available at www.sciencedirect.com

ScienceDirect

www.elsevier.com/locate/brainres

BRAIN RESEARCH

Research Report

Sensitivity of N170 and late positive components to social categorization and emotional valence

B. Montalan[a], S. Caharel[a], B. Personnaz[b], C. Le Dantec[a], R. Germain[b], C. Bernard[a], R. Lalonde[c,d], M. Rebaï[a,*]

[a]Université de Rouen, Faculté des Sciences, Laboratoire de Psychologie et Neurosciences de la Cognition et de l'Affectivité (PSY.NCA EA-4306), 76821 Mont-Saint-Aignan Cedex, France

[b]Université de Rouen, Faculté des Sciences, Laboratoire de Psychologie des Régulations Individuelles et Sociales (PRIS EA-3228), 76821 Mont-Saint-Aignan Cedex, France

[c]Université de Rouen, Faculté des Sciences, 76821 Mont-Saint-Aignan Cedex, France

[d]Centre Hospitalier de l'Université de Montréal/Saint Luc, Centre de Recherche en Sciences Neurologiques, Département Médecine, Canada

ARTICLE INFO

Article history:
Accepted 12 July 2008
Available online 25 July 2008

Keywords:
Social categorization
N170
LPC
Visual word processing
Emotional valence
Top–down effect

ABSTRACT

Previous experiments have shown that categorization of people into two distinct fictive groups has an impact on cognitive processes. The main objective of the present study was to examine whether this mere categorization improves information processing speed and alters early and late onset ERPs during a social judgment task. In a group membership situation, in-group evaluation enhanced information processing speed and occipito-temporal N170 amplitudes, associated with orthographic processing, compared to out-group evaluation, more so for positive than negative attributes. Moreover, negative adjectives elicited larger N170 amplitudes and faster information processing speed than positive adjectives. In contrast, positive adjectives in a non-membership context enhanced a late positive component in prefrontal regions. These results reflect the existence of a motivational top–down influence due to social categorization in early perceptual stages of word processing. These findings are also in accord with the existence of two distinct systems of evaluation, the first implicating an automatic processing represented in occipito-temporal neocortex and the other a more controlled processing represented in PFC.

1. Introduction

Several decades of investigation of intergroup relations have shown that individuals tend to evaluate a group to which they belong (the in-group) more favorably than a group to which they do not (the out-group) (Hewstone et al., 2002). A series of experiments using the Minimal Group Paradigm (MGP) have indicated that this phenomenon prevails even when the categorization of people into two distinct groups is arbitrarily defined (Tajfel et al., 1971). This "mere categorization effect" has been extended to various types of categorization criteria (Messick and Mackie, 1989; Mullen et al., 1992; Tajfel, 1982), using mainly explicit measurements such as allocation of resources and in- and out-group evaluation on trait dimensions (Tajfel et al., 1971; Brewer, 1979; Locksley et al., 1980). Nonetheless, these methods proved to be ineffective when group members refuse to discriminate others (Singh et al., 1998).

* *Corresponding author*. Fax: +33 2 35 14 63 49.
E-mail address: med.rebai@wanadoo.fr (M. Rebaï).

0006-8993/$ – see front matter © 2008 Elsevier B.V. All rights reserved.
doi:10.1016/j.brainres.2008.07.055

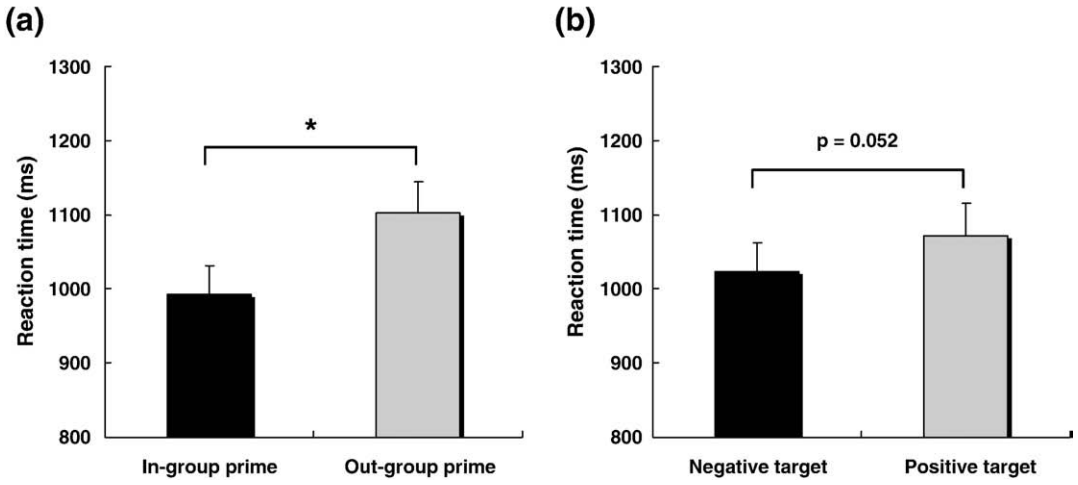

Fig. 1 – Condition C_1: Mean reaction times (ms) as a function of (a) Membership (in- or out-group prime) and (b) Descriptor (positive or negative target) ($^{*}p<.05$; $^{**}p<.01$).

Cognitive science methods have helped in outlining the effects of social categorization on cognition in minimal conditions of membership (Harring and Gaertner, 1992; Howard and Rothbart, 1980; Maass and Schaller, 1991; Otten and Wentura, 1999). For example, Howard and Rothbart (1980) found that subjects were more accurate in recalling negative behaviors of out-group members than those of in-group members. Likewise, Harring and Gaertner (1992) reported that participants remembered similarities and differences about in-group members, but mainly differences about out-group members. Since cognitive effects are demonstrable even for identical stimuli (Howard and Rothbart, 1980), individuals

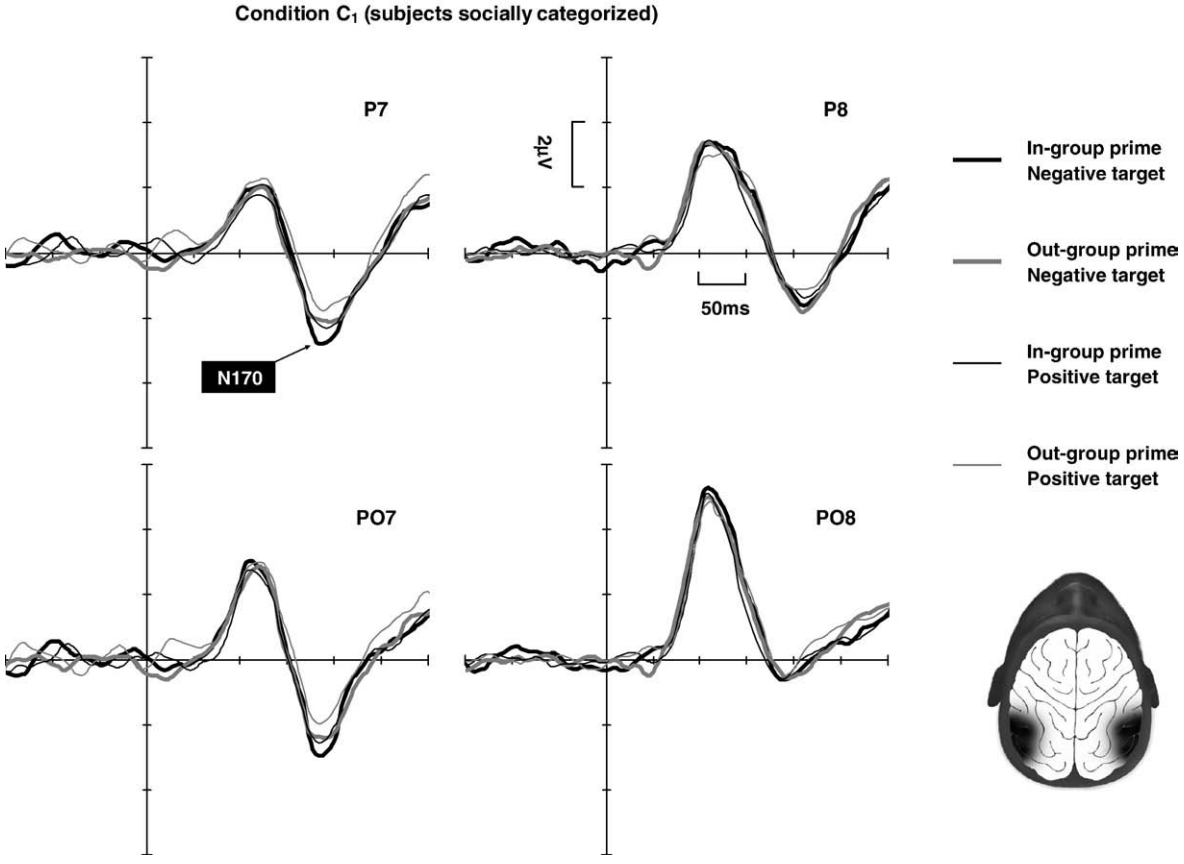

Fig. 2 – Condition C_1: Grand-average of ERPs recorded at occipito-temporal (P7, P8, PO7 and PO8) electrodes as a function of Membership (in- or out-group prime) and Descriptor (positive or negative target).