

# Lexical processing in Thai-English bilinguals

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This main focus of the research reported in this paper is upon the role that phonology has to play in the early stages of visual word recognition. However, it will be argued that in order to unambiguously examine the contribution that phonological processing has to make to lexical access, it is necessary to use a masked priming procedure with a particular subject group. Why these two features are necessary will be considered below.

Over the past quarter of a century there has been a continuing debate concerning the role of phonology in the identification of written words. That phonology has a role has been demonstrated in a number of experimental tasks: In nonword rejection times in lexical decision (Rubenstein, Lewis and Rubenstein, 1971), in sentence verification, (Baron, 1973), the Stroop task (Dennis & Newstead, 1981), and in proof reading (Gough & Cosky 1977). In each of these tasks the subject's performance indicated that they had phonologically processed the written foils (either by an increase in their correct rejection times or by an increase in their error rates).

On the other hand it has been argued that phonological recoding is not the only way to gain access to a word's lexical entry (Meyer, Schvaneveldt & Ruddy, 1974; Coltheart, 1978; Coltheart, Davelaar, Jonasson & Besner, 1977). These authors have suggested that lexical access can also proceed directly using the visual representation of the stimulus. In this regard it is pointed out that homophones exist in many languages. How could the meaning of the appropriate homophone be derived without recourse to how they are spelled? Further, in some languages such

as English many words have irregular spellings (e.g., yacht); some means of ensuring that such words be pronounced properly appears necessarily to involve an orthographic analysis. Clearly this is the situation for languages like Chinese that use character-based rather than alphabetic writing systems.

In short, although the existence of phonological influences on reading are not denied what is questioned is whether such influences must affect the process of lexical access. That is, the automaticity of these phonological effects has been questioned. For example, McQuade (1981) demonstrated that the pseudohomophone effect in lexical decision does not always emerge but seems to be dependent on the proportion of pseudohomophones present in the experiment.

Recently, however, new evidence that phonological activation occurs automatically in visual word recognition has been reported. For instance, Van Orden (1987) has reported that subjects produce larger false positive error rates in a semantic categorisation task when they respond to stimulus foils that are homophonic to category exemplars (e.g. ROWS for the category A FLOWER) than when they respond to spelling control foils (e.g., ROBS). These results suggest that a phonological code has been derived from the letter sequence ROWS, contacting the lexical representation of ROSE. This phonological code then gives rise to interference in decision making.

However it is not clear that the semantic categorisation task is a suitable response measure with regard to making claims regarding access processes alone. It has been suggested that this task may be sensitive to more than just lexical access,

requiring as it does access to word meaning, and not just to stored knowledge about the word form, (Forster, 1985; Verstaen, Humphreys, Olson and D'Ydewalle, 1995).

Other recent evidence supporting the view that phonology is automatically involved in word recognition comes from studies by Perfetti, Bell and Delaney (1988). These experiments are potentially more likely to index automatic phonological access to the lexicon as the response measure used (tachistoscopic word identification) requires at only the recovery of the visual form of the stimulus. In this procedure, subjects have to identify a briefly presented target word that has been masked by a letter string that is either phonologically related or not. Masking is reduced when target and mask have a phonological relationship.

However, while tachistoscopic identification in principle requires only detection of visual form, both Brysbaert and Praet (1992) and Verstaen, et al., (1995) have shown that phonological effects in backward masking may be strategy dependent. Such findings cast doubt on the utility of using such effects for arguments about the automaticity, or indeed even the primacy of phonological effects on word recognition.

The current set of experiments avoids these problems by using the masked priming technique developed by Forster and Davis (1984). In this procedure a sequence of visual stimuli are presented in rapid succession, each stimulus being superimposed on the previous one. The initial stimulus acts as a visual mask; the second as a prime, and the third as a target, which also acts as a backward mask.

The initial visual mask and the target (backward mask) are clearly visible; the prime is displayed relatively rapidly and the combined action of the forward and backward masks makes it unavailable for conscious report.

This masked priming procedure uses lexical decision as the response measure. This minimizes some above mentioned concerns regarding the nature of the response task and has been shown to be resistant to the proportionality effects typically found when related words are clearly presented (Von Baggo, 1990). Further this procedure is unaffected by a problem that possibly invalidates the masked priming technique of Evett and Humphreys (1981) and Perfetti et al. (1988) (see Davis & Forster, 1994).

Recent results using this techniques have provided evidence against the importance of phonological effects in reading (Davis, 1990; Davis, Iakovidis & Castles, submitted). These studies (in English) examined the effects of homophonic and pseudohomophonic primes on targets and showed that there was no benefit to processing for these "sound-the-same" primes when compared to graphemically matched controls.

The problem with accepting these findings unequivocally is that it is possible that potential phonological effects have been concealed by an opponent process operating at the orthographic level. Simply put, the phonological effects that arise when reading are cancelled out by opposing orthographic effects (see McClelland & Rumelhart, 1981).

One way to avoid such cross-activation between the orthographic and