UNCONSCIOUS PROCESSING OF TWO-WORD NEGATIONS: A 'NOT BAD' EXPERIMENT

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ABSTRACT

Subjects classified simple evaluatively polarized target words as pleasant or unpleasant in meaning. Target words were preceded by primes involving either the negation of an evaluatively polarized root word, or just the root word itself. Negated primes consisted of root words preceded by "NOT" (e.g. "NOT CLEAN", "NOT DIRTY") in Experiment 1, and root words preceded by prefixes such as "UN" and "DIS" (e.g. "UNHURT", "DISLOYAL") in Experiment 2. Prime stimuli were presented both subliminally (forward and backward masked) and supraliminally (no masking). In both Experiments 1 and 2, evaluative priming effects were obtained with supraliminal and subliminal primes. The direction of these priming effects, however, was determined entirely by the root words, and was uninfluenced by the presence of negation. This result suggests that the operation of negation, whether morphological or grammatical in form, exceeds the analytic capabilities of unconscious cognition.

INTRODUCTION

The question, 'Is semantic information unconsciously extracted from subliminal text?' has generated a large corpus of methodologically innovative and theoretically divergent literature (see Marcel, 1983; Cheesman & Merikle, 1984; Holender, 1986). Recently, Greenwald and Draine (1995) used a powerful new combination of methodological tools to produce a series of robust, replicable unconscious semantic priming effects (see also Greenwald, Klinger, and Schuh, 1995). These findings were an especially convincing demonstration that the meaning of single words may be analyzed unconsciously.

The present research further explored the linguistic capabilities of the cognitive unconscious by examining priming effects obtained from subliminal prime stimuli involving the operation of *negation*. In Experiment 1, negation was defined as a grammatical operation between two separate words (e.g. "NOT EVIL", "NOT FAIR"). In Experiment 2, negation was defined as a lexical operation between a prefix and a root (e.g. "UNHEALTHY", "ILLEGAL"). If negation can be processed unconsciously, it should be possible to obtain subliminal priming effects that are based on phrase meaning in Experiment 1, and based on the meaning of prefix-negated words in Experiment 2.

METHODS

In both Experiments 1 and 2, subjects classified evaluatively polarized words as pleasant or unpleasant in meaning. On each trial, a prime stimulus (also an evaluatively polarized word or phrase) was displayed for 50 ms. After a variable delay, a target word was presented. Prime and target words were randomly selected on each trial such that they were not the same stimulus. The proportion trials on which prime and target had the same evaluative classification was 50%.

Subjects were given initial practice at responding during a "response window" (Greenwald & Draine, 1995), defined in both experiments as the time interval from 383 to 517 ms following target onset. The response window procedure obliged subjects to respond at speeds that were generally too fast to permit high levels of accuracy. As a result, error rates were relatively high, allowing priming — the influence of the prime's category on classification of the target — to be measured along the dimension of response accuracy rather than latencies.

SUBLIMINAL VS. SUPRALIMINAL PRIMING

Prime stimuli in each block were presented subliminally (visually masked) and supraliminally (no masking) with the order of subliminal and supraliminal blocks counterbalanced across subjects. For subliminal blocks, the prime was both preceded and followed, at the same screen location, by strings of consonants (e.g., GKQHYTPDGFQBYLG) that served as forward and backward masks. The forward and backward masks — presented for durations of 100 ms and 17ms, respectively — made the prime words difficult or impossible to see for almost all subjects. For supraliminal blocks, blanks were presented instead of masks, so the prime stimuli were easily legible. All stimuli were presented in black letters on a gray background.

PRIME-TARGET SOAS

In different blocks of Experiments 1 and 2, the interval between onset of the prime and the onset of the target — *stimulus onset asynchrony* (SOA) — was either 67 ms or 150 ms, with the order of the SOA conditions counterbalanced across subjects. On a given trial of the 150 ms SOA condition, subjects had relatively more time to process the prime stimulus before they could begin processing the target. Given the commonly made assumption that conscious analyses require more execution time than unconscious analyses, conscious processing of the primes was expected to play a larger role in the longer SOA condition than in the shorter condition.

EXPERIMENT 1: 2-WORD PRIMES

Four categories of prime stimuli were used in Experiment 1. *'Bad'* stimuli were unpleasant words (e.g. DIRTY, EVIL, ANGRY); *'Good'* stimuli were pleasant words (e.g. CLEAN, HAPPY, HEALTHY); *'Not Bad'* stimuli were the unpleasant words preceded by "NOT" (e.g. NOT DIRTY, NOT EVIL, NOT ANGRY); and *'Not Good'* stimuli were the pleasant words preceded by "NOT" (e.g. NOT CLEAN, NOT HAPPY, NOT HEALTHY). The chief purpose of Experiment 1 was to determine whether *Not Bad* and *Not Good* primes, presented sub- or supraliminally, produced evaluative priming in a direction consistent with the two-word phrase meaning, or with only the *Good* or *Bad* roots.

EXPERIMENT 2: MORPHOLOGICALLY NEGATED PRIMES

Four categories of primes were also used in Experiment 2. *'Bad'* stimuli were unpleasant words (e.g. SELFISH, HURT, BIASED); *'Good'* stimuli were pleasant words (e.g. HONOR, POLITE, LUCKY); *'UnBad'* stimuli were the *Bad* stimuli with a negating prefix (e.g. UNSELFISH, UNHURT, UNBIASED); *'UnGood'* stimuli were the *Good* stimuli with a negating prefix (e.g. DISHONOR, IMPOLITE, UNLUCKY). Experiment 2 tested whether negation in morphological form could be unconsciously performed. That is, would *UnBad* and *UnGood* primes, presented sub- or supraliminally, produced a pattern of evaluative priming consistent with their complete meaning, or with only their *Good* or *Bad* roots.

RESULTS

EXPERIMENT 1

The dependent variable was Effective Prime Valence (EPV), computed as the error rate for trials with unpleasant targets minus the error rate or trials with pleasant targets. Significant supraliminal and subliminal priming effects were obtained. As can be seen from Figure 1, the magnitude of EPV was determined entirely by the evaluative category of the root words ($F = 35.04$, $p < .001$), and was not moderated by the presence or absence of "NOT" ($F = 1.65$, $p = .21$). Also, magnitude of priming was not significantly moderated by whether primes were sub- or supraliminal ($F = .90$, $p = .35$). Finally, there was no moderating effect of negation on root word priming in either sub- or supraliminal priming conditions ($F= 1.88$, $p = .18$).

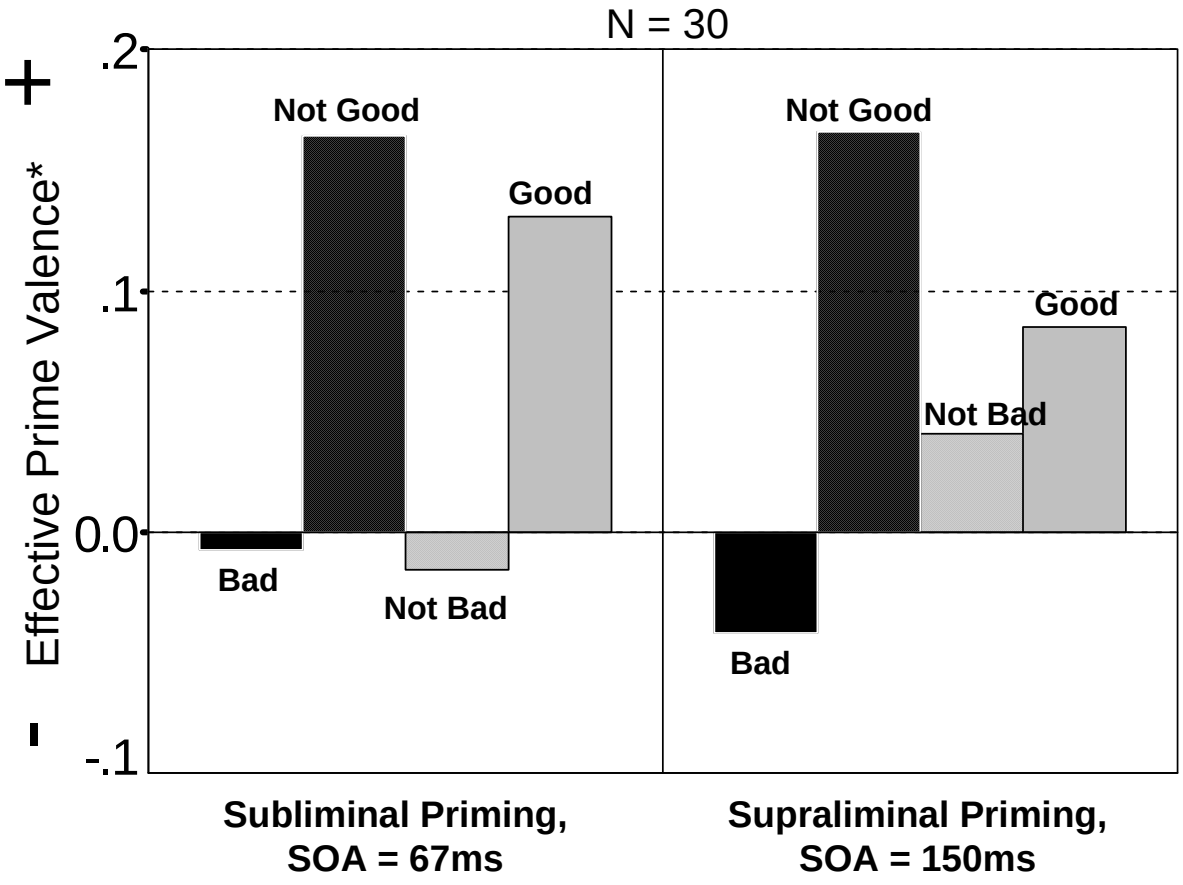
EXPERIMENT 2

Results of Experiment 2 paralleled those of Experiment 1. The dependent variable was again Effective Prime Valence (EPV). As can be seen from Figure 2, EPV was significantly affected by the evaluative category of the root word ($F = 37.68$, $p < .001$). However, the presence or absence of the negating prefix did not affect EPV ($F = .58$, $p = .45$). No effect of sub- vs. supraliminal prime presentation on magnitude of EPV priming was found ($F = .76$, $p = .39$). As with Experiment 2, there was no moderating effect of negation on root word priming in either sub- or supraliminal priming conditions ($F= 1.57$, $p = .22$),.

CONCLUSIONS

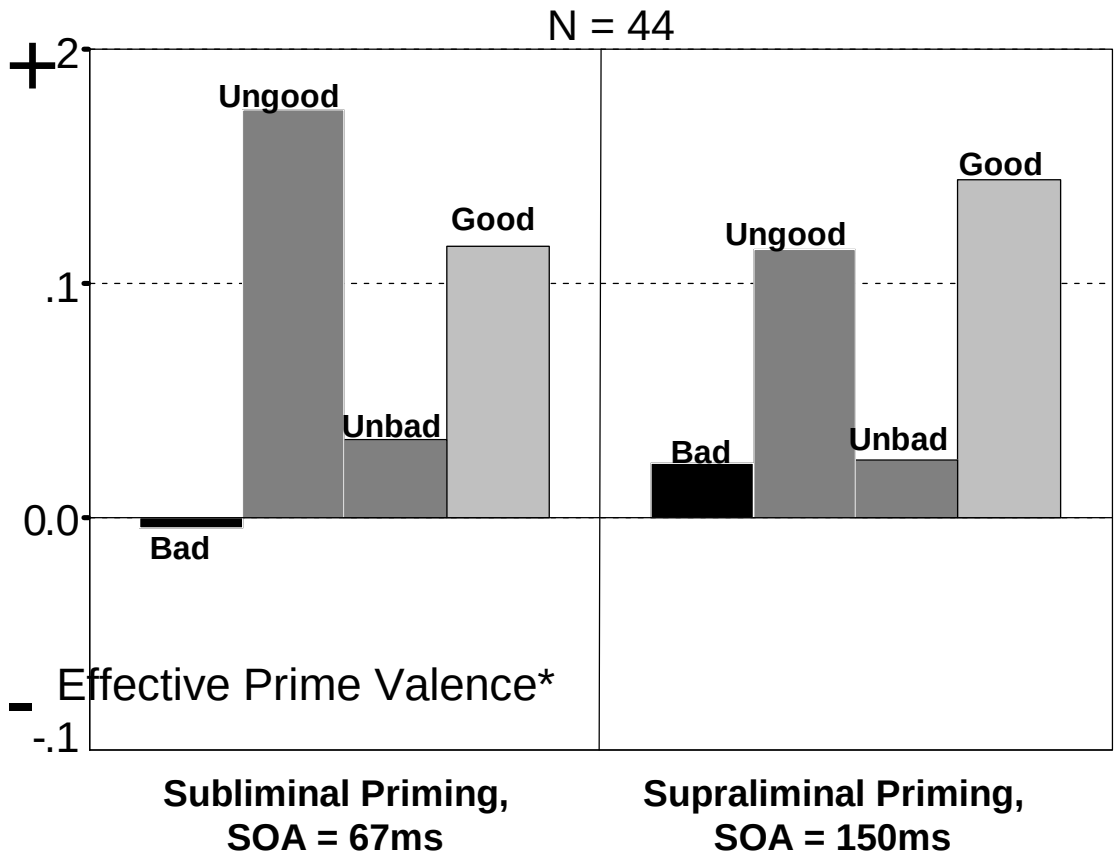
Experiment 1 found no evidence for unconscious processing of two-word negations. Rather, the pattern of priming was determined by single-word components of those phrases. Experiment 2 failed to produce evidence for unconscious processing of morphologically complex words with a negating prefix. Priming in that experiment was determined by the prefix-stripped root words. The results suggest that the cognitive unconscious is restricted to semantic processing of single, morphologically simple words. Grammatical operations, and even some intra-lexical operations that combine single morphemes, may require energy from working memory.

Figure 1
Experiment 1: Two-Word Primes



***Effective Prime Valence =**
P (Erroneous Pleasant Response) - P (Erroneous Unpleasant Response)

Figure 2
Experiment 2: Morphologically Complex Primes



***Effective Prime Valence =**
P (Erroneous Pleasant Response) - P (Erroneous Unpleasant Response)