

The asymmetry in language processing in proficient bilinguals: the wordtype effect.

Asymmetry in bilingual language processing refers to the differences in processing time occurring between the forward translation and the backward translation. The asymmetry is primarily used to evaluate which processing route, conceptual or lexical, is used between L1 and L2 in the mental lexicon (Grainger – Frenck-Mestre, 1998; la Heij et. al, 1996; Sholl et al., 1995). Furthermore, the asymmetry is influenced by the age of language acquisition (Kroll – Stewart, 1994) and word type (de Groot, 1993; de Groot et al., 1994; de Groot – Comijs, 1995; van Hell – de Groot, 1998). In other words, research on the asymmetry can indirectly explain how the mental lexicons of early and late bilinguals differ; and how are various word types processed.

The evaluation of the lexical processing of different word types has been the scope of research by de Groot and her colleagues. Within the category of word types de Groot and Comijs (1995) differentiated between the familiarity variables (word frequency, word familiarity), and semantic variables (concreteness, context availability and definition accuracy). Generally, research indicates that concrete and frequent words are processed faster than abstract and infrequent words. The mixed memory model was devised specifically to account for these phenomena (de Groot, 1993). The key feature of the mixed model framework is the fact that conceptual and lexical connections vary in strength. The strength of connections depends on the magnitude of activation occurring on a particular connection and between particular representations. The more activation occurs on a connection the stronger it gets and the faster the processing on that connection. For example, for the reason that high frequency words result in greater magnitude of activation than low frequency words they possess stronger connections and their processing requires less time.

Moreover, backward translation seems to be more influenced by familiarity variables than forward translation. This phenomenon can be explained by a combination of two facts. Firstly, the backward translation is based on lexical processing and as such is greatly influenced by variables entailing lexical processing. Secondly, the strength of lexical connections seems to be directly proportional to the frequency of words. The occurrence of this interrelation can be explained in the following manner. Frequent words have stronger lexical connections because they are generally more frequently processed in L1 or/and L2, and also during translation from one language to another. Logically then, familiarity variables affect more the backward direction which entails more lexical processing.

The phenomenon that concrete words are easier to process across languages has been explained by means of the decompositional conceptual representation in the bilingual memory (de Groot, 1993; de Groot – Comijs, 1995; van Hell et al., 1998). The meaning of a word is a set of different semantic features forming the semantic representation of this word in the conceptual store. The semantic representations of translation equivalents can to a lesser or greater degree overlap in semantic features. The degree of overlap depends, for that matter, on the word type of the translation pair. Concrete words, for example, would share more semantic features across languages than abstract words and thus, be easier to process across languages.

Furthermore, the forward direction has been proved to be more influenced by the semantic variables, including word concreteness, than the backward directions. The explanation for this finding seems apparent. Forward translation is said to use the conceptual route and sensitivity to semantic variables is naturally associated with conceptual processing. Therefore, the

forward direction will be more strongly influenced by the presence of semantic variables, for example, by processing of words differing in concreteness.

What is more, de Groot et al. (1994) suggest that faster processing in the backward direction can be attributed to abstract words rather than concrete words. In their study concrete words were processed with approximately the same speed in both directions and thus, did not cause any asymmetry, whereas abstract words were processed noticeably faster in the backward direction, triggering the asymmetry.

The main objective of the experiment described below was to establish to what extent lexical processing in proficient bilinguals is influenced by word frequency and word concreteness. The differences in the time of processing in the backward and the forward directions were compared to evaluate the asymmetry of bilingual processing. The outcomes of the experiment served as a basis for comparison with the research presented above. In order to achieve the intended goal the following research questions were put forward. Firstly, is it possible to duplicate the results (de Groot et al., 1994) that high frequency words are processed faster than low frequency words, and that concrete words are processed faster than abstract words. Secondly, do word frequency and word concreteness influence backward and forward translation and to what extent. And thirdly, could it be proven that the asymmetrical processing is an effect produced by a particular word type.

An across-language lexical decision task was conducted on late proficient bilinguals. The participants were asked to decide on the word/nonword status of a string of letters in either their L1 (Polish) or their L2 (English). The appearance of the string of letters was preceded by a brief presentation of a word prime. The target string of letters and the preceding word prime were either in the related condition (the target and the prime were translation equivalents) or in the unrelated condition (the prime and the target were unrelated words). Furthermore, the prime-target pairs varied in word frequency (high/low) and word concreteness (concrete/abstract). For a single participant, the presentation of the prime-target word pair in the related condition co-occurred with a presentation of the same target in an unrelated condition.

The experiment duplicated the general results that high frequency words and concrete words are processed faster than their counterparts. However, according to this experiment the fact that concrete words are generally processed faster than abstract words can be attributed to shorter RTs in the backward direction and only for those concrete words which are simultaneously high frequency words.

Furthermore, the experiment showed that wordtype exerts an influence on the backward and forward translation. However, contrary to the results obtained by de Groot et al. (1994), the forward translation, not backward, was more sensitive to word frequency. This result is probably an outcome of the age of acquisition of the participants. Late bilinguals during language learning rely on translation from L2 to L1 before they establish conceptual connections for L2 words (Kroll – Stewart 1994). Therefore, the representations of both the frequent and infrequent words have the chance to create strong interlingual connections but supposedly, only in the direction of second language acquisition, namely in the backward direction. As a result, the usual discrepancy between the strength of connections for frequent and infrequent words has been maintained only in the forward direction.

Finally, the LTD experiment, showed that shorter RTs in the backward direction are caused by concrete words (although the results for the interaction between direction and concreteness were not significant in this experiment) which display greater discrepancy in the processing speed between the two directions.

References:

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