The aim of this study was to investigate whether priming emerged for a large category when orthographic overlap between primes and targets was completely eliminated by presenting the primes as pictures and the targets as words. The results showed that this was the case, but only when a large target set was used. The absent priming for small target sets could be caused by the fact that in this case subjects do not semantically process the targets (and thus the primes) because they can be categorized based on subword elements or recalled from short-term memory.

Crucially, our results cannot be explained by the reigning non-semantic accounts (e.g. Damian, 2001; Kunde, Kiesel & Hoffmann, 2003) and provide strong evidence for the claim that subliminal primes can be genuinely semantically processed (Dehaene et al., 1998).

Introduction

Can semantic information be extracted from subliminally presented stimuli and subsequently influence behavior? To answer this heavily debated question, researchers commonly apply a standard masked priming paradigm where the categorization of a target word is influenced by a preceding masked prime word. Priming effects obtained with novel primes from a large category (e.g. animals) are taken as evidence of semantic processing of subliminal information (e.g. Van den Bussche & Reynvoet, 2007). However, it has been argued (e.g. Abrams & Greenwald, 2000) that when orthographic overlap between primes and targets is present (e.g. cat - cow), the obtained priming effects might stem from subword processing rather than from semantic analysis of the primes.

To eliminate this confound of orthographic overlap, we designed an experiment using words as target and pictures as primes.

Method

- N = 21
- Fig. 1: sequence of a trial
- Task: categorize targets as animals or non-animals
- Primes: 50 pictures of objects and animals
- Targets: 2 conditions: 4 (small target set) or 50 (large target set) animal and object words
- Post test to assess prime visibility: perform same task, but now on the primes – primes could not be classified above chance, ensuring their subliminal nature!

Results

Priming effects in this study are expressed by faster response times to congruent trials (i.e. prime and target belong to the same semantic category) compared to incongruent trials (i.e. prime and target belong to different categories). Median RTs from correct responses were submitted to a repeated measures analysis with target set size (small or large), nature of targets (animals or non-animals) and congruency (congruent or incongruent) as within-subject factors.

A significant interaction between target set size and response congruency was observed (F(1,20) = 5.62, p = .03). The congruency effects were only significant for the large target set (9 ms, t(20) = 2.44, p = .02 for the animal targets; 8 ms, t(20) = 2.08, p = .05 for the non-animal targets). The congruency effects for the small target set were not significant (0 ms, t(20) = -0.04, p = .97 for the animal targets; 1 ms, t(20) = 0.20, p = .84 for the non-animal targets).

The effects are depicted on Figure 2.

Conclusion

The aim of this study was to investigate whether priming emerged for a large category when orthographic overlap between primes and targets was completely eliminated by presenting the primes as pictures and the targets as words. The results showed that this was the case, but only when a large target set was used. The absent priming for small target sets could be caused by the fact that in this case subjects do not semantically process the targets (and thus the primes) because they can be categorized based on subword elements or recalled from short-term memory.

Crucially, our results cannot be explained by the reigning non-semantic accounts (e.g. Damian, 2001; Kunde, Kiesel & Hoffmann, 2003) and provide strong evidence for the claim that subliminal primes can be genuinely semantically processed (Dehaene et al., 1998).