Automatic processing of political preferences in the human brain

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ABSTRACT

Individual political preferences as expressed, for instance, in votes or donations are fundamental to democratic societies. However, the relevance of deliberative processing for political preferences has been highly debated, putting automatic processes in the focus of attention. Based on this notion, the present study tested whether brain responses reflect participants' preferences for politicians and their associated political parties in the absence of explicit deliberation and attention. Participants were instructed to perform a demanding visual fixation task while their brain responses were measured using fMRI. Occasionally, task-irrelevant images of German politicians from two major competing parties were presented in the background while the distraction task was continued. Subsequent to scanning, participants' political preferences for these politicians and their affiliated parties were obtained. Brain responses in distinct brain areas predicted automatic political preferences at the different levels of abstraction: activation in the ventral striatum was positively correlated with preference ranks for unattended politicians, whereas participants' preferences for the affiliated political parties were reflected in activity in the insula and the cingulate cortex. Using an additional donation task, we showed that the automatic preference-related processing in the brain extended to real-world behavior that involved actual financial loss to participants. Together, these findings indicate that brain responses triggered by unattended and task-irrelevant political images reflect individual political preferences at different levels of abstraction.

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Introduction

In times of elections, huge budgets are spent on campaigns to inform political preferences and convince people to vote for particular candidates and their affiliated political parties. Recent findings indicate, however, that political preferences are by no means a prime exemplar for deliberate decisions but are considerably shaped by fast, automatic processes. Rapid judgments of competence based solely on the facial appearance of candidates were shown to reliably predict the outcome of elections (Ballew and Todorov, 2007; Todorov et al., 2005). Moreover, implicit measures of attitudes that assess automatic evaluative associations (Greenwald et al., 1998) were found to improve the prediction of supposedly deliberate behavior such as political voting (Friese et al., 2007; Galdi et al., 2008; Karpinski et al., 2005). Furthermore, incidental

exposure to environmental cues and irrelevant events has been suggested to shape political choices without participants' awareness (Berger et al., 2008; Carter et al., 2011; Hassin et al., 2007; Healy et al., 2010).

Such automatic processing – guiding human judgments and choices in the absence of conscious deliberation – has previously been found to be reflected in brain responses for non-political stimuli. Neural activation has been shown to reflect preferences for paintings, houses and unknown faces when participants evaluated stimuli with respect to other, non-preference-related aspects (Kim et al., 2007; Lebreton et al., 2009). Activation patterns obtained in the absence of conscious deliberation were also reported to predict subsequent preferences for cars even when attention was diverted from potential choice options (Tusche et al., 2010).

Based on this evidence, we investigated whether brain responses track political preferences when political stimuli (i.e., images of national politicians) are presented to participants outside the focus of attention. We hypothesized that preferences for politicians might be encoded in brain areas such as the ventral striatum (VS), the medial prefrontal cortex (mPFC), the anterior cingulate cortex (ACC), and the insula that have previously been shown to be involved in automatic valuation and incidental processing of popularity of socially

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tagged stimuli (Kim et al., 2007; Lebreton et al., 2009; Mason et al., 2009; Tusche et al., 2010). Following up on findings that preferences for politicians can be predicted based on rapid inferences from viewing their faces, we assumed that judgments based on the visual appearance of political candidates might mediate these preference judgments (Antonakis and Dalgas, 2009; Ballew and Todorov, 2007; Spezio et al., 2008; Todorov et al., 2005). Given the human capacity of rapid face recognition and automatic retrieval of person knowledge (Gobbini and Haxby, 2007; Todorov et al., 2007), we further hypothesized that task-irrelevant images of prominent politicians might automatically activate mental representations of *affiliated parties*. Hence, in a second step, we examined whether brain responses obtained during automatic processing of images of national politicians also reflect preferences for associated political parties. Taking advantage of the fact that preferences for a number of German politicians and for their affiliated political parties differ significantly, we used behavioral pretests to identify national politicians who were valued and appreciated, independent of participants' attitudes towards the associated parties. Likewise, we were able to determine several politicians who were consistently judged as rather unpopular — even if they belonged to the preferred political party (Fig. 1A). This allowed us to select politicians such that participants' valuations of politicians were matched across parties and permitted us to disentangle preferences for associated parties from politician-specific processing.

Participants were instructed to perform a demanding visual fixation task while their brain responses were measured using fMRI. At unpredictable intervals, *task-irrelevant* images of politicians were passively presented in the background while the fixation task continued. Subsequent to scanning, participants' political preferences were measured both for passively viewed politicians and for affiliated parties. Importantly, during the acquisition of brain responses, participants were not aware that political preference judgments would be required later on. We then investigated whether brain responses reflect participants' preferences for the unattended politicians as well as for the associated political parties. Finally, we tested whether automatic preference-related processing in the brain extends to real-world behavior such as voluntary donations.

Materials and methods

Participants

Twenty healthy volunteers (aged between 22 and 33 years, 7 female) participated in the fMRI session and the behavioral posttest. Both sections of the experiment were approved by the local ethics committee. All participants were German native speakers, free of psychiatric or neurological history, had normal or corrected-to-normal vision, were right-handed and gave written informed consent. Participants were paid a fixed amount of €12 to take part in the study plus 20% of the remainder of an endowment of €12 that the participant did *not* donate to political parties after scanning. Data of one participant had to be excluded because of excessive head movement during scanning. Due to technical problems during the acquisition of functional images, data of another participant were incomplete and had to be discarded.

Stimuli

Monochrome images of 24 faces (front view with eye-gaze directed towards observer) were used as stimuli in the fMRI section of the experiment. All pictures were homogenized regarding size and contrast (MATLAB 7.0 and Adobe® Photoshop® CS2 9.0). During the fMRI experiment, images were centrally presented against a white background using MATLAB 7.0 in combination with the Cogent toolbox (http://www.vislab.ucl.ac.uk/Cogent).

Faces showed either familiar [F] or unfamiliar [UF] German politicians affiliated with one of two major competing parties represented in the federal government (Party A [P_A]: Christian Democratic Union, CDU; Party B [P_B]: Social Democratic Party, SPD). Unfamiliar politicians were included to obtain brain responses associated with automatic face processing of national politicians for which party-related information was lacking. Based on self-reported party preference (see below) obtained *after* scanning, one of the political parties [P_A/P_B] was defined as 'preferred' while the other one was specified as 'non-preferred' [$P_{pref}/P_{non-pref}$]. Each experimental condition ([F/P_{pref}], [F/$P_{non-pref}$], [UF/P_{pref}], [UF/$P_{non-pref}$]) was represented by 6 of 24 images of politicians that
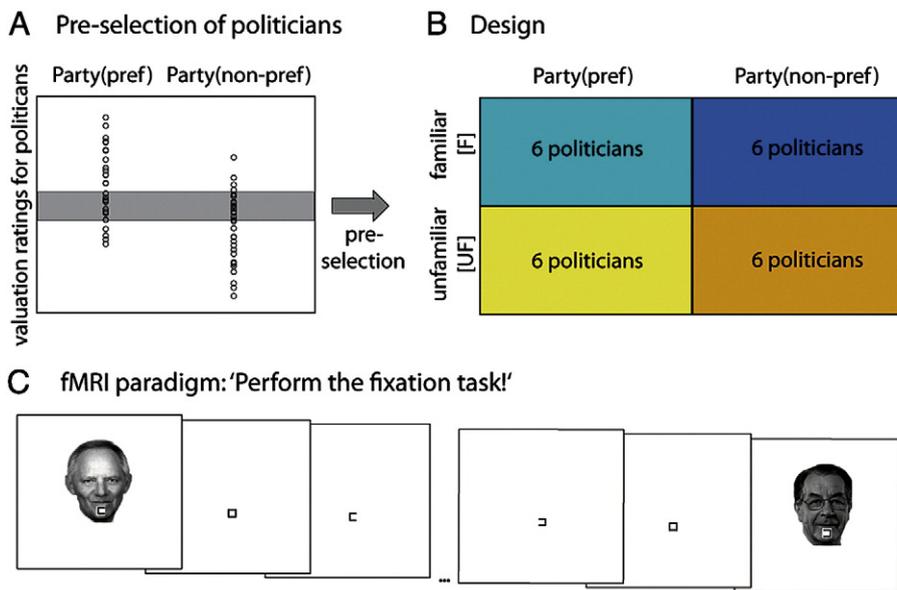
Fig. 1. Experimental design and task. A. Illustration of the pre-selection of politicians to disentangle preferences for politicians and associated political parties: Images of national politicians were chosen based on results from behavioral pretests using independent samples. Politicians were selected such that politician-specific valuation judgments were matched across the preferred and the non-preferred party (illustrated by the gray bar). B. Design: Images showed faces of either familiar [F] or unfamiliar [UF] national politicians affiliated with one of two major competing national parties [P_A/P_B]. Based on ratings of self-reported party liking, parties were defined as either preferred [P_{pref}] or non-preferred [$P_{non-pref}$]. C. fMRI task: Participants performed a demanding visual fixation task that diverted attention from politically-relevant stimuli (i.e., images of national politicians) that were projected onto the background of the screen at unpredictable intervals while the fixation task continued.