

What do you mean by conscious?

John Morton

MRC Cognitive Development Unit, London WC1H 0AH, England

What is happening with BBS and word recognition? First Humphreys and Evett (1985) and now Holender require unrealistic standards of proof before one is allowed to adopt particular theoretical positions. Humphreys and Evett were at least pushing a default theory, but it isn't clear at all what contribution is being made by the target article to the development of our ideas. Methodological surveys are important. We would, of course, need to be told if there were an artifact in, say, one of the Marcel (1983a) experiments, but that Holender is allowed to make such claims outside the context of, say, the Marcel (1983b) theoretical paper is a commentary in itself. Whether there are such artifacts we will no doubt be told by other contributors, but, in any case, it should not be lost sight of that what counts as an artifact depends upon the definitions of the terms in the theoretical description, which, in turn, depend upon the model one is using. Holender eschews theory, and so *conscious* and *semantic* are defined only in terms of particular procedures and by covert appeal to the everyday use of related terms such as *aware*.

In fact, consciousness can be regarded as epiphenomenal, or as a set of constructive processes equivalent in kind to the rest of the information-processing equipment or as a device that monitors the operation of other processes. The question of whether a subject displays conscious identification of a stimulus would be answered differently depending on which one of these theoretical positions one adopted. In all cases one would want to relate the theoretical use to our common experience of consciousness. After all, we would not have such a term available if we did not have experience in need of labelling. But Holender expects us to discuss consciousness while explicitly prohibiting phenomenology from the discussion and from the experiments. Being a subject in an experiment is an experience that too many experimenters deny themselves. The interest of the Marcel demonstrations (and Dixon's [1971; 1981] work, etc.) lies in the fact that as a subject one has not the slightest idea, strive as one may, of what is going on. That Marcel, at any rate, has had to adopt particular procedures to make the point (or, indeed, to get published) is a pity. But whether the presence or absence judgements happen to be 60% or 70% correct is really of little importance if one is actually talking about unconscious processes that, on some definitions, can be operating just as well with detection tasks as with any other.

If the debate is not about consciousness but is instead about the processing of verbal and pictorial stimuli then Holender equally fails to meet the demands. Again, this is because his discussion is couched in model-free terms. Thus, Marcel's experiments could be seen as attacking-stage theories of processing. With a stage theory, there would have to be an accessible outcome at the first stage of a multistage process before there could be any processing with accessible outcome at the second stage. If you can get semantic information without identification then that could be seen as supporting, rather, a cascade theory of processing. A theoretical issue of this kind can be decided without bringing "consciousness" into the discussion at all. However, it would require the use of a proper task analysis of the experimental paradigms being used in terms of the theoretical framework one has adopted. What one cannot do is look for (sophisticated) artifacts atheoretically.

As a climax I would like to challenge Holender's assumption that the null hypothesis should be that semantic activation requires consciousness. Why shouldn't the null hypothesis be the contrary? After all, the claims are not at all outrageous theoretically. Even very early versions of the logogen model (e.g., Morton 1968) accounted quite explicitly (albeit rather cavalierly) for unconscious processing of verbal stimuli. All it needs is two thresholds on the logogen – a very respectable,

nonmystical information-processing account that would be entirely suitable for these lean economic times. Indeed, given my own theoretical history I feel perfectly justified in throwing out Holender's entire position, instead challenging him to *prove* that a semantic analysis requires consciousness to be engaged. My ancient theory (and its offspring) asserts that such is not the case – indeed, requires that it not be. Whose is the burden of proof?

Processing of the unattended message during selective dichotic listening

R. Näätänen

Department of Psychology, University of Helsinki, 00170 Helsinki, Finland

Holender reviews literature from three paradigms that have yielded most of the results giving raise to claims for semantic activation without conscious identification of the stimulus. Holender is successful in casting considerable doubt on these claims. In the present commentary, I will focus on one of these paradigms, that involving dichotic listening, particularly the analysis of the unattended message during focused or selective dichotic listening, one of the key issues in Holender's paper. Recent research using event-related brain potentials (ERPs) appears to be of considerable relevance here.

Holender's main claim here was that there is no valid evidence for semantic activation of (any of) the irrelevant message when attention was stringently focused on the message delivered to the opposite ear, that is, when no conscious identification of irrelevant stimuli occurred. If no semantic activation indeed occurs in these conditions, it would be important to ascertain whether this is due to imperfect processing of physical stimulus features or to lack of semantic analysis of fully processed sensory data. The latter alternative is suggested by the ERP data. This evidence is provided by the ERP component called the "mismatch negativity" (MMN), isolated from the N2 wave (Ford et al. 1973; Squires et al. 1975) by Näätänen, Gaillard, and Mäntysalo (1978; 1980). MMN is an attention-independent, automatic brain response to a physically deviant stimulus in a sequence of repetitive homogeneous stimuli. MMN is sensitive to slight stimulus changes, even to those approaching the discrimination threshold (Sams et al. 1985). When tone pips are delivered, MMN occurs in response to pitch and intensity deviations in both directions (for a review, see Näätänen et al., in press). MMN is generated by a neuronal-mismatch process between the sensory input from a deviant stimulus and the neuronal representation of the physical features of the repetitive, "standard" stimulus (Näätänen, in press). This process, at least in response to a pitch change, can be localized to the primary auditory cortex by magnetoencephalographic methods (Hari et al. 1984). It is important to note that MMN is similar for the attended and unattended inputs in selective dichotic listening (Näätänen et al. 1978; 1980), which implies that the neuronal representations of the standard stimuli in both inputs must contain fully processed sensory information and that the comparison process occurring within each input is an equally elaborated (task-unrelated; see Näätänen, in press) processing of their physical stimulus features. The short-duration neuronal stimulus representations mentioned probably form the neurophysiological basis of the precategorical store or sensory register, at least in the auditory modality in which this is called echoic memory (see Näätänen 1984; Näätänen et al., in press). Even the time course of decay (a few seconds) of the neuronal representations is attention-independent (see Näätänen & Gaillard 1983).

On the other hand, no available ERP data appear to clarify whether semantic activation occurs to the unattended message of selective dichotic listening, although in principle the N400 wave of semantic incongruity or mismatch (Kutas & Hillyard