ELSEVIER

Discussion

On the masking and disclosure of unconscious elaborate processing. A reply to Van Opstal, Reynvoet, and Verguts (2005)

Wilfried Kunde[a,*], Andrea Kiesel[b], Joachim Hoffmann[b]

[a]*Department of Psychology, Martin-Luther-University Halle-Wittenberg, D 06099 Halle (Saale), Germany*
[b]*Department of Psychology, Julius-Maximilians-University of Wuerzburg, Germany*

Abstract

We have recently argued that unconscious numerical stimuli might activate responses by a match with prespecified action trigger codes (action trigger account) rather than by semantic prime processing (elaborate processing account). [Van Opstal, F., Reynvoet, B., and Verguts, T. (2005). How to trigger elaborate processing? A comment on Kunde, Kiesel, and Hoffmann (2003). *Cognition*] replicate one piece of evidence for our inference—an inefficiency of primes not presented in target format (verbal or Arabic). But this was found only with letter masks and not with hash masks. The authors conclude that letter masks block unconscious prime processing, and that elaborate processing can account for unconscious priming effects if all its (sometimes subtle) side conditions are considered. We agree that the type of mask in general is an important factor in priming studies but we note that (i) the authors' mask-blocking hypothesis is not well supported by the data, (ii) clear evidence for semantic prime processing in their study is lacking and, (iii) differences in mask efficiency (rather than mask type) might account for the conflicting results. To corroborate this inference we replicate van Opstal et al.'s results with letter masks but reduced mask efficiency. Altogether their data do not challenge the action-trigger account nor do they strongly support the elaborate processing view.
© 2005 Elsevier B.V. All rights reserved.

Keywords: Masked priming; Number; Contextual influences

When required to categorize a numerical stimulus as smaller or larger than five responding is faster when the target is preceded by a masked prime that falls on the same side of the five as the target. According to the elaborate processing view this is so, because masked primes are unconsciously analyzed semantically up to the preparation of a task-defined motor response (e.g. Dehaene et al., 1998). Inspired by work by Ach (1910) and Neumann (1989) we have made an alternative suggestion. We reasoned that participants might categorize stimuli into appropriate action triggers depending on expectations and task instructions in advance of stimulus presentation (Kunde, Kiesel, & Hoffmann, 2003). Stimuli that match a trigger activate the corresponding action instantaneously without being processed up to a semantic level. For example, if participants expect the digit 2 to be presented in the experiment, any stimulus resembling the digit 2 will activate its assigned response to some extent without numerical processing or repeated practice. Several observations corroborated this proposal. Numerical primes do not activate responses when they fall outside the expected numerical target range, or when action triggers are recruited by non-numerical properties, or when primes occur in an unexpected format (Arabic instead of verbal or vice versa). Moreover, primes produced congruency effects independent of the numerical distance to the target, hence without a trace of a numerical evaluation.

Van Opstal, Reynvoet, & Verguts (2005) pick out one piece of evidence for the action trigger account (and against elaborate processing), namely the inefficiency of primes in a different format than the targets. Their Experiment 1 shows that primes in unexpected format can affect RTs when masked by hash symbols instead of letters. Experiment 2 shows that number masks reduce priming effects in general compared to letter masks. The results are attributed to a blocking of semantic prime processing by task-relevant mask symbols.

First of all, there is no reason to question the importance of the study's methodological conclusion "that even an apparent detail such as the composition of the mask, can lead to different results" (p. 14). In fact there is growing evidence showing that masks exert more effects than just rendering primes invisible (e.g. Verleger, et al., 2004). Also, the basic idea that the relevance of mask symbols interacts with ongoing prime processing is interesting. However, we question that van Opstal et al.'s explanation of mask-type effects is sufficiently covered by the reported data, and we suggest that mask efficiency rather than mask type might explain the apparent contradictions as well.

1. Important but ambiguous mask type effects (Van Opstal et al.'s Experiment 2)

We first want to comment on Van Opstal et al.'s Experiment 2, which varied trial by trial the format of primes, targets and masks (verbal or Arabic). Priming was generally lower with number masks than with letter masks, which is attributed to the higher "relevance of the symbols by which the mask is composed" (p. 2).

First of all, we find it hard to see why numbers were more relevant than letters in this experiment. After all, targets were presented in numerical and verbal format. So obviously, number masks and letter masks contained relevant objects to a similar extent.