Letters Response

# Response to McQueen *et al.*: Theoretical and empirical arguments support interactive processing

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McQueen *et al.* [1] continue to argue against interactive processes in speech perception, but we suggest that their arguments are unconvincing. Theoretical and empirical arguments support the interactive account. Concerning their theoretical points, a rational analysis is consistent with interactive models because they can produce optimal information integration [2]. We argue that interactive, rather than feedforward, processing is the algorithm that the brain uses to accomplish optimal information integration. Interactive processing provides a more parsimonious algorithm than the feedforward approach of McQueen *et al.*, which requires an additional decision level and a specialized feedback mechanism that affects learning but not processing.

We suggest that the empirical arguments offered by McQueen *et al.* are also unconvincing. The failure to find lexically mediated compensation for coarticulation in Ref. [3] is not problematic; the lexically mediated effect will necessarily be smaller than the effect that is produced by an unambiguous phoneme (Figure 2 in Ref. [4]) and might be too small to be detected reliably. Furthermore, one failure to replicate cannot outweigh three independent successful replications that were based on 16 different lexical contexts (reviewed in Ref. [4]). Regarding the 'higher-order transitional probability' argument of McQueen *et al.*, there is no definition of 'higher-order transitional probability' that can account for the full set of data [5].

Perceptual learning cannot explain lexically induced selective adaptation as neatly as McQueen *et al.* claim. They cite audiovisual recalibration data from the ambiguous condition in Ref. [6] that showed learning followed by adaptation-driven unlearning. However, the lexically mediated selective-adaptation data (Figure 3 in Ref. [6]) correspond more closely to the unambiguous condition (Figure 1 in Ref. [6]), showing selective adaptation relative to baseline. This correspondence suggests that lexically mediated selective adaptation operates in the same way as perceptually mediated selective adaptation (the unambiguous condition in Ref. [6]), as predicted by interactive processing.

In sum, McQueen *et al.* [1] have provided neither a theoretical basis nor a sufficient argument to bring into doubt the evidence that supports interactive processes in speech perception. Lexically guided learning is not a special case for which feedback must be introduced; it is just one of many benefits of interactive processing.

## References

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