by today, *received wisdom* tends to associate bilingualism with a range of cognitive advantages including *divergent thinking*, which is referred to in North America as *creative thinking*. This is the opposite to what is called *convergent thinking* which is a cognitive process required when answering questions which have one correct answer, thus requiring individuals to ‘think’ in the same way. Convergent thinking characterizes IQ testing and fails to take account of more creative and imaginative aspects. Means are, therefore, required to assess other aspects which will enable individuals to provide original answers as well as the more obvious ones thought by others generally. Reader 1 (page 61) refers to Scott’s (1973) study where individuals were asked to think of as many uses of paper clips as possible. Baker (2017: 142) refers to the work of Torrance (1974a, 1974b) and the “Use of an Object Test” which assesses individuals on the following criteria:

- fluency; the *number* of answers given
- flexibility: the *range* of answers according to set categories provided in a Test Manual
- originality: scored according to the statistical *infrequency* of a response indicated in the Test Manual
- elaboration: the *additional detail* provided over and above an account of the use of the object.

The hypothesis, therefore, is that having two languages is conducive to divergent and more creative thinking in relation to these four criteria and that having two or more words for the same object increases word associations.

Based on the above criteria adopted by Torrance (1974), Kharkhurin’s (2008) study also showed a positive causal relationship between being bilingual and the ability to think divergently, as quoted in Baker (2011: 150):

Kharkhurin (2008: 232) found that bilingualism appears to ‘have an impact on the ability to rapidly produce a large number of ideas or solutions to a problem (fluency), the capacity to consider a variety of approaches to problems simultaneously (flexibility), and have a tendency to encourage the process of thinking through the details of an idea (elaboration)’.

However, the Kharkhurin (2008) study did not indicate any superiority with regard to the criterion of creativity i.e. *originality* and, therefore, Baker (2011: 150) seems to distinguish between the four criteria of Torrance (1974) by associating fluency, flexibility and elaboration with a *psychological* paradigm and originality with a *creative* paradigm; differentiating between “the ability to *activate* a multitude of unrelated concepts [and] the ability to generate novel ideas” and asking, “Do bilinguals show advantages on psychological rather than the purely linguistic creativity measures?”

One can, therefore, possibly question the superiority of bilinguals on the basis of *creativity*, Lauren (1991) finding that differences on this measure amongst children also varied with age.

Metalinguistic advantages

The advantages of bilingualism with regard to divergent thinking leads one, inevitably, to consider whether or not there are *other* possible cognitive advantages also. Whether consciously and/or subconsciously, bilinguals may well analyse, compare and contrast their two languages, a process referred to as *objectification*. Being aware of differing grammar as well as the need to avoid language interference may provide a bilingual with *metalinguistic* benefits. Vygotsky (1962) maintained that bilingualism enables a child “to see his language as one particular system among many, to view its phenomena under more general categories, [which] leads to awareness of his linguistic operations”.

A bilingual person has two or more words for every object and idea. Compared with a monolingual, a balanced bilingual is, therefore, likely to have a larger total vocabulary across both languages. When slightly different meanings or nuances are attached to words in the two languages, a bilingual person may develop the ability to think more flexibly.

Working with two linguistic and conceptual codes also nurtures the ability to deal with abstract ideas independently of words.

This relates to the ability to separate the *sound* of words from their meaning to which a very early longitudinal and often-mentioned study had referred. Leopold (1939-49) ascribed his daughter’s ability to repeat stories and to freely substitute vocabulary in the process of the story-telling to her bilingual German-English development. The study provides early evidence of the relationship between bilingualism and *metalinguistic flexibility*.

In Reading 1, Chin & Wigglesworth (2007: 62) define metalinguistic awareness as “the ability to focus on different levels of linguistic structures such as words, phonemes and syntax” also paraphrasing Cummins’ (1977) definition as “the development of children’s awareness of certain properties of language including their ability to analyse linguistic output”. Baker (2011: 152) quotes Tunmer & Herriman’s (1984: 12) definition:

Metalinguistic awareness may be defined as the ability to reflect upon and manipulate the structural features of spoken language, treating language itself as an object of thought, as opposed to simply using the language system to comprehend and produce sentences.

Described as “a burgeoning area of study”, Reader 1 discusses studies in metalinguistic awareness in four areas:

- word awareness
- phonological awareness
- sentence awareness
- semantic awareness

Word awareness

This aspect is further analysed in relation to (a) the awareness of word as a discrete unit and (b) the awareness of the arbitrariness of language.

(a) Awareness of word as a discrete unit

In relation to the first, Reading 1 refers to the often- mentioned studies of Bialystock (1987, 1988) involving Grade 1 monolingual English and bilingual French-English children which indicated a higher level of performance amongst the bilingual group in terms of the analysis of linguistic units. Whereas Yelland et al. (1993) also discovered the same superiority amongst children learning Italian as a second language, their study also suggested the additional advantage of acquiring higher reading skills at an earlier stage of development. Such benefits, obviously, have implications for the provision of early and primary education.

(b) Awareness of the arbitrariness of language

Since bilinguals and multilinguals (unlike monolinguals) use more than one word for the same object, one would expect them to have a greater awareness of the ‘symbolic’ nature of language and how the attaching of labels to various things is somewhat arbitrary (although perhaps not etymologically).

Research often referred to with regard to bilinguals' awareness of the arbitrariness of language (as by Baker, 2017:144 and Chin & Wigglesworth, 2007: 63-64 in Reading 1) is that of Ianco-Worrall (1972) and Ben-Zeev (1977). Comparing a group of Afrikaans-English bilingual children aged 4-9 with monolinguals matched on IQ, socio-economic status, gender and age, Ianco-Worrall's (1972) study illustrated a greater awareness of the arbitrary labelling of objects amongst bilinguals. Unlike, their monolingual counterparts, they found no reason, for example, why a dog could not be called 'cat' (and a cat 'dog'), perceiving the name and the object as being separate and having a non-fixed relationship. Using a similar test, a study by Cummins (1978) (see Reading 1 page 64) involving Irish-English bilingual children in Grades 3 and 6 showed that children's responses to the possibility of exchanging 'moon' and 'sun', for example, divided into three groups:

1. empirical justifications: the words being interchangeable because the sun and the moon both shine
2. rigid conventional justifications: the labels seen as being the only ones possible
3. arbitrary assignment responses: recognising the arbitrary relationship between form and function, as shown in the response, "you could change the names because *it doesn't matter what things are called*".

Bilinguals, however, were seen to relate significantly more to the third category, which was especially true of children in Grade 6.

Other tests exist in which individuals are asked, for example, to read the *names* of colours which are actually written in a different colour e.g. the word 'blue' written in red, as well as vice-versa, to name the *colour* of a word which names a different colour.

Baker (2011) refers to the Symbol Substitution Test adopted by Ben-Zeev (1977) with 5-8 year old Hebrew-English children in which they were asked to substitute a nonsense word in sentences, for example, 'macaroni' for 'I', thus having to say 'Macaroni am warm' instead of 'I am warm'. Reader 1 (page 63) provides the example of exchanging the words 'turtle' and 'plane'.

Again, the simultaneous use of two language systems seems to make bilingual children more analytical than monolinguals with regard to their awareness of language construction and the grammatical function of words.

Phonological awareness

Chin & Wigglesworth (2007: 65) define this as “the ability to recognise that speech is composed of distinct units of sound” and provide examples of tests which require children to isolate phonological units. Research, studies such as that of Davine et al. (1971) point to the superiority of bilinguals in distinguishing differences, Rubin & Turner (1989) also discovering additional advantages amongst French- English bilinguals in terms of reading and writing skills.

Sentence awareness

This reflects an ability to detect grammatical errors within *sentential* units and to correct and possibly explain them. Whereas research on monolingual children has indicated an inability to do this before the age of five and a half to six years old (despite being orally correct), this ability has been discovered among bilingual children as young as four and a half (Galambos & Goldin-Meadow, 1983). As Reading 1 points out: “While young monolingual children focused on the message conveyed, bilingual children readily focused on the structure”. Additional research by Bialystok (1987) seems to provide further proof of superior early metalinguistic awareness amongst bilingual children. Pupils aged five to nine years showed an ability to assess the correctness of sentences on the basis of syntax, so that they could detect correct and incorrect grammar regardless of whether the sentence was meaningful or not. However, Galambos & Hakuta (1988) found that this ability correlated with levels of bilingual *proficiency*, the more proficient performing better, a finding which seems to corroborate the Thresholds Hypothesis of Cummins (1976) and Toukomma-Kangas (1977) (see below). Whereas a further study by Galambos & Goldin-Meadow (1990) of Spanish and English monolinguals and English-Spanish bilinguals confirmed the superiority of bilinguals at detecting and correcting errors, this did not apply to their ability to *explain* such errors. According to Chin & Wigglesworth (2007: 66) in Reader 1: “The results indicate that bilingualism accelerates metalinguistic awareness but does not change the awareness qualitatively”.

The definition of metalinguistic awareness as offered in Baker (2017:145), “upon the nature and functions of language” as well as the Tunmer & Herriman (1984: 12) definition quoted previously suggest a rather *conscious* and rational cognitive process which, arguably, may not be ascribed to bilinguals at so early a stage of linguistic development, such as the 5-8 year-old children used by Ben-Zeev (1977) and by Galambos & Goldin-Meadow (1990). However, is it reasonable to expect

any transition from subconscious to conscious metalinguistic awareness to be anything other than a gradual process?

Semantic awareness

Chin & Wigglesworth (2007: 66) in Reading 1 maintain that studies carried out by researchers have used “an assortment of tasks which qualify as semantic awareness tasks” even though they were not labelled as such, naming Ianco-Worall (1972), Ben-Zeev (1977) and Cummins (1978) among them. Reference is made to the Semantic-Phonetic Preference task designed to assess to what degree children, given a series of words, focus on their *semantic* rather than *phonetic* similarity. In one study, Ianco-Worall (1972) showed that, unlike the monolingual group, bilinguals tended to pair words according to *meaning* (e.g. *cap* and *hat*) rather than their *sound* (*cap* and *can*). Although the difference between bilinguals and monolinguals at 4-6 years old was not so prevalent by the age of 7, the research illustrated that such semantic differentiation developed in bilinguals some two to three years earlier. Research by Ben Zeev (1977) reached similar conclusions. However, whereas in both studies semantic preference was interpreted as a positive indication of more advanced cognitive development characteristic of later years, Chin & Wigglesworth (2007: 66) argue that phonetic preference could also be interpreted as “a sign of increased phonetic awareness”.

The separation of word *sound* from *meaning* and the ability to treat language analytically is related to the wider issue of bilingualism and metalinguistic awareness which, as Baker (2011: 153) points out, is part of the experience of bilinguals at early stages of their education:

Phonological awareness and the cognitive skills of symbolic representation are needed to read and write. Letters are symbols without inherent meaning and do not resemble the sounds they represent. Bilinguals may comprehend such symbolic representation earlier than monolinguals as they see words written in two different ways.

This aspect of metalinguistic awareness, therefore, has been considered an advantage in developing reading skills amongst young children, making bilinguals able to read and become literate at an earlier age. However, whereas the development of literacy can also extend to additional beneficial skills of a social, cognitive and linguistic nature, yet, maintaining that there is a direct causal relationship between bilingualism and literacy may over-simplify the cognitive process, thus ignoring the

possible effects of other variables, such as the level of contrast in the writing system of each language or a child's level of proficiency in both. Bialystok et al. (2003) also suggest that metalinguistic advantages can be stronger in bilinguals when the two languages spoken are more similar in phonology and sound structures (e.g. Spanish and English as opposed to Spanish and Chinese). According to Baker (2017:147-48), this may suggest that increased metalinguistic awareness may be due to speaking 'specific combinations of languages with similar features' rather than to bilingualism *per se*. This differentiation introduces a further variable into what is already a highly complex area of study.

Baker (2017: 144-46) discusses a wide range of research related to the connection between bilingualism and metalinguistic awareness, some of which is mentioned above, and summarises the general findings according to a review of the research by Bialystok (2001):

- that bilinguals do not have superior metalinguistic abilities in *all* respects
- that bilinguals who are relatively balanced however, (see the Thresholds Theory below) have increased metalinguistic abilities in tasks which require 'selective attention' to information, emanating from: (a) their higher level of analysis in the knowledge of language and (b) greater control of attention in the processing of language.

The last bullet point, it seems, relates to a crucial matter which is that since *both* languages are active when one language is being spoken, a bilingual's need to keep the two languages separate requires him / her to avoid or to minimise intrusion from the other i.e. code-mixing. Whether or not this implies a *conscious* or *subconscious* process on behalf of the speaker is not clear. Nevertheless, it is characteristic of many bilinguals who either make a *conscious* effort to keep their speech 'pure' and languages separate, or do so without thought. However, would the alleged superior metalinguistic trait also apply to bilinguals who regularly engage in code-switching? Presumably, an individual who code-switched for reasons of lexical deficiency could not be considered a 'balanced' bilingual, but what about one who deliberately code-switches for *rhetorical* effect, as discussed in the first module ECDA-7010: Introduction to Bilingualism? The answer would seem to be that the *rhetorical* use of code-switching (a *conscious* process) is *itself* a further indication of greater control in the processing of language.

Superior levels of attentional control amongst bilingual children have also been seen as advantageous in the development of numeracy. The use of symbols (numbers) to represent varying amounts demands a substantial level of concentration which young bilinguals gain at an early age by having to listen attentively to changes in languages being spoken (Bialystok & Codd, 1997).

The research which has involved comparisons of monolinguals and bilinguals across a wide variety of languages and provides evidence of the superiority of *balanced* bilinguals over *both* monolinguals and less balanced bilinguals in relation to divergent thinking and metalinguistic awareness seems to support the Thresholds Theory of Cummins (1976) and Toukomma-Kangas (1977). This maintains that, whereas monolinguals do not suffer any negative effects from having age-related competence in only one language, bilinguals who achieve a *balanced* level of linguistic proficiency *do* gain cognitive benefits.

The Thresholds Theory

Cummins (1976) discusses the cognitive benefits of bilingual education on three levels which are presented analogously in Figure 4 as three floors of a house. On the lower floor, children who have no age-related mastery of either language may well suffer some cognitive defects and educational disadvantages, a stage of linguistic development which we can compare with *semilingualism* discussed in module ECDA-7010: Introduction to Bilingualism. Children who have age-related competence in one of the two languages may not suffer any cognitive defects or educational disadvantages but, however, are not likely to enjoy any benefits and advantages either. However, those children who reach a level of age-related competence in *both* languages are likely to reap cognitive benefits.

As mentioned earlier, evidence of the relevance of the Thresholds Theory is provided by Galambos & Hakuta (1988) who maintain that enhanced *metalinguistic* awareness correlates with the balanced development of *both* languages. In tests designed to examine the ability of pupils from a low socio-economic background in the United States to correct grammatical mistakes in Spanish sentences *read* to them, the level of correction seemed to correlate with the level of individual children's bilingual proficiency.

The bilingual experience requires that the form of the two languages being learned be attended to on a routine basis. Experience at attending to form would be predicted

to facilitate any task that required the child to focus on form upon demand. (Galambos & Hakuta (1988: 153)

Also mentioned in Baker (2017:147) is research by Carlisle et al. (1999) which points in the same direction, concluding that metalinguistic performance in the early stages of bilingual development can be *enhanced and hindered according to the degree or level of bilingual proficiency* attained, such as adequate command of vocabulary in both languages.

The Thresholds Theory also seems to be supported by Ricciardelli (1992a) and his review of 24 studies (1992b). Whereas 20 studies reflected the superiority of bilinguals over monolinguals, the four which did not were based on samples of less proficient bilinguals.

Cummins' (1976) Thresholds Theory, however, does not determine a *specific level* of bilingual proficiency required. Chin & Wigglesworth (2007: 67) highlight this issue very clearly:

The main problem with the Threshold Theory is the difficulty in establishing what these thresholds are in concrete terms. Assuming that an objective quantification of a bilingual's linguistic competence is possible, it is still impossible to determine where one should draw a line for each threshold.

Chin & Wigglesworth (2007) note that Edelsky et al. (1983) refer to the hypothesis as “a post hoc explanation of the bilingual phenomenon [which] needs direct empirical investigation with rigorous replications across linguistic and cultural groups”.

Figure 4: Cummins' (1976) Thresholds Theory. (Source: Baker (1993: 136))

