Processing and the bilingual brain

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The cognitive study of bilingualism has recently become a major focus of interdisciplinary research. Two factors are driving this development, one scientific and one technological. The first is the discovery that the fundamental differences between first language acquisition and subsequent language acqutisition may reside in processing abilities rather than in grammatical (morphosyntactic, lexical) knowledge *per se*. The second is the increasing availability of neuroimaging and neurophysiological techniques for the investigation of the normal brain, which make possible unprecedented insight into language processing. The UK is in an ideal position to take the lead in an interdisciplinary research programme on bilingualism that bridges linguistic theory, psycholinguistics, and experimental neuroscience.

Three areas of investigation are central to such a programme. The first deals with 'interfacing' abilities in bilinguals and their relationship to age of first exposure to a language. The key hypothesis (Felser et al, 2003; Sorace, 2003; Tsimpli et al., in press) is that aspects of grammar that require the integration of syntactic knowledge with other types of information (e.g. pragmatic, lexical, semantic, prosodic) are more problematic for bilingual speakers than aspects requiring only syntactic knowledge, and may present residual difficulties even at the near-native level. Neurocognitive studies concur in showing more extensive cerebral activation in non-native processing (regardless of overt "fluency"). Yet much is still unknown about how these interface abilities are affected by age of first exposure and proficiency level, and whether different interfaces are selectively affected . Addressing these questions will require the use of conventional psycholinguistic techniques (including syntactic priming, eye-tracking) in conjunction with time-sensitive neurocognitive approaches to study both production and comprehension in bilinguals and identify the exact locus of processing difficulties. For example, event-related potentials (ERPs) could be used to reveal whether the specific components of referential processing that have been identified in monolingual speakers (van Berkum et al (2003) have a different signature in bilingual speakers.

The second area concerns the effects of a second language on the first ("L1 attrition"). Investigation of these 'reverse transfer effects' has just begun. Linguistic research suggests that the same 'interface' aspects of language that exhibit instability in advanced L2 acquisition are more susceptible to change during L1 attrition, but there is no psycholinguistic or neurocognitive evidence about whether it is specifically *processing* abilities that are involved. This issue would need to be explored in a combination of psycholinguistic and neurocognitive studies that manipulate variables such as language pairs, length of L2 exposure and intensity of L1 use.

The third issue is the extent to which bilinguals share linguistic information between languages. Although there has been considerable work on whether lexical information can be shared, very little is known about other levels of representation, such as syntax, semantics, and discourse. We intend to combine linguistic, psychological and neurocognitive methods to address these issues, asking questions like when it is possible to prime syntactic information between languages (see Hartsuiker et al., 2004), whether neuroimaging suggests separate loci for linguistic information in different languages, and whether natural and experimentally elicited code-switching can be informative about how linguistic information is

integrated between languages. The analysis of the neurological and cognitive aspects of bilingual language processing can shed light on the limits of the human language processor and contribute to our understanding of its functioning in monolingual speakers.

References

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