

# Unconscious perception re-revisited: A comment on Merikle's (1982) paper

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The purpose of this paper is to draw attention to the fact that, contrary to the implications of a recent paper by Merikle (1982), the case for unconscious perception does *not* stand or fall with evidence from the backward masking studies that are the focus of his criticisms. In recent years, evidence from some 11 different areas of research has provided support for the view that the brain can respond to stimulus material of which the recipient remains unaware. A brief summary of some of this evidence is given here. In addition, it is argued that since the threshold-determining procedures employed in the backward masking studies were inappropriate anyway, Merikle's particular criticisms of these procedures are irrelevant.

In his recent critique, in *Perception & Psychophysics*, of backward masking studies that have purported to demonstrate perception without awareness (Fowler, Wolford, Slade, & Tassinari, 1981; Marcel, 1980; McCauley, Parmelee, Sperber, & Carr, 1980), Merikle (1982) made the surprising assertion that there has been little reported evidence since 1960 that seriously challenges the conclusion drawn by Eriksen (1960) that "at present there is no convincing evidence that the human organism can discriminate or differentially respond to external stimuli that are at an intensity level too low to elicit a discriminated verbal report. In other words, a verbal report is as sensitive an indicator of perception as any other response that has been studied" (p. 298).

Merikle (1982) clearly had failed to keep pace with the literature on "unconscious" perception. It is not without significance that in acknowledging that Eriksen's (1960) conclusion is not universally accepted, he cited as a case in point a reference that was already more than 10 years out of date (Dixon, 1971). In a more recent volume, Dixon (1981) discussed not only the research covered in the earlier work but also that covered in many more recent studies, from some 11 different areas of research (see also Dixon & Henley, 1980), which together provide strong support for the view that the brain can respond to stimuli of which the recipient remains unaware, including stimuli that are at an intensity level too low to elicit a discriminated verbal report.

The possibility of "unconscious" perception would seem to have been established beyond reasonable doubt by findings from physiological studies. Of particular

relevance in the present context is that research (e.g., Libet, 1973; Libet, Alberts, Wright, & Feinstein, 1967; Shevrin, 1973; Shevrin & Fritzler, 1968a, 1968b; Shevrin & Rennick, 1967; Shevrin, Smith, & Fritzler, 1969, 1970, 1971) which has shown not only that stimuli of which the subject remains unaware can evoke a cortical response, but, moreover, that the brain can respond differentially to the meaning of such stimuli.

In Libet's (1973; Libet et al., 1967) experiments, which involved recording evoked potentials from the somatosensory cortex of fully conscious human subjects, it was found that tactile stimulation too weak for conscious perception can nevertheless elicit the primary component of the compound evoked potential. Reports of sensation, brought about by an increase in the same stimulation, occurred along with later components of the compound evoked potential.

In the series of experiments by Shevrin and his colleagues (cited above), the primary wave amplitude of the visual evoked response has been found to be greater for meaningful than for meaningless subliminal stimuli (pictures flashed for 1 msec). The meaningful stimuli have also been shown to exert a significant effect—although one quite different from that exerted by the same stimuli presented at supraliminal levels—upon subsequent free associations.

Behavioral evidence for "unconscious" discrimination has come in recent years from a number of diverse areas of research: for example, studies of patients with "blind-sight" (Pöppel, Held, Frost, 1973; Sanders, Warrington, Marshall, & Weiskrantz, 1974; Weiskrantz, 1977; Weiskrantz, Warrington, Sanders, & Marshall, 1974), at least one of whom "can both 'detect' and 'identify' ... but admits to no awareness of either capacity" (Weiskrantz et al., 1974, p. 723); experiments on binocular rivalry (Walker, 1978); studies of perceptual defense (1) using the method of "closed loop control"

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(Dixon, 1958, 1960; Dixon & Haider, 1961; Henley, 1974; Henley & Dixon, 1976), (2) involving investigations of changes in the EEG (Dixon & Lear, 1963, 1964; Emrich & Heinemann, 1966), (3) employing the methodology of signal detection theory (Broadbent & Gregory, 1967; Dorfman, 1967; Hardy & Legge, 1968), and (4) using a sensory scaling approach (Worthington, 1969); pheromonal studies (e.g., Cowley, Johnson, & Brooksbanck, 1977; Kirk-Smith, Booth, Carroll, & Davies, 1978); studies concerned with the effects of material, of which subjects remain unaware, on the unattended channel in dichotic listening (e.g., Corteen & Dunn, 1974; Corteen & Wood, 1972; Forster & Govier, 1978; Govier & Pitts, 1982; Henley & Dixon, 1974; Lewis, 1970; Mackay, 1973; Mykel & Daves, 1979), dichoptic viewing (Philpott & Wilding, 1979; Somekh & Wilding, 1973), and other attentional paradigms (e.g., Bradshaw, 1974; Underwood, 1976, 1977), to name but a few. It should be emphasized that much of this research was not carried out with the purpose of demonstrating the phenomena of perception without awareness. Nevertheless, these studies have in common the fact that they have demonstrated that the human organism can respond to stimuli that are at a signal-to-noise ratio that is too low to elicit a discriminated verbal report.

Clearly, the case for perception without awareness does not stand or fall with the studies of backward masking to which Merikle (1982) devoted his attention.

But what of the criticisms he leveled at these particular studies? These criticisms centered around the procedure used for determining thresholds for discriminated verbal reports. Typically, these thresholds have been based on a series of trials in which the stimulus onset asynchrony (SOA) between the mask and a preceding stimulus was systematically decreased until report accuracy (stimulus present/absent) fell to a predetermined level—usually 50% correct.

Merikle (1982) argued that a 50%-correct performance is an adequate threshold measure only if two conditions are met: (1) It must be established that subjects actually use the two possible responses; and (2) the observed response probabilities must be based on a number of trials sufficient to enable determination of whether the observed S-R correlations for each response differ from those expected on the basis of chance variation. If these conditions are not satisfied (he argued), the observed absence of discriminated verbal reports as indicated by 50%-correct decisions may indicate that (1) just one of the two possible responses was used on most trials, (2) the two responses were used in a discriminative manner that could not be distinguished from chance performance, or (3) the two responses were used in a nondiscriminative manner equivalent to chance performance. Merikle argued that since all the backward masking studies under review included too few trials at the threshold SOAs to establish meaningful response

distributions, it is not possible to determine which of these three interpretations of their threshold data is correct. Thus, in Merikle's view, none of them can provide evidence for or against perception without awareness.

On the face of it, these arguments seem reasonable. However, Merikle (1982) overlooked a much more important issue—the question of whether a forced-choice discrimination task as a means of determining threshold in experiments concerned with perception without awareness is appropriate in the first place.

If it is indeed the case that subjects can respond to verbal stimuli of which they remain unaware, this should apply as much during forced-choice discrimination trials as during any other trials. Support for this contention comes from the results of a study by Rollman and Nachmias (1972), whose purpose was to test two alternative models of the detection process, signal detection theory and low threshold theory. The stimuli used in that study were dim red and green flashes (referred to simply as A and B by the experimenter, in order to avoid giving subjects the impression that the stimuli would necessarily look colored). On some hundreds of trials, subjects were presented briefly with either the red flash ( $S_A$  trials) or the green flash ( $S_B$  trials), or with nothing at all (N trials). On each occasion, they were asked, first, to make a detection response (to indicate whether a stimulus was or was not present) and, second, regardless of the detection response used, to make a "recognition" response (A or B).

The major finding from Rollman and Nachmias's (1972) research was that even on those trials on which subjects were quite confident that no signal had been presented, "recognition" performance was above chance. This finding, which was interpreted by those authors as favoring signal detection theory over low threshold theory, supports the results of previous studies of "unconscious" perception in demonstrating that verbal responses may be influenced by stimuli of which the recipient remains unaware.

Thus, returning to the question of the threshold procedures used in the backward masking studies, the use of a 50%-correct cutoff in a forced-choice discrimination method would seem totally inappropriate. Given that the subject is able to make unconscious discriminations, his or her performance in a forced-choice discrimination task should not be expected to be at the chance level unless it is made absolutely clear that he or she is being asked to report what is *consciously* seen. Under these circumstances, with a systematic decrease in SOA one would expect a corresponding increase in the number of reports of "stimulus absent." If, however, the subject is asked merely to respond "signal present/absent"—in effect, to indicate whether he or she *thinks* a signal was present or absent—performance *should* differ from chance. An equal distribution of "present" and "absent" responses would suggest

that the subject, knowing that an equal number of each type of response was expected of him or her, is doing his or her best to oblige and that this tendency is sufficient to overcome any effect on his or her responses of a subthreshold stimulus.

This does not, of course, answer the charge that the threshold measures employed in the backward masking studies were inadequate. This, as the foregoing considerations would suggest, they may have been, but not for the reasons suggested by Merikle (1982). His particular arguments, given the total inappropriateness of the methods concerned, become quite irrelevant.

However, in defense of the conclusion drawn by the authors of the backward masking studies, that is, that subjects were influenced by the contents of a priming stimulus of which they were unaware, it is worth noting the unlikelihood of subjects' failing to report awareness of stimuli that, in the event, were so clearly related to their responses to target stimuli, had they in fact been aware of them. Merikle's (1982) interpretation of the threshold data of Fowler et al. (1981)—that subjects adopted a stringent criterion for deciding "Yes," a prime word had been presented, that sufficient information was available for discriminated reports if only a less conservative response criterion had been adopted—runs counter to both everyday observation and to the experience of most experimenters who have ever had cause to determine thresholds: Most subjects, reluctant to be found wanting in any respect, err on the side of reporting "signal present" rather than adopting a strict criterion. It is something of a puzzle to this writer that, although emphasizing the notion that verbal reports are as sensitive an indicator of perception as any response that has been studied, Merikle seemed so reluctant to accept the word of subjects who reported non-awareness of stimuli.

Merikle (1982) concluded that his review demonstrated that "an absence of discriminated verbal reports does not necessarily imply an absence of awareness or, *in other words*, an inability to discriminate primes from blank fields" (*italics mine*; p. 301). His grounds for equating absence of awareness and inability to discriminate primes from blank fields are far from clear. However, the weight of evidence does suggest that the converse is true—that is, that the presence of discriminated responses does not imply the presence of awareness.

In sum, contrary to Merikle's (1982) belief, there is now substantial evidence, from a number of different areas of research, to challenge Eriksen's (1960) conclusion that "at present there is no convincing evidence that the human organism can discriminate or differentially respond to external stimuli that are at an intensity level too low to elicit a discriminated verbal report" (p. 298).

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