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Dissociating perceptual and representation-based contributions to priming of face recognition ☆

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Abstract

Repetition priming of object identification refers to the phenomenon whereby experience with an object induces systematic changes in subsequent processing of that same object. This data-driven form of priming is distinct from conceptually-driven priming. To date, considerable controversy exists about whether data-driven priming reflects facilitation in perceptual processing or mediation by preexisting object representations. The present study concerned priming of recognizing familiar and unfamiliar faces and how this priming is influenced by face inversion, which interferes with perceptual face processing. Perceptual and representation-based loci conjointly contributed to priming; the perceptual locus was operative similarly for familiar and unfamiliar faces, whereas the representation-based locus was only invoked for familiar faces and resulted in a response-time reduction triple the magnitude of that from the perceptual locus. The results constrain theoretical accounts of data-driven priming by indicating that improved identification can result from the combination of perceptual and representation-based facilitation.
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1. Introduction

The identification of an object can be facilitated when that same object had been encountered recently. Such changes in the ability to identify an object develop quickly are long-lasting, and can occur even in the absence of explicit memory for the recent encounter (Roediger & McDermott, 1993; Schacter, 1992; Schacter, Chiu, & Ochsner, 1993). These processing changes are a prime example of implicit memory (for reviews, see Richardson-Klavehn & Bjork, 1988; Roediger & McDermott, 1993; Schacter, 1987).

It is important to distinguish this *data-driven* form of priming from *conceptually driven* forms of priming, which depend on conceptual knowledge spanning multiple modalities or domains. Conceptually-driven priming, for instance, appears as facilitation when objects are classified repeatedly according to such conceptual knowledge, for example, when famous persons are categorized by their nationality or occupation. Compared to conceptually driven priming, data-driven priming is disrupted to a relatively greater extent by perceptual transitions between initial and subsequent object encounter, such as a change of input modality from hearing to seeing[1] (Roediger & McDermott, 1993).

A variety of tasks have been employed to study data-driven priming. However, some tasks are more suitable than others. For example, tasks that require the naming of famous persons in response to their faces can be facilitated by both data-driven priming and conceptually driven priming from name processing. Whereas a domain shift will eliminate the data-driven part of priming, the conceptually driven part will remain unaffected (Ellis, Flude, Young, & Burton, 1996). On the other hand, other tasks have been demonstrated to selectively measure data-driven priming; such tasks include the name familiarity task and the face familiarity task that is used in the present study (Burton, Kelly, & Bruce, 1998; Ellis et al., 1996; for a review, see Burton, 1998). The face familiarity task can be administered without immediate face repetition, so as to avoid short-lived, so-called semantic or associative priming effects (Burton, Bruce, & Johnston, 1990; Calder & Young, 1996; Schweinberger, 1996); in this case, neither conceptual information that has been associated with a face (e.g., the name of the corresponding person) nor information that can be visually derived from any face (e.g., gender or age) is likely to contribute to priming. The face familiarity task is thus well suited for investigating data-driven priming.

Contemporary theoretical accounts of data-driven priming usually attribute it to either: (a) facilitation of perceptual processing or (b) mediation by abstract object representations that already exist in long-term memory (for example, see Bowers, 2000; Burton, 1998; Richardson-Klavehn & Bjork, 1988; Schacter, 1992; Tenpenny, 1995). Evidence taken to favor a perceptual locus includes reduced priming following various perceptual transformations of stimuli from first to second presentation. On the other hand, findings of reduced priming for unfamiliar compared to familiar stimuli favor a representation-based locus.

To disentangle the contributions of perceptual processing and preexisting representations to data-driven priming, we measured priming in a familiarity task for familiar and unfamiliar faces

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[1] In keeping with this strong influence of perceptual transitions, the type of priming under investigation in the present study is frequently called "*perceptual priming*." Whereas this term has been associated with one theoretical account of priming (Tulving & Schacter, 1990), our emphasis on multiple accounts for this type of priming leads us to rely on the label "data-driven priming" here.