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4 Bilingual Construction of Two Systems

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This chapter focuses on bilingual children’s construction of their linguistic system(s), with attention to the question of where interaction between the two languages is or is not observed. We examine data concerning the development and relationship of the morphosyntactic systems and the organization of the semantic systems. With regard to the acquisition of the morphosyntactic system in each language, the role of the input, influences on the timing of development, and the question of possible acceleration when there are commonalities across the languages are discussed. In relation to semantics, the influence of linguistic differences across the two languages and the fact that the construction of the semantic system(s) is grounded in a common cognitive space will be proposed as key. A model of development is presented according to which predictions regarding interaction revolve around this construction of the two languages linked to a common cognitive base.

One of the key questions concerning the acquisition of language in bilingual children is the extent to which the two languages the child is learning interact and influence one another in development. Are developments in the two languages different from corresponding developments in the linguistic systems of their monolingual peers, and if so, where do the differences lie? A great deal of research on these questions has focused on grammatical development (see, e.g. Chapter 3). A number of theoretical stances make predictions concerning the most likely components of the grammar to undergo interaction and concerning the nature of the relationship between the grammars of the two languages necessary for such interaction to occur. Recent research has also focused increasingly on semantic knowledge in bilinguals, and has documented a wide variety of cases of interaction (Ameel et al., 2005; Ameel et al., 2009; Brown & Gullberg, 2008a, 2008b; Jarvis & Pavlenko, 2008; Pavlenko,
This chapter will explore the question of interaction in these two domains. First, we will examine whether predictions regarding morphosyntactic systems hold in relation to Welsh-English-speaking children’s acquisition of grammatical forms in their two languages. The data will suggest that any relationship that is observed in acquisition is more likely attributable to cognitive, metalinguistic, and metacognitive advances in the child than it is to specific grammatical comparisons across the two languages. The chapter will then examine possible interactions in the semantic systems of bilinguals. We will present some of the work we have been doing to examine this question, and will argue for a model in which the semantic systems of the bilingual’s languages interact with that bilingual’s cognitive understanding of the world. Finally, a model of development that draws on constructivist–emergentist approaches to language learning in children can help to explain the effects documented here – the low occurrence of interaction in developing morphosyntactic systems, and the higher incidence of convergence in the bilingual’s semantic systems.

Background

The question of the nature and location of influence between the two languages of a bilingual has longstanding roots in even the earliest work on second language acquisition. Researchers in that tradition have long concerned themselves with the question of when ‘transfer’ occurs, in which direction (L1 to L2, but also L2 to L1?), and under what conditions (Dulay & Burt, 1974a, 1974b; Dulay et al., 1982; Gass, 1980; Krashen, 1982; Lado, 1957; see also Chapter 2). Early on, researchers recognized that there may need to be some similarity between the two languages for transfer to occur (e.g. Andersen’s (1983) ‘Transfer to Somewhere’ principle and Wode’s (1978) ‘Crucial Similarity Measure’; but see Kellerman’s (1995) ‘transfer to nowhere’ principle) – but it was also recognized that transfer does not always occur in cases of structural similarity in the two languages, because of speakers’ expectations about what might possibly be transferable (Kellerman, 1978, 1983; Krashen, 1983).

In more recent years, such questions addressing L2 acquisition have re-emerged in relation to simultaneous bilinguals. In examining the types of transfer that may or may not occur, researchers working within a Chomskyan, modular tradition have proposed that language interaction in bilinguals is not likely to occur within the ‘internal interfaces’ of a grammar (i.e. within the morphological, syntactic, and semantic modules of the grammar), but are highly likely to occur within the ‘external interfaces’ of the grammar – at the points at which, for example, syntax and pragmatics come together (Hulk & Müller, 2000; Sorace, 2003; Tsimpli & Sorace, 2006; White, 2009). Thus, one might predict that bilinguals carry over from one language to the other the syntactic means through which pragmatic
elements such as topic-comment relations are expressed, but not, for example, the verbal endings from one language to the other. Some have proposed in addition that there must be overlap, or similarity, across the surface structures of the two languages in order for the child to carry over aspects from one language to the other (Döpke, 2000; Hulk & Müller, 2000; Paradis & Genesee, 1996). (See Gathercole, 2007, for discussion.)

Very recently, as there has been growing recognition that (a) the developmental progression of bilinguals follows much the same route as it does in monolinguals (Gathercole, 2007; Gathercole & Hoff, 2007; Håkansson et al., 2003; Kupisch, 2004; Li & Associates, Inc., 2005; Rieckborn, 2005, 2006) and that (b) the progression of bilinguals may initially be timed slightly behind that of monolinguals (Gathercole & Hoff, 2007; Gathercole & Thomas, 2005; Gathercole et al., 2001; Pearson, 2002; Kupisch, 2004; Oller & Eilers, 2002; Pearson et al., 1998; Rieckborn, 2005, 2006), researchers have been taking a closer look at potential interactions between the bilingual's two grammatical systems as they develop. The clearest evidence for such interaction would be if the progression for some particular structures in one of the bilingual's languages is out of line with the general progression one might expect given the general level of exposure by the bilingual child to that language. It might be, for example, that the acquisition of some aspect of one of the languages can ‘boost’ the development of a comparable form in the child’s other language, resulting in acceleration in the acquisition of that form; or, conversely, it might be that when there are differences between the structures in the two languages, this might make their discovery in either language harder, leading to a greater delay in acquisition than might be expected. Indeed, some research suggests that similarity of form across languages might help boost the bilingual child’s acquisition of forms in one of her languages. This might be particularly true in cases in which the forms in one language are more complex than they are in the other, so the ease of acquisition in the latter may help facilitate acquisition in the former.

A nice example can be found in Fernández Fuertes and Liceras’ (2010) study of the acquisition of copulas in two Spanish-English bilingual children. These researchers asked whether the more functionally prominent copulas, ser and estar, in Spanish might help these children to discover and use the copula be in English earlier than their monolingual counterparts do. These authors point out that (a) Spanish has two copulas, ser and estar – ser for individual-level predicates (permanent) and estar for stage-level predication (temporary state), (b) ser and estar help Spanish-speaking children to establish inflectional categories early, and (c) English-speaking monolingual children show high omission of copula be (Becker, 2000, 2004) (e.g. ‘I in the kitchen’ (Nina, 2;01; Suppes, 1974, CHILDES). So, they reasoned, perhaps the early development of inflectional categories in Spanish will help Spanish-English (S-E) bilinguals develop inflectional categories in English, and thus promote the early correct use of overt be. Given that the common progression
over covert forms, in such cases. In another study, Serratrice and Sorace discovered that even Italian-Spanish bilinguals (speaking two languages both of which have null subjects) over-used overt subjects (Serratrice et al., 2009; Sorace et al., 2009; Sorace & Serratrice, 2009).

It is crucial in examining questions regarding interaction and regarding any potential facilitation or acceleration in bilinguals that the issues be viewed within the broader perspective in which other factors, such as normal processes of acquisition, frequency of exposure, and language-specific complexity, are taken into account. As noted above, all things being equal, bilingual children’s timing of development, but not sequence (Gathercole, 2007), is generally dependent on relative amount of exposure to the language in question (Gathercole, 2007; Gathercole & Hoff, 2007). Thus, for example, in the Welsh-English context, the development of Welsh is in advance in children who come from homes in which only Welsh is spoken relative to those from homes in which both Welsh and English or only English are spoken, but the acquisition of English proceeds in advance in children who come from homes in which only English is spoken relative to those from homes in which both Welsh and English or only Welsh are spoken, and so forth (Gathercole et al., 2013; Gathercole & Thomas, 2009). At the same time, all children learn aspects of Welsh that are less complex earlier, in sequence, than aspects that are more complex. For example, grammatical gender, which is quite opaque in Welsh, is learned quite late (and may never be fully mastered) by children from all home language backgrounds (Gathercole et al., 2005; Gathercole & Thomas, 2005, 2009; Thomas & Gathercole, 2005, 2007). Keeping these factors in mind, in the following sections, we examine, first, the grammatical development in Welsh-English bilinguals more closely for potential interactions, and, second, potential interactions in another realm, that of linguistic semantics.

Grammatical Abilities

In order to examine the children’s knowledge of grammatical structures in each language, we developed receptive grammatical tests in each language that covered roughly comparable structures in the two languages and that could be expected to develop over a protracted period of development. Thirteen sets of structures were chosen for inclusion in the tests, namely the following:

- Active Sentences
- Negation
- Passive (truncated)
- Comparative
- Superlative
Present Perfect  
Future  
Time Conjunctions (before/after/until)  
OS Relative Clauses  
SS Relative Clauses  
SO Relative Clauses  
Quantification, Universal or Exhaustive (every, both)  
Quantification, Existential or Non-exhaustive (some, not all)  

An example of each type of structure for English and Welsh is shown in Table 4.3.

These structures are listed in Table 4.3 in an order that we predicted might correspond to the relative difficulty and timing of acquisition, as judged by work in the literature. Thus, for example, we can expect simple

Table 4.3 Types of structures tested in receptive grammar tasks

<table>
<thead>
<tr>
<th>STRUCTURE TYPE</th>
<th>ENGLISH Examples</th>
<th>WELSH Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Active</td>
<td>The elephant smelled the horse.</td>
<td>Gwnaeth yr eliffant ogleuo’r ceffyl.</td>
</tr>
<tr>
<td>Negation</td>
<td>The goats aren’t eating.</td>
<td>Tydi’r geifr ddim yn bwyta.</td>
</tr>
<tr>
<td>Passive (Truncated)</td>
<td>The clown was pushed.</td>
<td>Cafodd y clown ei wthio.</td>
</tr>
<tr>
<td>Comparative</td>
<td>The tree is taller than the house.</td>
<td>Mae’r goeden yn dalach na’r tŷ.</td>
</tr>
<tr>
<td>Superlative</td>
<td>The apple is lowest.</td>
<td>Yr afal sydd isaf.</td>
</tr>
<tr>
<td>Present Perfect</td>
<td>He has jumped.</td>
<td>Mae o wedi neidio.</td>
</tr>
<tr>
<td>Future</td>
<td>The ducks will jump over the rock.</td>
<td>Mi (w)neith y hwyaid neidio dros y garreg.</td>
</tr>
<tr>
<td>Time Conjunction (before/after/until)</td>
<td>Before the teacher fell, she took her hat off.</td>
<td>Cyn i’r athrawes ddisgyn, mi dynnodd hi ei het.</td>
</tr>
<tr>
<td>Relative Clause, OS</td>
<td>A circle covers the box that has a ring in it.</td>
<td>Mae’r e cylch yn gorchuddio’r bocs sydd efo modrwy ynndo.</td>
</tr>
<tr>
<td>Relative Clause, SS</td>
<td>The donkey that kicked a cow was wearing socks.</td>
<td>Roedd yr asyn (w)na’th gicio’r fuwch yn gwisgo sanau.</td>
</tr>
<tr>
<td>Relative Clause, SO</td>
<td>A dancer that the girl called had a ring.</td>
<td>Roedd y dawnsiwr (w)na’th y ferch ffonio efo modrwy.</td>
</tr>
<tr>
<td>Quantifier, Universal/Exhaustive (every, both)</td>
<td>Every princess is on a tractor.</td>
<td>Mae pob tywysoges ar dractor.</td>
</tr>
<tr>
<td>Quantifier, Existential/Non-Exhaustive (not all, some)</td>
<td>Some of the dancers are wearing dresses.</td>
<td>Mae rhai o’r dawnswyr yn gwisgo ffrogiau.</td>
</tr>
</tbody>
</table>
active sentences and simple negatives to be learned fairly early in the two languages (Bloom, 1973; Borsley & Jones, 2001; Brown, 1973; Crain & Lillo-Martin, 1999). Passives, Comparatives, Superlatives, Present Perfects, and Futures are expected to be learned between approximately 3½ and 5 years of age (Budwig, 2001; Gathercole, 2009; Weist, 2008). Time conjunctions are expected to be understood perhaps somewhat later (age 5 or 6) (Clark, 2003; Coker, 1978; Gathercole, 2009), and relative clauses perhaps somewhat later than that (Hamburger & Crain, 1982; Kidd & Bavin, 2002). Quantifiers take even longer for children to gain a full understanding (Gathercole, 2009; Hurewitz et al., 2006; Papafragou, 2003, 2006; Papafragou & Musolino, 2003; Papafragou & Schwarz, 2006).

The structures chosen were ‘roughly comparable’ in the sense that they expressed comparable functions, not necessarily in the sense that they involved any similar formation of the structure itself. In fact, we can divide the structures into three types – those that share comparable structural properties in the two languages; those that are mixed, sharing some features of their formation, but differing in other aspects; and those that are clearly distinct in formation. Those that fall into the first type and the last type can be the most instructive in examining whether children ‘bootstrap’ from one language to the other. The prediction would be, if such bootstrapping occurs, that in the case of comparable structures, bilingual children may have an advantage, and in the case of distinct structures, they may have a disadvantage. The structures can be grouped as follows

A. Similar structures

- **Comparative**
  - E: A-er than; W: A-ach na
- **Superlative**
  - E: A-est; W: A-af
- **Future**
  - E: will + V; W: wneith + V
- **Universal or Exhaustive Quantification** (every, both)
  - E: Q (the) N; W: (yr) Q N
- **Existential or Non-exhaustive Quantification** (some, not all)
  - E: not all (of the) N; some (of the) N;
  - W: Neg Aux pob N ddim; rhai (o’r) N

The comparative in both languages involves the use of a suffix on the adjective (-er in English, -ach in Welsh) followed by a standard marker (than in English, na in Welsh) introducing the standard of comparison; the superlative is marked by the addition of a suffix on the adjective; (one form of) the future is constructed using a future auxiliary plus the non-finite form of the main verb² and quantifiers in both languages are pre-nominal (every N, pob N; some of the N, rhai o’r N).

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² Future auxiliary + a non-finite form of the main verb.
Similarly, with OS and SS relatives, English uses a complementizer, as in (3), whereas Welsh may not, as in (4):

(3) A pig smelled the elephant [that — was eating an orange].
(4) Naeth y mochyn ogleuo’r eliffant [— oedd yn bwyta oren].
   did the pig smell-the elephant [— was PRT eat orange]

C. Finally, those constructions that have some structural similarities and some differences are the following:

Active:
E: SVO, W: VSO, AuxSVO

Negation:
E: S Aux Neg V...; W: Neg-Aux S Neg V

English uses SVO as the dominant word order; Welsh uses two word orders, VSO and (more frequently in colloquial speech) AuxSVO. In negation, English uses single negation, with the negative not occurring between the auxiliary and the verb, whereas Welsh allows double negation, often with a negative particle sentence-initially and the negative form dim internally, although this is oversimplifying a lot (see, e.g. Borsley, 2005).

As noted, for the purposes of examining crosslinguistic interaction in development, the most relevant examinations will entail the structures shown in (A), where acceleration might be predicted to occur, and those in (B), where deceleration might be predicted to occur. It should be added as well that, if interaction is more likely to occur in cases involving the interface between syntax and pragmatics, then we could predict interaction especially in the case of those structures that involve pragmatics for their proper use and interpretation. Here, the relevant structures would be the comparative, the superlative, and the quantifier constructions, as these all involve the use of conversational implicature for their proper interpretation (see Gathercole, 2009).

Method

Stimuli

Three sentences were drawn up for each of the 13 sets of structures for each of two versions of the test in each language. Two versions of the tests, A and B, were prepared for both languages, so that a given child would not receive the same pictures or translation-equivalent sentences across the two languages. The pictures and items for version A in the two languages were the same, and the pictures and items for version B in the two languages were the same.
In each version, each type of grammatical structure was tested with the three trials in a forced-choice picture task, with four picture choices for each trial. The lexical items appearing in versions A and B were the same, but their occurrence was balanced so that they would be heard on distinct trials and in distinct structures across the versions. Approximately half the children received version A in English and B in Welsh, and half version B in English and A in Welsh.

Procedure

For each trial, a set of four computerised pictures was presented, and the child was asked to pick the picture that went best with the sentence s/he heard. All verbal stimuli were presented aurally. Five practice trials unrelated to the structures of interest were administered initially, in the relevant language, to familiarize the child with the procedure.

Participants

For the English receptive grammar task, 376 children were tested, including monolinguals and bilinguals, and for the Welsh receptive grammar task, all 278 of the bilinguals were tested. The children came from four distinct home language groups, according to the language(s) reported by parents to be the language(s) spoken by them to children in the home: monolingual English, bilinguals with only English at home (‘OEH’), bilinguals with both Welsh and English at home (‘WEH’), and bilinguals with only Welsh at home (‘OWH’).

Children came from four distinct age groups, 2–3 (mean age 3;3, range 2;1–4;0), 4–5 (mean age 5;0, range 4;1–6;8), 7–8 (mean age 8;1, range 7;0–8;11), and 13–15 (mean age 14;8, range 13;0–15;8). The number of children tested at each age is shown in Table 4.4 by home language. The breakdown of ages, with means and median ages for each home language group at each age, is shown in Table 4.5.

Table 4.4 Participants, English and Welsh receptive grammar measures, by age group and home language*

<table>
<thead>
<tr>
<th>Age</th>
<th>MON E</th>
<th>OEH</th>
<th>WEH</th>
<th>OWH</th>
<th>TOT</th>
</tr>
</thead>
<tbody>
<tr>
<td>2–3</td>
<td>23</td>
<td>11</td>
<td>18</td>
<td>22</td>
<td>74</td>
</tr>
<tr>
<td>4–5</td>
<td>38</td>
<td>25</td>
<td>20</td>
<td>23</td>
<td>106</td>
</tr>
<tr>
<td>7–8</td>
<td>17</td>
<td>30</td>
<td>22</td>
<td>33</td>
<td>102</td>
</tr>
<tr>
<td>13–15</td>
<td>20</td>
<td>18</td>
<td>25</td>
<td>31</td>
<td>94</td>
</tr>
</tbody>
</table>

*MON E = monolingual English (only tested in English); OEH = bilingual with only English at home; WEH = bilingual with Welsh and English at home; OWH = bilingual with only Welsh at home
Results

General findings

The full report of the overall results from the study can be found in Gathercole et al. (2013). To summarize the general results: children from all home language groups progressed in the same sequence across structures, but at the earliest ages, for both languages, those children who had the greatest amount of input in the given language performed in advance of those from homes in which less input in that language was available. The general progression by home language group and age is shown in Figures 4.1 and 4.2 (from Gathercole, 2013).

Table 4.5 Mean (and Median) ages for participants, English and Welsh receptive grammar measures, by age group and home language*

<table>
<thead>
<tr>
<th>Age</th>
<th>MON E</th>
<th>OEH</th>
<th>WEH</th>
<th>OWH</th>
<th>TOT</th>
</tr>
</thead>
<tbody>
<tr>
<td>2–3</td>
<td>3;6 (3;7)</td>
<td>3;2 (3;2)</td>
<td>3;1 (3;0)</td>
<td>3;1 (3;1)</td>
<td>3;3 (3;3)</td>
</tr>
<tr>
<td>4–5</td>
<td>5;0 (4;10)</td>
<td>5;0 (5;0)</td>
<td>5;1 (5;3)</td>
<td>4;10 (4;9)</td>
<td>5;0 (4;11)</td>
</tr>
<tr>
<td>7–8</td>
<td>7;9 (7;7)</td>
<td>8;1 (8;2)</td>
<td>8;1 (8;1)</td>
<td>8;2 (8;2)</td>
<td>8;1 (8;1)</td>
</tr>
<tr>
<td>13–15</td>
<td>14;7 (14;10)</td>
<td>14;7 (15;1)</td>
<td>14;8 (14;11)</td>
<td>14;9 (14;9)</td>
<td>14;8 (14;10)</td>
</tr>
</tbody>
</table>

*MON E = monolingual English; OEH = bilingual with only English at home; WEH = bilingual with Welsh and English at home; OWH = bilingual with only Welsh at home

Figure 4.1 Performance on English receptive grammar by age and home language
comparable in structure, but not where English and Welsh differ in structure. If, on the other hand, correlations occurred in cases in which the structures were dissimilar, this would suggest that some other factor – for example requisite cognitive preparation for use of the structures in question or a more general linguistic advancement, such as expanded MLU length – might account for correlations in performance.

Correlational analyses of scores on the two tests, reported in Gathercole et al. (2013), showed that, indeed, there were significant correlations between the total scores on the English and Welsh tests at ages 2–3, \( r = 0.552, p = 0.000 \), at ages 7–8, \( r = 0.353, p = 0.001 \), and at ages 13–15, \( r = 0.384, p = 0.001 \), but not at age 4–5, \( r = 0.144, \text{n.s.} \). There were significant correlations on the following sub-scores:

- **At age 2–3:** Similar structures: comparatives \( r = 0.405, p = 0.012 \); future \( r = 0.395, p = 0.014 \); Dissimilar structures: time conjunctions \( r = 0.481, p = 0.002 \); SO relatives: \( r = 0.480, p = 0.002 \).  
- **At age 4–5:** Similar structures: comparatives \( r = 0.279, p = 0.022 \); existential/non-exhaustive quantification \( r = 0.319, p = 0.010 \); Dissimilar structures: passive \( r = 0.241, p = 0.050 \); OS relatives \( r = 0.276, p = 0.024 \).  
- **At age 7–8:** Similar structures: existential/non-exhaustive quantification \( r = 0.441, p = 0.000 \); Dissimilar structures: SO relatives \( r = 0.241, p = 0.029 \); Other: actives: \( r = 0.296, p = 0.006 \).  
- **At age 13–15:** Similar structures: universal/exhaustive quantification \( r = 0.410, p = 0.000 \); Dissimilar structures: passive \( r = 0.297, p = 0.010 \); present perfect \( r = 0.299, p = 0.010 \).

Note that the correlations that hold at the different ages on substructures of the two languages do so for both comparable structures (e.g. the comparative) and dissimilar structures (e.g. relative clauses, passives). This suggests that, rather than children bootstrapping from the syntactic structures of one language to the other, there may be a certain cognitive preparedness or a general linguistic preparedness that allows children to map some cognitive understanding or linguistic advance they have gained with the linguistic means for expressing that in each language. For example, for proper use of the comparative (in any language), one must come to a certain level of appreciation of comparison between entities, and of the relative position of two values on a given scale (see Gathercole, 2009). For the proper use of relative clauses, there must be, among other things, an ability to hold multiple components of a sentence in memory and an ability to coordinate multiple grammatical/theta roles for nominal elements expressed in the sentence, or a meta-linguistic appreciation that such multiple relations can hold within a single sentence. Such advances could easily affect advances in both languages at the same time.
Acceleration by group?

To examine the question of possible acceleration more closely, one further set of analyses would be relevant. We can examine the relative performance across the home language groups at each age on the relevant structures – those for which similarity might encourage transfer and those for which dissimilarity might lead to depressed performance. But which bilinguals are most likely to show a boost? There are several possible predictions regarding performance across home language groups, if interaction does indeed lead to acceleration.

First, it is possible that all bilinguals gain a boost, relative to monolinguals, from a structure in language B in learning language A. If so, their performance relative to monolinguals on that structure should exceed expectations, in relation to the general level of their performance, and might even exceed that of the monolinguals (as in, e.g., the data reported by Fernández-Fuertes & Liceras, 2010). So, for example, let’s say that the OEH children generally perform across structures with mean scores approximately 20% lower than the scores obtained by the English monolinguals. With a boost on a particular structure, the OEH children might perform at only 10% below the monolinguals, at the same rate, or even higher than the monolinguals. Similar expectations would hold for the WEH and the OWH children on the same structures, relative to their overall performance.

A second possible prediction regarding which bilinguals might show a boost in language A might concern only those bilingual children who are most advanced in language B. These more advanced bilinguals might be the ones who are best placed for transferring from language B to language A, given their greater grounding/knowledge of language B. This would mean, for example, that the greatest boost in English would occur in the OWH children because of transfer from their dominant language, Welsh, and the greatest boost in Welsh would occur in the OEH children because of transfer from their dominant language, English. (These same bilinguals would be predicted to show some delay as well in the cases of those structures that differed in the two languages.)

A final possible prediction of which bilinguals might show a boost concerns those bilinguals who are most balanced in their knowledge of the two languages. These bilinguals may be better able to draw connections between language A and language B than those who are dominant in one of the languages, and therefore may be more likely to transfer back and forth between the two languages than either of the other two groups. In this case, the prediction would be that boosts would occur in our data in the WEH group for both languages, insofar as these children are the most likely to receive input in both languages on a consistent basis. (Again, the prediction would also be that these bilinguals would show the greatest delay in those structures that differed in the two languages.)

These three possibilities are shown in columns 3 and 4 of Table 4.6.
Table 4.6 Predictions regarding acceleration or delay by home language group

<table>
<thead>
<tr>
<th>Prediction</th>
<th>In whom?</th>
<th>ENGLISH</th>
<th>WELSH</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>A. Similar structures:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Comparative</td>
<td>1. ALL BILINGUALS: Bilinguals will exceed monolinguals</td>
<td>BILS &gt; MONS</td>
<td>n.a.</td>
</tr>
<tr>
<td>Superlative</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Future</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Universal/Exhaustive Quantification</td>
<td>Acceleration</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Existential/Non-Universal Quantification</td>
<td>2. DOMINANT IN OTHER LANGUAGE: Those dominant in other language will carry over to this language</td>
<td>OWH &gt; OEH, WEH</td>
<td>OEH &gt; OWH, WEH</td>
</tr>
<tr>
<td></td>
<td>3. BALANCED BILINGUALS: Balanced bilinguals will transfer between languages</td>
<td>WEH &gt; OEH, WEH</td>
<td>WEH</td>
</tr>
<tr>
<td><strong>B. Dissimilar structures:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Passive</td>
<td>1. ALL BILINGUALS</td>
<td>BILS &lt; MONS</td>
<td>n.a.</td>
</tr>
<tr>
<td>Present Perfect</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Time conjunctions</td>
<td>2. DOMINANT IN OTHER LANGUAGE</td>
<td>OWH &lt; OEH, WEH</td>
<td>OEH &lt; OWH, WEH</td>
</tr>
<tr>
<td>OS Relative Clauses</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SS Relative Clauses</td>
<td>Deceleration</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SO Relative Clauses</td>
<td>3. BALANCED BILINGUALS</td>
<td>WEH &lt; OEH, WEH</td>
<td>WEH</td>
</tr>
</tbody>
</table>
In order to examine performance, to determine whether any of the three types of predictions are substantiated by the data, mean scores [out of three] for each structure at each age by each home language group were examined. The mean scores are shown in Table 4.7 for English and Table 4.8 for Welsh. Scores for structures that are similar in Welsh and English are shown in the top half of the Tables, those that are dissimilar in the bottom half. The average mean scores for all 13 structures for each home language group are also shown for each age at the bottom of each table. Note that the overlapping structures were included in the calculations of these means, so the means for all 13 structures do not directly correspond to the means of the 11 structures shown.

To assess whether acceleration or deceleration occurred in any given instance, the following calculations were performed. First, at each age, the relation between the mean score of each home language group to that of those who were most proficient in the language – the monolinguals for English and the OWH group for Welsh – was determined. This relation is expressed as a percentage at the bottom of Tables 4.7 and 4.8. (e.g. for English, at age two–three, the OEH children’s scores were generally 21.7% lower than those of the monolinguals; the WEH children’s were 37.7% lower; and the OWH children’s were 40.6% lower; for Welsh, at age two–three, the WEH children’s scores were 25.3% lower than the OWH children’s, and the OEH children’s scores were 45.6% lower; and so forth.)

Given this overall relative performance at each age for each home language group, each sub-score was then examined to see if it fell within the normal performance for that home language group. An arbitrary leeway margin was set at 10% of the monolingual score around the mean range for the given group. Any scores that did not fall within the given mean range plus or minus that 10% are shown boxed in bold in the tables. Those above the expected range are shown boxed with solid bold lines; those below that range are shown boxed with broken bold lines.

On examination of these data, we can see the following. First, there are relatively few cases of acceleration, at least as defined here. There are only two cases for English, five for Welsh – in contrast to 20 cases of depressed scores for English and 25 for Welsh. Secondly, the cases in which acceleration is observed fall into both the upper and lower structures in the charts – that is, in both cases where acceleration could be predicted to occur and cases for which deceleration might be predicted. The specific cases here where possible acceleration is shown are, in English, in the two- to three-year-old OWH children’s performance on the comparative, and the four- to five-year-old OEH children’s performance on the SO relatives; and in Welsh, in the WEH children’s performance on the future at age two to three and on partial quantification, the present perfect, SS relatives, and SO relatives at ages four to five. Note that the cases in which possible deceleration is observed also fall into both the upper and lower structures. About half fell into the upper structures (9 of 20 in English and 13 of 25 in Welsh) and half into the lower.
Table 4.7  ENGLISH performance by structure, age, and home language

<table>
<thead>
<tr>
<th>Structures</th>
<th>2–3</th>
<th>4–5</th>
<th>7–8</th>
<th>13–15</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>OEH</td>
<td>WEH</td>
<td>OWH</td>
</tr>
<tr>
<td>A. Similar:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Comparative</td>
<td>0.78</td>
<td>0.90</td>
<td>0.69</td>
<td>1.13</td>
</tr>
<tr>
<td>Superlative</td>
<td>0.83</td>
<td>0.60</td>
<td>0.54</td>
<td>0.66</td>
</tr>
<tr>
<td>Future</td>
<td>0.91</td>
<td>0.80</td>
<td>0.39</td>
<td>0.50</td>
</tr>
<tr>
<td>Universal/Exhaustive</td>
<td>0.91</td>
<td>0.60</td>
<td>0.54</td>
<td>0.44</td>
</tr>
<tr>
<td>Existential/Non-exhaustive Quantification</td>
<td>1.00</td>
<td>0.80</td>
<td>0.31</td>
<td>0.50</td>
</tr>
<tr>
<td>B. Dissimilar:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Passive</td>
<td>1.13</td>
<td>1.00</td>
<td>0.62</td>
<td>0.81</td>
</tr>
<tr>
<td>Present Perfect</td>
<td>1.00</td>
<td>0.70</td>
<td>0.54</td>
<td>0.69</td>
</tr>
<tr>
<td>Time conjunctions</td>
<td>1.30</td>
<td>0.60</td>
<td>0.62</td>
<td>0.44</td>
</tr>
<tr>
<td>OS Relative Clauses</td>
<td>0.87</td>
<td>0.70</td>
<td>0.69</td>
<td>0.44</td>
</tr>
<tr>
<td>SS Relative Clauses</td>
<td>0.78</td>
<td>0.80</td>
<td>0.46</td>
<td>0.25</td>
</tr>
<tr>
<td>SO Relative Clauses</td>
<td>0.87</td>
<td>0.50</td>
<td>0.69</td>
<td>0.44</td>
</tr>
<tr>
<td>AVERAGE, all structures</td>
<td>1.06</td>
<td>0.83</td>
<td>0.66</td>
<td>0.63</td>
</tr>
<tr>
<td>MON – %</td>
<td>21.7</td>
<td>37.7</td>
<td>40.6</td>
<td>10.5</td>
</tr>
</tbody>
</table>
Table 4.8 WELSH performance by structure, age, and home language

<table>
<thead>
<tr>
<th>Structures</th>
<th>2–3</th>
<th>4–5</th>
<th>7–8</th>
<th>13–15</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>OEH WEH</td>
<td>OWH</td>
<td>OEH WEH</td>
<td>OWH</td>
</tr>
<tr>
<td>A. Similar:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Comparative</td>
<td>0.60 0.46</td>
<td>0.94</td>
<td>0.78 1.26</td>
<td>1.55 2.35</td>
</tr>
<tr>
<td>Superlative</td>
<td>0.60 0.77</td>
<td>0.69</td>
<td>0.87 1.05</td>
<td>1.55 1.76</td>
</tr>
<tr>
<td>Future</td>
<td>0.10 0.39</td>
<td>0.25</td>
<td>0.48 0.68</td>
<td>0.91 0.69</td>
</tr>
<tr>
<td>Universal/Exhaustive</td>
<td>0.20 0.69</td>
<td>0.88</td>
<td>1.00 1.21</td>
<td>1.55 2.41</td>
</tr>
<tr>
<td>Quantification</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Existential/Non-exhaustive</td>
<td>0.50 0.46</td>
<td>0.81</td>
<td>0.91 1.58</td>
<td>1.27 2.45</td>
</tr>
<tr>
<td>Quantification</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B. Dissimilar:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Passive</td>
<td>0.40 0.31</td>
<td>1.13</td>
<td>0.91 1.00</td>
<td>1.68 2.17</td>
</tr>
<tr>
<td>Present Perfect</td>
<td>0.70 0.69</td>
<td>1.06</td>
<td>1.26 1.63</td>
<td>1.36 2.41</td>
</tr>
<tr>
<td>Time conjunctions</td>
<td>0.20 0.69</td>
<td>0.81</td>
<td>1.04 1.26</td>
<td>1.32 1.97</td>
</tr>
<tr>
<td>OS Relative Clauses</td>
<td>0.30 0.08</td>
<td>0.56</td>
<td>0.70 1.00</td>
<td>1.55 1.97</td>
</tr>
<tr>
<td>SS Relative Clauses</td>
<td>0.40 0.23</td>
<td>0.38</td>
<td>0.65 1.16</td>
<td>0.82 1.48</td>
</tr>
<tr>
<td>SO Relative Clauses</td>
<td>0.10 0.54</td>
<td>0.63</td>
<td>0.61 1.21</td>
<td>0.86 1.28</td>
</tr>
<tr>
<td>AVERAGE, all structures</td>
<td>0.43 0.59</td>
<td>0.79</td>
<td>0.97 1.30</td>
<td>1.46 2.03</td>
</tr>
<tr>
<td>OWH – %</td>
<td>45.6 25.3</td>
<td>33.6 11.0</td>
<td>12.5 8.2</td>
<td>4.4 3.3</td>
</tr>
</tbody>
</table>
Such data provide little support for any of the predicted cases under an acceleration hypothesis. That is, there does not appear to be any strong evidence in favor of children’s learning how to say X in language A by transferring what they’ve learned about how to say X in language B. Any cases of relatively advanced performance are few and dispersed, and they do not show a strong advantage for any one sub-group of bilinguals.

If that is the case, how, then can we best account for those cases in which acceleration does appear to have occurred? As conjectured above in relation to correlations occurring across the two languages, one plausible explanation is that, rather than reflecting children’s bootstrapping from one structure to the other, the effects observed reflect a cognitive, metalinguistic, or metacognitive advance that affects performance in both languages. This would mean, not the transfer of one grammar to the other, but, for example, gaining the cognitive underpinnings necessary for the processing of the structures in question and applying that cognitive knowledge or facility to the acquisition of both languages. Or, alternatively, it could mean gaining a metalinguistic or metacognitive awareness of a message or meaning that can be encoded by language and applying that awareness to the acquisition of both languages. For example, a child may discover (metalinguistically) in one language that future time or recent past time can be a linguistically relevant notion to be encoded, and this may make the discovery of the means to express that in the other language more viable.

In summary, careful analysis of bilingual children’s abilities in English and Welsh at four ages failed to provide support for an approach positing direct interaction between the morphosyntactic systems of these children’s two languages, much like the findings in Chapter 3. Any evidence we have seen suggesting that acquisition in the two languages might be ‘informed’ by a common source appear to be better explained as deriving from the child’s knowledge at some other level – most likely metalinguistic, cognitive, or metacognitive.

Semantic knowledge

Let us turn to possible interaction in another realm, linguistic semantics. Our particular focus is on lexical semantics encoded differently in bilinguals’ two languages. Specifically, in order to examine bilinguals’ knowledge of the semantics of their two languages, we have been carrying out a series of studies to examine bilinguals’ linguistically related categorization, in particular in cases in which the two languages differ. No two languages cut up the semantic space in exactly the same ways. Thus, for example, English has one word for many types of brush, whereas Spanish distinguishes brushes for hair (cepillo) from brushes for painting (brocha); Spanish categorizes stairs and ladders as one sort of thing (escalera), whereas English mandatorily differentiates stairs from ladders. English has one word, key, for keys to open doors and
keys on a computer keyboard, whereas some dialects of Welsh have two totally separate categories for these, goriad vs. allwedd; but Welsh has one word that can be used for both thumbs and big toes, bawd, whereas English necessarily keeps these separate. English has one word, tree, for all kinds of trees, whereas Arabic distinguishes deciduous trees, shajarah, from date trees, nakhla; in contrast, Arabic has one category for clocks and watches, saeah, whereas English keeps these separated into two categories.

The question is how bilingual speakers handle such differences internal to the semantics of words in their two languages. We know that one of the tasks of a word-learning child is to learn what the boundaries of application are for words. They make frequent errors of underextension and overextension, indicating that this process is far from simple (Anglin, 1977; Bowerman, 1978; Clark, 1973; Dromi, 1987, 2009; Kay & Anglin, 1979). It is also clear that children are guided by the structure of their specific language in establishing semantic categories; this is widely attested for a wide range of semantic fields (Berman & Slobin, 1994; Bowerman, 1996a, 1996b; Bowerman & Choi, 2001; Choi, 2006; de León, 2009; Gathercole & Min, 1997; Gathercole et al., 2000; Imai & Gentner, 1997; Li, 2009; Narasimhan & Brown, 2009; Weist, 2008). Yet, at the same time, the possible semantic organization children entertain is far from random – it is to some extent informed by the (nonlinguistic) cognitive knowledge of the child. Thus, for example, children’s overextensions are often based on similarity of shape and function, seldom by similarity of color or size (Clark, 1973). That is, children’s semantic hypotheses are affected by their cognitive knowledge of what is likely to be judged as ‘similar’ on some level.

We hypothesized that bilinguals’ establishment of semantic categories in their two languages would be influenced by the two languages in question, in interaction with their growing cognitive understanding of the world. This would be especially true of early bilinguals, such as simultaneous bilinguals and early L2 bilinguals, less likely with late L2 bilinguals. In the latter case, categorization in the L1 has been established by the time the acquisition of the L2 begins, so the hypothesis was that such bilinguals are more likely to exemplify L1-to-L2 transfer of semantic categories than L2-to-L1.

We also hypothesized that the level of interaction would depend on the type of category. In our research, we have grouped semantic, language-specific categories into three major types, based on the semantics of the wider words (e.g. brush, escalera, key, bawd, tree, and saeah in the examples above). First, a ‘classical category’ is one that contains items whose membership, despite the fact that they are objectively, ‘-etically’, distinguishable, is specifiable in terms of necessary and sufficient conditions. Thus, for example, among the categories mentioned above, bawd in Welsh (containing both thumbs and big toes) can be defined as ‘the largest of five digits extending from any of the four limbs of a human’, escalera in Spanish (containing both stairs and ladders) as ‘a multi-runged vertical construction used to ascend by foot to a higher height’, and saeah in Arabic (clocks and watches) as ‘a timepiece’. A second
major type or category is a ‘radial category’ (Lakoff, 1987), in which a central application of a word has been conventionally extended in a motivated fashion beyond the central use, but for which membership cannot be specified with necessary and sufficient conditions. Thus, for example, **aien** in Arabic has as its central application eyes, but it is also used, by metaphorical, but conventionalized, extension to stove burners; **pintura** in Spanish refers centrally to paint, but it also is used for the product of paint, a painting; **pen** in Welsh refers to a head, but also to the end or top of something, such as the top of a list; and **glass** in English refers centrally to the material, but has been conventionally extended to drinking receptacles made from this material, and then also any similar drinking receptacle, even if it is made of plastic.

We might represent such classical and radial types as $F_1$ and $F_2$ in the hypothetical language $A$ at the top in Figure 4.3 (from Gathercole & Moawad, 2010: 7). $F_1$ represents a lexical form that refers in the cognitive space to etically distinguishable referents, $x$ and $y$, but the language pulls these together by $F_1$ under a common meaning, $m_1$, with $m_1$ specifiable via necessary and sufficient conditions. $F_1$ is an example of a classical category in language $A$. $F_2$ is an example of a radial category. It represents a lexical form that refers in the cognitive space to distinguishable referents, $a$ and $b$, that are linked in some way, by similarity of shape, function, association, or the like, but, crucially, $a$ and $b$ do not share a set of criterially defining features. The language pulls $a$ and $b$ together by $F_2$ under a (complex) meaning structure $m_2$.

These can be compared with a third type, homophones, represented by $F_3$ in Figure 4.3. Homophones are words that share the same form (phonological shape), but they refer to items so distant in the cognitive space, $p$ and $q$, that no speaker of language $A$ would consider the referents to belong to the same category, even though the language could be considered to be ‘inviting’ them to do so.

These contrast with the categories in the hypothetical language $B$, in Figure 4.3, in which each of the referents shown in the conceptual space – $x$, $y$, $a$, $b$, $p$, and $q$ – all have distinct labels or forms in language $B$, and, hence, belong to distinct categories, each of which corresponds to a different semantic meaning.

Our primary question has been how bilinguals process categories such as those shown in Figure 4.3, when their two languages categorize referents in distinct fashion. We have focused on cases in which one language has a wider category than the other and subsumes two distinct categories from that other language, as in $F_1$ versus $f_1$ and $f_2$ in Figure 4.3. We have been examining this question with various types of bilinguals from a variety of language pairs, including Arabic-English (Gathercole & Moawad, 2010; Gathercole et al., 2009), Welsh-English (Tomos, 2011), and Spanish-English (Gathercole et al., 2009, 2010, 2011; Gathercole et al., 2008; Stadthagen-González et al., 2009).

Typical data are those reported for Arabic-English bilinguals. In that case, two sets of bilinguals were studied, early L2 learners of English
(beginning E before age 6) and late L2 learners (beginning English after age 12), as well as monolingual speakers of Arabic and English. Speakers were asked to judge which pictures, out of six, could be labelled by a given word, either in Arabic or English. Words included half in which English had the wider category (such as *tree*), and half in which Arabic had the wider category (such as *sateah*). When the word was from the wider language, two pictures were appropriate; when it was from the narrower language, one
picture was appropriate. Words came from classical, radial, and homophonic category types.

The results from that study are shown in Figure 4.4 (from Figure 4.2, Gathercole & Moawad, 2010: 7). Those bilinguals tested in English performed much lower than monolingual English speakers when English had a wider category than Arabic. When English was narrower, the bilinguals

![Figure 4.4: Performance on English and Arabic by bilinguals and monolinguals (from Gathercole & Moawad, 2010)](2721_Ch04.indd)
performed well on the radial and homophonic categories, but on the classical categories, they performed below the monolinguals, especially the early L2 bilinguals. That is, the early bilinguals carried over the wider classical category from Arabic to their L2, English.

Those bilinguals tested in Arabic, on the whole, performed similarly to their monolingual Arabic-speaking counterparts. The main exception to this was in performance on classical categories for which English had the wider scope. Here, the early L2 bilinguals applied the wider categorization from English to their L1, Arabic. We have been obtaining similar results in cases of simultaneous bilinguals (Tomos, 2011; Gathercole & Moawad, 2010; Gathercole et al., 2009, 2010, 2011; Gathercole et al., 2008; Stadthagen-González et al., 2009), and have found as well that language dominance in the community also plays an important role in how all bilingual groups perform.

Our interpretation of such data are that semantic interaction phenomena in bilinguals are, first, widespread, and, secondly, most apparent in the case of categories that bring together items in the conceptual space that are close together – namely, classical categories. Semantic interaction between the two languages is least likely to occur in cases in which the referents are distant conceptually, that is, in the case of homophones.

Model of constructing a language

How can we account for results such as those above? What model can collectively provide for (1) minimal interaction at the local level (within morphosyntactic constructs); (2) the influence of cognitive, metalinguistic, and metacognitive abilities; and (3) a higher level of interaction within the semantic realm than elsewhere? These phenomena seem to fall out naturally when seen within an emergentist perspective on language development and given the fact that the two languages are being constructed in a single individual with a single brain and cognition. That is, these effects are natural consequences of the emergent nature of two languages developing in a single individual.

First, certain principles have been documented over the last half century regarding the processes of learning a first language (see Gathercole, 2007). These include the following:

(1) Piecemeal acquisition. Children initially accumulate bits and pieces of knowledge in a haphazard fashion. Initially, these pieces may not be linked, and they become linked later only as more and more connections between them are accumulated.

(2) Acquisition in context. Children’s initial knowledge is embedded within context – including both the situational and real-life context and the linguistic context in which linguistic items are experienced. The latter includes statistical learning, for which there is wide-ranging evidence in
acquisition at all levels of the language (e.g. Croker et al., 2000; Freudenthal et al., 2002; Jusczyk, 1999; Li, 2003, 2009; Li et al., 2004; Pelucchi et al., 2009; Saffran, 2003).

(3) Emergence of structure from accumulated knowledge. As the initially piecemeal knowledge grows and begins to form interconnecting links, structural properties emerge, leading often to reorganization and higher-level abstractions of such knowledge (Bowerman, 1982; Elman et al., 1997; Karmiloff-Smith, 1978, 1979).

(4) Influence of language on timing and sequence of acquisition. Language is learned in language-specific fashion. Complexity has to do to a large extent with language-specific properties, including the relative opacity of structures (Gathercole, 2002c; Gathercole, 2007; Gathercole & Hoff, 2007; Gathercole & Montes, 1997; Gathercole et al., 2001; Lieven, 1994; Moawad, 2006; Thomas, 2001), cue reliability, and form-function pairings (MacWhinney et al., 1984; McDonald, 1987).

(5) Role of exposure for timing/speed of acquisition. Finally, the speed of acquisition of a language has partly to do with the level of exposure to a language (Li & Associates, Inc., 2005).

If we take the first two and the fourth of these and examine their import for bilingual acquisition, the implication is that initial acquisition will respect the contexts in which forms are heard. On the nonlinguistic level, this means we can expect distributed learning—for example, knowing how to say things in one context in one language, but in another context in the other language. On the linguistic level, this means associating linguistic forms—morphemes, affixes, etc.—with the linguistic contexts in which they have been heard. Children are excellent at picking up the constellations of constructs that they hear together in the input (e.g. Jusczyk, 1999; Saffran, 2003), even in cases of homonymic forms (Clark & de Marneffe, 2012; Veneziano & Parisse, 2010). Bilingual children are good at keeping given morphemes, especially bound morphemes, associated with forms with which they have occurred (Gathercole, 2007; Gathercole, 2002a, 2002b; see Deuchar & Vihman, 2005, for early mixing involving predicates). It is not surprising, then, that at a local level, within the morphosyntactic systems of their two languages, bilingual children keep the two languages fairly separate, since they have occurred in separate linguistic constellations in the input.

If we take the third principle, whereby some level of abstraction is occurring through multiple linkages, we can expect some interaction between the child’s two languages to begin occurring in the places where the two languages might ‘meet’ in such multiple linkages. Where is that likely to occur? Precisely in the place where the two languages must of necessity meet—one of these is at the common cognition through which the languages are being learned and processed. What is included in that common cognition? We can expect it to include at least the following: (1) the child’s emerging understanding of the
world – including judgments of similarity and differences (of shape, of function, of properties, etc.), of social interaction, and the like; (2) the child’s processing abilities – including short term memory span, long term memory, speed of processing phonological input, and the like; (3) the child’s growing understanding of the linguistic purposes of language – including what constitutes a proposition, abstraction of what types of meaning can commonly get encoded (e.g. specification of time in the past; spatial relations; quantities; relative quantities), and the like; (4) the child’s growing understanding of the pragmatic purposes of language – including the pragmatic structure of discourse into topics and comments, even perhaps the combinatorial potential of oral and gestural communication.

We have seen evidence of the first of these, a common understanding of similarity, linked with semantic organization in the bilingual’s two languages in our work and others’ work on semantic interaction in bilinguals in relation to categorization: the closer in the conceptual space the members of categories are, the more susceptible crosslinguistically non-isomorphic categories are to convergence. The second, the child’s processing abilities, we have suggested may be key in relation to the potential acceleration observed above in the area of some types of relative clauses: potential growth in processing capacity may underlie advances in both languages in such areas. Effects related to the third, a meta-cognitive understanding of the uses of language, would include evidence indicating, for example, shared word order across a bilingual’s two languages for expressing arguments of propositions; shared use of overt markers for essential elements of propositions, such as subjects; potential acceleration in the expression of general linguistic encoding such as past or future tense marking; and the like. And the fourth, the growing understanding of the pragmatic uses of language, would be operative in cases in which the child discovered, for example, a particular word order for expressing topics. The full range of expectations still needs to be worked out, but the overriding principle is that it is the unified cognitive and meaning base with which the two languages connect that leads to shared associations between the two languages.

This perspective on interactive influences in the languages of bilinguals is radically different from one in which the modules of language are seen as distinct and in which interaction occurs at the interface between those modules. That type of model cannot account for the morphosyntactic facts laid out here, and it lacks power for predicting and explaining interactions of the semantic type explored here.

Conclusion

We have attempted to examine in detail potential evidence for interaction between a bilingual speaker’s two systems at two levels, that of morphosyntax
and of semantics. Careful analysis of bilingual children’s abilities in English and Welsh at four ages failed to provide support for an approach positing direct interaction between the morphosyntactic systems of these children’s two languages. Any evidence we have seen suggesting that acquisition in the two languages might be ‘informed’ by a common source appear to be better explained as deriving from the child’s knowledge at some other level – most likely metalinguistic, cognitive, or metacognitive.

At the same time, evidence on speakers’ processing of linguistically encoded categories that differ in their two languages suggests very prolific interactions between the bilingual’s two semantic systems. This appears especially true in cases where the semantics encoded have to do with closely related cognitive spaces, and especially in those bilinguals whose linguistic and cognitive development take place contemporaneously, as in simultaneous bilinguals or early L2 learners.

Such phenomena can be explained through an emergentist perspective on language development. Principles that appear operative in language acquisition in both monolinguals and bilinguals can help provide insight into the reasons why interaction is observed in some areas and not in others. Such a view leads to further predictions for linguistic phenomena in bilinguals beyond those explored here; future research can help to test the extent to which such predictions are borne out.

Another type of interaction is explored in the next section of the book, the interaction of the bilingual’s two languages in discourse. Specifically, it addresses bilinguals’ choice of language in code-switched utterances.

Notes

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(2) Welsh has another future form, in which the verb takes a finite inflection. That form was not tested here.

(3) This term is taken from the phonetics/phonemic distinction – the former has to do with the raw, objective nature of sounds, the latter with the structuring and functioning of the sound system and contrasts in it in the particular language.

(4) This type of category is most similar to phonemic categories in phonology – we can specify the phoneme on the basis of shared phonetic features, and the phones brought together by that phoneme are often treated as indistinguishable by native speakers of the language.
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