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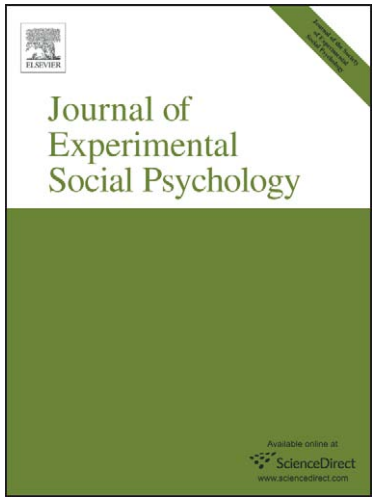
Empfohlene Zitierung / Suggested Citation:
Macrae, C. N., & Cloutier, J. (2009). A matter of design: priming context and person perception. *Journal of Experimental Social Psychology*, *45*(4), 1012-1015. https://doi.org/10.1016/j.jesp.2009.04.021



A Matter of Design: Priming Context and Person Perception

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PII: S0022-1031(09)00103-6
DOI: 10.1016/j.jesp.2009.04.021
Reference: YJESP 2260

To appear in: *Journal of Experimental Social Psychology*

Received Date: 3 February 2009
Revised Date: 10 March 2009
Accepted Date: 19 April 2009

Please cite this article as: Macrae, C.N., Cloutier, J., A Matter of Design: Priming Context and Person Perception, *Journal of Experimental Social Psychology* (2009), doi: 10.1016/j.jesp.2009.04.021

Running Head: Person Perception

A Matter of Design:

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Word Count: 2496

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Abstract

A matter of considerable debate is whether people spontaneously use categorical knowledge (i.e., stereotypes) to guide their interactions with others. Despite initial evidence for the unconditional automaticity of category activation, recent research has identified a range of factors that moderate this process. Extending this line of inquiry, the current investigation explored the extent to which contextual influences — specifically the order in which priming stimuli are presented to participants — may modulate person categorization. Using a standard semantic-priming paradigm to index category and stereotype activation, participants were presented with priming stimuli that were either intermixed or blocked by sex. The results revealed that: (i) category and stereotype activation are moderated by the order in which priming stimuli are presented; and (ii) priming effects decrease monotonically as a function of category repetition. The theoretical implications of these findings are considered.

A Matter of Design:

Priming Context and Person Perception

Thinking about individuals on the basis of the social groups to which they belong is an indispensable cognitive tool. When one lacks the time, motivation or inclination to construe other people on the basis of their unique identities, category-based responding provides a conduit through which social interaction can unfold (Allport, 1954; Macrae & Bodenhausen, 2000). Given the benefits that categorical thinking affords, one question has loomed large in investigations of social-cognitive functioning — when confronted with unfamiliar targets, do people inevitably activate category-based knowledge structures in memory?

For almost four decades it was assumed that category activation is an inescapable consequence of the person perception process (Allport, 1954; Brewer, 1988; Bargh, 1999; Fiske & Neuberg, 1990). Recent work has cast doubt on this viewpoint, however. A rapidly expanding literature has identified a range of target- and perceiver-related factors that modulate category activation, including facial typicality, gaze direction, cue availability, hormonal factors, attentional capacity, chronic and temporary processing goals and pre-existing prejudiced beliefs (Gilbert & Hixon, 1991; Lepore & Brown, 1997; Livingstone & Brewer, 2002; Macrae, Alnwick, Milne & Schloerscheidt, 2002; Macrae, Bodenhausen, Milne, Thorn & Castelli, 1997; Macrae, Hood, Milne, Rowe & Mason, 2002; Moskowitz, Gollwitzer, Wasel & Schaal, 1999; Moskowitz, Li & Kirk, 2004). Collectively, these studies demonstrate that category activation can best be characterized as a conditionally automatic mental process (Blair, 2002). Extending work on this core social-cognitive topic, emphasis in the current inquiry falls on a largely neglected facet of person perception, the task context in which category-triggering stimuli are encountered (Wittenbrink, Judd & Park, 2001). Motivating our investigation is the assumption that contextual factors at encoding may modulate the automaticity of category activation (Castelli, Macrae, Zogmaister & Arcuri, 2004).

One of the most potent contextual factors in experimental research is the structure of the task environment in which stimuli are encountered (Schmidt, 1991). For example, when participants are required to memorize items from two distinct classes (e.g., high- vs. low-frequency words, typical vs. distinctive faces), performance is reliably influenced by the order in which stimuli are presented. Specifically, memory for salient items (e.g., distinctive faces) is enhanced when the stimuli are presented in mixed rather than pure (i.e., blocked by item type) lists (e.g., Dewhurst & Parry, 2000; Hosie & Milne, 1996; Hunt & Elliot, 1980; Watkins, LeCompte & Kim, 2000). Driving this effect is the contextual distinctiveness of stimuli (Wallace, 1965), with mixed lists enhancing the relative salience (i.e., 'primary' distinctiveness), hence memorability, of unusual items (Schmidt, 1991).

Albeit in a quite different domain, we anticipate that related effects may emerge in explorations of person perception (Mitchell, Nosek & Banaji, 2003). In particular, we expect context-induced shifts in the perceptual distinctiveness of facial primes (i.e., blocked vs. mixed primes) to modulate the automaticity of category activation (Cloutier & Macrae, 2007; Cloutier, Mason & Macrae, 2005). Without exception, research demonstrating the automaticity of category activation has presented participants with intermixed primes, be they faces or verbal labels, in sequential priming paradigms (e.g., Dovidio, Evans & Tyler, 1986). While reflecting good experimental practice, these intermixed primes may nevertheless have contributed to the emergence of the phenomenon under investigation. As a case in point, consider the process of sex categorization. The categorical distinctiveness of priming stimuli will clearly be shaped by the composition of the overall stimulus set (Hosie & Milne, 1996). For example, sex will be more salient (i.e., perceptually distinctive) when male and female faces are intermixed than when they are presented in same-sex blocks.

In his seminal writings, Bruner (1957) described various processing stages that must be completed before successful categorization occurs. Relevant to the current inquiry is the first of

these stages, *primitive categorization*. According to Bruner (1957), "Before any more elaborate inferential activity can occur, there must be a first, 'silent' process that results in the perceptual isolation of an object or an event with certain characteristic qualities" (pp. 130-131). In other words, a rudimentary perceptual analysis precedes the semantic appraisal of a stimulus. As categorical knowledge serves as a tool to guide person understanding, one might anticipate that it will be most useful in task contexts in which it serves as a ready basis for segregating individuals on the basis of their group membership (Macrae & Bodenhausen, 2000). This assumption, of course, gives rise to an interesting possibility. When face primes are blocked by sex (rather than intermixed), stimuli may be unlikely to be passed through the system for additional semantic processing as the task context does not provide a categorical basis for differentiating the targets (Klauer, Miierke & Musch, 2003; Kunda, Davies, Adams & Spencer, 2002). We explored this possibility in our initial experiments.

Experiments 1a/1b:

Prime Context and Person Construal

Method

Participants and Design

Twenty-three undergraduates completed Experiment 1a (18 females) and eighteen undergraduates completed Experiment 1b (12 females) for additional course credit. Each experiment had a 2 (Prime Presentation: blocked or mixed) X 2 (Trial Type: matching or mismatching) repeated measures design. All that differed between the experiments was the manner in which person perception was assessed (Expt 1a – category accessibility, Expt 1b – stereotype accessibility).

Stimulus Materials and Procedure

Participants arrived at the laboratory individually, were greeted by a male experimenter, seated facing the screen of an Apple Macintosh computer (IMac) and randomly assigned to complete either Expt. 1a or 1b. Participants in Expt. 1a were informed that the study comprised an investigation of people's ability to classify forenames by gender. It was explained that a series of forenames would appear in the center of the screen (e.g., *Angela*, *David*) and the task was simply to indicate, via a key press, whether each name was male or female. Participants in Expt. 1b were told that the study comprised an investigation of people's ability to classify words (e.g., *cigar*, *lingerie*), again via a key press, as characteristically masculine or feminine in implication (Macrae & Martin, 2007). All participants completed two blocks of trials (i.e., blocked primes & mixed primes) in which target words were preceded by facial primes.

The priming stimuli in Expt. 1a consisted of 64 digital color headshots (400 x 400 pixels) of unfamiliar individuals (32 men & 32 women) displaying neutral expressions. The target items (i.e., 64 forenames: 32 male & 32 female) were selected from a list of popular Scottish forenames (www.gro-scotland.gov.uk). Each trial involved the appearance of a fixation cross which remained on screen for 1000ms. A priming face then appeared for 150ms, followed by a target item that remained on screen until a response was made. The inter-trial interval was 1500ms and participants completed 64 trials in each block. Face primes were either intermixed or blocked by sex and the same 64 priming faces and 64 target forenames were used in each block of trials. Forenames were randomly presented in each block of trials and the order of presentation of the blocks and the meaning of the response keys were counterbalanced across the sample. The computer recorded the latency and accuracy of each response. Expt. 1b was identical, apart from the following modifications. The priming stimuli comprised 60 unfamiliar faces (30 men & 30 women) and the target items were 60 stereotyped items (30 masculine & 30 feminine) taken from Crawford, Leynes, Mayhorn and Bink (2004).

Results and Discussion

Mean categorization latencies served as the dependent measure of interest. Given the presence of outlying responses in the data set, response times that were slower than 3 standard deviations from the mean were excluded from the analyses, as were trials on which errors were committed (Expt. 1a = 4.9%, Expt. 1b = 2.4%). A 2 (Prime Presentation: blocked or mixed) X 2 (Trial Type: matching or mismatching) repeated measures analysis of variance (ANOVA) was undertaken on the data for each experiment, the results of which are summarized below.

Category Activation (Expt. 1a)

The analysis revealed a main effect of Prime Presentation [$F(1,22) = 6.55$, $p < .02$, $d = 0.54$], such that reaction times were faster when the facial primes were mixed than blocked. In addition, however, a Prime Presentation X Trial Type interaction was also observed [$F(1,22) = 5.14$, $p < .04$, $d = 0.48$; see Figure 1 upper panel). Additional analyses revealed that while category activation (i.e., matching RTs < mismatching RTs) emerged in the mixed condition [$t(22) = 4.32$, $p < .001$, $d = 0.92$], no such effect was observed when the facial primes were blocked by sex [$t(22) < 1$, *ns*].

Stereotype Activation (Expt. 1b)

The only effect to emerge in the analysis was a Prime Presentation X Trial Type interaction, [$F(1,17) = 8.63$, $p < .01$, $d = 0.71$; see Figure 1 lower panel). Additional analyses revealed that while stereotype activation emerged in the mixed condition [$t(17) = 2.22$, $p < .04$, $d = 0.54$], a comparable effect was not observed when the facial primes were blocked by sex [$t(17) < 1$, *ns*].

The current results support the contention that the automaticity of category activation is moderated by the task context in which facial primes are encountered (Castelli et al., 2004). As expected, whereas mixed primes triggered category and stereotype activation, priming effects were

eliminated when the faces were blocked by sex. Limiting the current findings, however, is the fact that same-sex primes were always presented in a single homogenous run, thus leaving open the possibility that block size (i.e., the number of same-sex category repetitions) may modulate the magnitude of category-related priming. Given that the salience of applicable categories is an important determinant of person perception, it is possible that category activation may be impacted by the relative distinctiveness of facial primes. According to Schmidt (1991), the relative distinctiveness of an item is determined by the degree to which it overlaps with an active representation that is held in working memory. Critically, this representation is based on the nature of the preceding stimuli in the information-processing stream (e.g., the number of same-sex faces). Thus, the number of preceding female stimuli will shape the relative categorical salience of a male face (and vice versa). Given this observation, in our next experiment we explored the possibility that the magnitude of category-based priming may be moderated by the relative distinctiveness of facial primes.

Experiment 2

Prime Repetition and Category Activation

Method

Participants and Design

Thirty-three undergraduates (25 females) completed the experiment for additional course credit. The experiment had a 3 (Block Size: 1, 4, or 8) X 2 (Trial Type: matching or mismatching) repeated measures design.

Stimulus Materials and Procedure

The experiment was a modified version of Expt. 1a. Participants completed 3 blocks of trials (1, 4, or 8 category repetitions). During each block, participants were presented with 64 forenames (32 male & 32 female) that were preceded by 64 facial primes (32 unfamiliar men & 32 unfamiliar

women). Across the blocks, male and female facial primes alternated on every trial, after every 4 trials or after every 8 trials. The order of presentation of the blocks and the meaning of the response keys were counterbalanced across the sample.

Results and Discussion

The data were trimmed using the procedures outlined previously. Including trials on which errors were committed, 7.9% of the data were excluded from statistical analysis. Initially, a 3 (Block Size: 1, 4 or 8) X 2 (Trial Type: matching or mismatching) repeated measures ANOVA was undertaken on the data. The only effect to emerge in this analysis was a main effect of Trial Type [$F(1,32) = 10.42$, $p < .003$, $d = 0.57$], such that reaction times were faster on matching than mismatching trials. To directly test the hypothesis that the magnitude of category activation may be moderated by the relative distinctiveness of facial primes, differences in mean categorization latencies for mismatching and matching trials (i.e., category priming) were subjected to a within-participants linear contrast analysis. Importantly, this yielded an effect of Block Size [$F(1,32) = 5.42$, $p < .03$, $d = 0.41$], indicating that priming decreased monotonically as a function of category repetition (see Figure 2). Further analyses revealed that while significant levels of category-based priming emerged when facial primes alternated on every trial [$t(32) = 4.83$, $p < .001$, $d = 0.85$], no such effect was observed when the primes alternated after every 4 [$t(32) = 1.56$, *ns*] or 8 trials [$t(32) < 1$, *ns*].

General Discussion

An emerging literature has documented the boundary conditions of category activation. Rather than reflecting an inevitable consequence of person registration, category activation is modulated by a host of target- and perceiver-related factors (Macrae & Bodenhausen, 2000). Extending this general line of inquiry, the current investigation explored the possibility that the very priming procedures that have traditionally been used to explore person perception may have

contributed to the ease with which category and stereotype activation can be triggered. The results supported this contention. Through enhanced categorical distinctiveness (Schmidt, 1991), intermixed priming stimuli created the optimal contextual conditions for category and stereotype activation to emerge. Moreover, the relative distinctiveness of priming stimuli moderated the strength of category activation.

So why is category activation susceptible to the influence of the priming context? At least two possibilities exist. First, given the mind's natural propensity to focus on novel or changing stimuli (Johnston & Hawley, 1994), invariant category-specifying perceptual inputs may block the semantic processing of facial primes (Bruner, 1957). Interestingly, an equivalent attentional bias is thought to underlie the demonstration that prime frequency modulates the emergence of evaluative priming, with infrequent primes triggering the most pronounced priming effects (Klauer et al., 2003). A second possibility offers a modified cognitive explanation for the current findings. Blocked primes may continue to attract semantic processing, it is simply that the impact of repeated categorical stimuli is attenuated. Through satiation or habituation, it has been reported that excessive exposure to a stimulus can impede subsequent processing of that item (e.g., Balota & Black, 1997; Smith, 1984; Smith & Klein, 1990). Such an effect has obvious functional utility as it biases the attentional system to process new information by filtering out repetitive (i.e., redundant) material (Balota & Black, 1997). A mechanism of this kind may contribute to the effects reported in the current investigation (see also Kunda et al., 2002), albeit with some modifications. Most notably, in the current experiment habituation/satiation must be triggered through the presentation of different exemplars from the same category rather than the repeated presentation of the category label itself (Smith, 1984).

While repetition blocked the activation of associated category-related knowledge in memory, in no sense do we wish to suggest that repeated primes completely eliminate categorical thinking. Rather, in a group of exclusively male faces, perceivers are likely to identify different

categorical dimensions along which targets can be differentiated (e.g., age, race). In this way, categorical thinking provides the flexibility that social cognition demands. In a world of booming, buzzing confusion categorical information may frequently come to people's assistance. In considering when exactly this happens, however, attention should be directed not only to the characteristics of the target and perceiver, but also the task context in which person perception is explored.

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Acknowledgements

The authors thank Joel Cooper and two anonymous reviewers for their comments on this work. This research was supported by a Royal Society-Wolfson Fellowship to CNM.

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Figure Captions

Figure 1. Category and Stereotype Activation as a Function of Prime Presentation and Trial Type (Expts. 1a & 1b)

Figure 2. Magnitude of Category-Related Priming as a Function of Block Size (Expt. 2)