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Cognition 105 (2007) 457–465
COGNITION
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Brief article

Perceptual uniqueness point effects in monitoring internal speech ☆

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Received 26 January 2006; revised 18 October 2006; accepted 21 October 2006

Abstract

Disagreement exists about how speakers monitor their internal speech. Production-based accounts assume that self-monitoring mechanisms exist within the production system, whereas comprehension-based accounts assume that monitoring is achieved through the speech comprehension system. Comprehension-based accounts predict perception-specific effects, like the perceptual uniqueness-point effect, in the monitoring of internal speech. We ran an extensive experiment testing this prediction using internal phoneme monitoring and picture naming tasks. Our results show an effect of the perceptual uniqueness point of a word in internal phoneme monitoring in the absence of such an effect in picture naming. These results support comprehension-based accounts of the monitoring of internal speech.

Keywords: Self-monitoring; Speech production; Speech comprehension

☆ This manuscript was accepted under the editorship of Jacques Mehler.

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doi:10.1016/j.cognition.2006.10.006

1. Introduction

Speakers monitor their own speech for errors and appropriateness (e.g., Levelt, 1989). There exist different accounts of how this monitoring is achieved (for reviews, see Hartsuiker & Kolk, 2001; Postma, 2000). Probably all models of self-monitoring assume the existence of external monitoring, whereby the speaker monitors self-generated overt speech. This involves the normal speech comprehension process. Self-monitoring models also agree that, in addition, there exist mechanisms for the monitoring of the internal speech plan before it is articulated. However, the models make different claims about the functional locus of the internal monitoring device. One class of model assumes that the internal monitoring device is located inside the production system (e.g., Laver, 1973; Schlenk, Huber, & Wilmes, 1987). Another class of model assumes that internal monitoring is achieved via the speech comprehension system. Such an account has been developed by Levelt and colleagues (Levelt, 1983, 1989; Levelt, Roelofs, & Meyer, 1999; Roelofs, 2004), called the perceptual-loop theory of self-monitoring. According to Levelt et al. (1999), in planning spoken words, a phonological representation is constructed incrementally from the beginning of a word to its end. The phonological word representation is fed into the speech comprehension system as it becomes available over time. This results in sequential activation of the comprehension system, as is the case with the processing of real external speech. The comprehension system is then used to monitor the planned speech.

Because self-monitoring is achieved via the speech comprehension system according to the perceptual-loop theory, it predicts perception-specific effects on internal self-monitoring. One such perception-specific effect is the uniqueness point effect (e.g., Marslen-Wilson, 1990). The uniqueness point of a word is defined as the phoneme in the word where it diverges from all other words in the language, going from the beginning of the word to its end. The uniqueness point influences the speed of spoken word recognition. For example, Marslen-Wilson (1990) observed that listeners are faster in deciding that a spoken item is a word or not (auditory lexical decision) when the uniqueness point is early in a word than when it is late in a word. Moreover, in phoneme monitoring experiments, participants are faster in detecting a target phoneme in a spoken word when the phoneme follows the uniqueness point of the word than when it precedes the uniqueness point (Frauenfelder, Segui, & Dijkstra, 1990). Moreover, if the target phoneme follows the uniqueness point, phoneme monitoring is faster when the distance of the phoneme to the uniqueness point is long than when it is short (Frauenfelder et al., 1990). Whereas the uniqueness point of a word affects spoken word recognition, there is no evidence that suggests that it influences spoken word production.

We report an experiment that examined whether there are perception-specific effects in the monitoring of internal speech, as predicted by the perceptual-loop theory. Participants were presented with pictured objects and they indicated by pressing a button whether the picture name contained a pre-specified target phoneme. We manipulated the position of the target phonemes relative to the uniqueness point of the picture names. This was done to test the critical prediction of the perceptual-loop theory that monitoring latencies should depend on the distance of the