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Behavioral, physiological and neural evidence of the role of political ideology in social cognition

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1. General Introduction

Humans are social animals and, as such, their interaction with the entities that populate the social world is fundamental for their survival. The study of the processes that contribute to build and shape people's interaction with those social entities is defined as social cognition (Moscowitz 2005). These processes, in turn, are influenced by an impressive number of factors, either related to the individual and to the social context. Among those factors, one playing a fundamental role in social cognition is political ideology. Political ideology not only reflects the idea that people have about how the social world should be ordered and structured (Erikson and Tedin 2006), but also represents something that people use to build and shape the social world itself.

1.1 Aim of the present work

The social and economic crisis of the last decade seems to have given new impetus to a thirty years old idea claiming that we are living in post-ideological and post-political world (Fukuyama 1992). This idea is supported by the rising of a wide range of populistic movements claiming their detachment from any political ideology (see for example, Movimento 5 Stelle in Italy, Podemos in Spain, Le Front National in France). Although different, these movements share their opposition to the actual political system and their contempt toward its representatives (i.e., politicians). Starting from this point, we asked ourselves whether this ideological crisis depends on the fact that political ideologies have no longer who can represent them and thus on how political ideology is actually conveyed and perceived by people.

Thus, with the present work we aimed at extending the current knowledge on how political ideology affects social cognition, specifically by looking at the impact that presenting political information in different way has on how people perceive, categorize, evaluate and interact with other social entities. In doing so, we either employed different tools and techniques taken both from experimental psychology and neuroscience and we tested politically polarized and non-aligned people to provide a detailed description of these processes.

In the second chapter we present three studies that tested whether the way political ideology is conveyed can impact the emergence of the intergroup bias in left and right-wing people. Specifically, we measured

how participants evaluated on an emotional and cognitive level their political ingroup and outgroup presented in different forms (i.e., images of politicians, ideological words and items referring to general people belonging to their political ingroup and outgroup).

In keeping with this, the study presented in the third chapter explores whether different political ideologies presented in different forms could affect moral decision-making. Specifically, by means of an eye-tracker we measured physiologically whether images of politicians and ideological words representing left and right-wing ideologies and used as primes could affect how politically non-aligned people allocate their attention toward specific information (i.e., personal vs social) and how this, in turn, could drive their tendency to deceive other people during an interactive game.

The study in the fourth chapter provides very preliminary evidence of how biases associated to political ideology and another source of social information, such as ethnicity, affect how these information are processed in the brain and, in turn, their impact on people's ability to discriminate their own facial identity from that of other social entities.

1.2 The Left and Right divide

Since French Revolution the term political ideology refers to an organized set of beliefs and values organized along a spectrum with two intrinsically opposite extremes: Left and Right (Bobbio 1994). Although many scholars argued against its existence (see Bobbio 1994), this dichotomy is still widely used as in the common language as in Research to describe the political world*.

Political scientists, philosophers and other academics attempted to find the criteria that allow to distinguish between Left and Right. Among those that have been proposed, Jost and colleagues (2003) individuated two core dimensions: one that refers to reject vs. accept inequality and the other that refers to advocate vs resist to change (Jost et al. 2003). In such vein, the authors proposed the idea of political ideology as motivated social cognition: people are motivated to endorse the political ideology that better satisfy their psychological needs and motives, and through that ideology they build and shape their social world (Jost et al. 2003). The authors individuated also the nature of two main motivations linked to the two core aspects dividing left and right-wing ideology: the epistemic motivation to reduce uncertainty and the existential

motivation to reduce anxiety (Jost et al. 2003). Given that, differences between Left and Right can be observed on a series of peripheral elements around these two motivations.

*Notably, many research in political and social psychology used the terms Conservatism vs. Liberalism/Progressivism to indicate Left and Right respectively. Although not perfectly overlapping, these terms seem to capture the original Left and Right distinction, thus we will refer to them interchangeably.

Specifically, right-wing ideology is positively correlated with system justifying tendencies (Jost et al. 2004), authoritarian tendencies (Altemeyer 1998), a hierarchical view of the society (Tilly et al. 2001), close-mindedness (Thorisdottir 2011), intolerance of uncertainty (Jost et al. 2007), need for cognitive closure (Chirumbolo et al. 2004; Federico et al. 2014; Zavala et al. 2010), need for structure (Altemeyer 1998), reflective reasoning (Jost et al. 2003), personality traits related to conscientiousness (Caprara and Zimbardo 2004; Carney et al. 2008), sensitivity to disgust (Helzer and Pizarro 2011; Inbar et al. 2009), threat, fear and anger (Altemeyer 1998; Jost et al. 2003; Kanai et al. 2011; Rosenblatt et al. 1989; Tomkins 1995). Conversely, Left-wing ideology is negatively correlated with those measure and positively correlated with cognitive complexity (Sidanius 1985), openness to experience (Caprara and Zimbardo 2004; Carney et al. 2008) and tolerance (Jost et al. 2003).

Having found the aspects that reflect the oppositional nature of the Left and Right, more recently researchers attempted to investigate the neural and physiological underpinnings of these differences by means of new methodologies and techniques imported from the neurosciences.

In this vein, one of the most promising line of research focused on conflict monitoring, a neurocognitive mechanism that refers to the function of detecting discrepancies between inconsistent responses (Botvinick et al. 2001). By unveiling how new, unpredicted and potentially conflicting information are differently processed by left and right-wing people, the study of conflict monitoring was able to shed new light on one of the core aspects of the Left and Right divide, namely the one related to the (in)tolerance for uncertainty. Specifically, different research found how left-wing people are better at self-regulating when they encounter conflicting information as signaled by larger ERN and N2, two event-related potentials originating in the anterior cingulate cortex (ACC) and strongly related to this process (Amodio et al. 2007; Dennis et al. 2015; Weissflog et al. 2013). Relatedly, an MRI study provided structural evidence of these

findings by showing a strong correlation between an increased volume of grey matter in the ACC and greater endorsement of left-wing ideology (Kanai et al. 2011).

Similarly, neural and physiological evidence of the ideological divide were found on another core aspect of the ideological divide, namely the sensitivity to anxiety and threat. Oxley and colleagues found that right-wing people have higher sensitivity to threat as signaled by their higher skin conductance in responses to threatening stimuli (Oxley et al. 2008). Relatedly, Kanai and colleagues (2011) found that greater endorsement for right-wing ideology was associated to increased volume in the right amygdala, an area that generally reflect emotional processing (Kanai et al. 2011). With this regard, the authors found also an increased volume of grey matter of the left insula, an area strongly related to sensitivity to disgust (Inbar et al. 2009; Kanai et al. 2011).

Going even further, researchers have made some attempt to detect genetic factors responsible for the observed physiological, structural, and functional brain differences, which in turn, in combination with environmental factors, might play a role in people's tendency to endorse left or right-wing ideology. For instance, Hatemi and colleagues (2011) observed that genetic polymorphisms linked to both cognitive flexibility and threat sensitivity predicted scores on a general attitudinal measures of left vs. right-wing ideology.

1.3. Aftermaths of ideological differences

In the previous paragraph we showed that endorsing left or right-wing ideology is associated with dispositional, motivational, physiological, neural and even genetic differences, that, in turn, can have many consequences related to how people interaction with the surrounding environment and with the social entities that are part of it. In other words, with the following paragraphs, and later with the present work, we explore the effect of those differences on people's social cognition.

Political Ideology, Social Perception and Social Categorization

One of the main consequences involves a fundamental process in social cognition: social categorization. In its classic definition social categorization refers to an automatic process aimed at simplify the social world by putting together elements perceived as similar into the same category or group (Tajfel et al.

1971). In doing so we minimize the difference between the elements belonging to the same category and maximize the difference between elements of different categories (Tajfel et al. 1971).

Traditionally, we extract the perceptual cues of a social entity (e.g., skin's tone) and we assign it to a specific category in a univocal process that follows a bottom-up pathway. However, a more recent theorization suggested that this process is affected also by higher-order factors (e.g., motivations and attitudes) that, following a top-down path, alter the perception of the social entity itself and lead to a specific category assignment (Freeman and Ambady 2011). In this vein, because it synthetizes different of these higher-order factors, political ideology represents a key factor in influencing social categorization. An example of what we are saying comes from the principle of *hypodescent*, according to which multiracial people are categorized as belonging to the most socially subordinate group (Ho et al. 2011). Krosch and colleagues observed that, because right-wing ideology is characterized by a higher sensitivity to racial stereotypes and preference for inequalities, in people endorsing this political ideology this principle is more accentuated; specifically, they are more prone to categorize multiracial people as Black (Krosch et al. 2013). Relatedly, Caruso and colleagues (2009) presented participants with pictures of biracial political candidates (real and fictitious) that were altered in a way that made those candidates darker or whiter than they originally were. Participants were then asked to evaluate the representativeness of those pictures. The authors found that when the candidate's ideology did not match with theirs, participants evaluated the darkened picture as more representative. Conversely, when the candidate had their same ideology, participants evaluated the lightened one as more representative (Caruso et al. 2009).

Political Ideology and Intergroup bias

When categorizing social entities we create groups that we distinguish in those we belong to (ingroups) from those we do not (outgroups). This distinction is important because it represents the basis of how we form our social identity, which represents a fundamental part of the Self (Tajfel et al. 1971). Given its importance, this process can lead to dramatic consequences, among which one of the most studied is the well-known intergroup bias (Tajfel and Turner 1979). This apparently inevitable phenomenon is defined as an "unfair evaluative, emotional, cognitive, or behavioral response toward another group in ways that

devalue or disadvantage the other group and its members either directly or indirectly by valuing or privileging members of one's own group" (Dovidio and Gaertner 2010). Reflecting earliest approaches to intergroup bias, in this definition the aspect related to favoring the ingroup (i*ngroup favoritism*) is predominant. Indeed, not only -as noted by Allport (1954)- ingroup is psychologically more relevant, but having a positive image of the ingroup was thought to be more effective in fulfilling people's need of self-enhancement, (Abrams and Hogg 1990; Hogg and Abrams 1988; Tajfel and Turner 1979). Accordingly, in her review Brewer (1979) concluded that ingroup favoritism was a fundamental aspect of intergroup bias, especially when groups have no functional relations with each others (e.g., in the case of the minimal group paradigm; Tajfel et al. 1971). Nonetheless, more recently researchers have started to understand the importance of outgroup derogation as well. Indeed, in specific context, such as when the relation between the groups is meaningful -particularly in terms of competition (Scheepers et al. 2006) and threat (Riek et al. 2006)- outgroup derogation can be relevant as ingroup favoritism. In this vein, political ideology represents a key factor. Indeed, political groups are part of specific groups defined as morality-based. In these groups the distinction from the others is rooted on moral convictions, meaning that the position of the ingroup is right while that on the outgroup is wrong (Parker and Janoff-Bulman 2013). Because of this strong divide, the distinction between these groups seem to necessary entail outgroup derogation (Parker and Janoff-Bulman 2013).

Accordingly, political ideology is not only a fundamental identity element, but it can also shape intergroup relations because of those dispositional, motivational, functional and even biological elements that we mentioned above. Confirming the dual-process motivational model (Duckitt 2001), a meta-analysis by Sibley and Duckitt (2008) found strong evidence of the relation between personality traits, political ideology and intergroup bias. Specifically, low agreeableness, low openness to experience and high conscientiousness predicted different form of intergroup bias (i.e., sexism, racism, etc.) via two measures of political attitude, namely Right-Wing Authoritarianism (Altemeyer 1998) and Social Dominance Orientation (Tilly et al. 2001). In fact, on the one hand, low openness to experience and high conscientiousness predict intergroup bias through higher endorsement of attitudes related to social cohesion and collective security

(RWA); on the other hand, low agreeableness and, again, low openness to experience leads to higher intergroup bias through the endorsement of values related to a hierarchical view of the society and group dominance attitudes (SDO).

Given that, while there is full consensus about the relation between political ideology and intergroup bias, the classic assumption -supported by others meta-analytic reviews (see also Jost et al. 2003)- that right-wing people are generally more biased than left-wing ones is still under debate. The recent framework of the *ideological conflict hypothesis* proposed the idea that left and right-wing people can be equally biased depending on the group target of their evaluations (Brandt et al. 2014; Chambers et al. 2013). The authors argue that classic research took into consideration as target groups mainly those that were in open contrast with right-wing values (Brandt et al. 2014). Indeed, in studies where people could select the target groups they had to evaluate, as in *least-liked-group* paradigm, a very weak effect of right-wing ideology on intergroup bias was found (Sullivan et al. 1981). Relatedly, since left and right-wing people were shown to endorse their values with a similar intensity (Skitka and Bauman 2008) and since people seem generally and equally motivated to search for information that confirm their thoughts (Mercier and Sperber 2011), the authors propose that intergroup bias is equally likely to occur in both left and right-wing people depending on the fact that certain groups might be perceived as threatening for their worldview (Brandt et al. 2014).

2. Left threatened by Right: political intergroup bias in the contemporary Italian context

2.1 Introduction

Humans are social animals that form groups not only to survive in the world, but also to increase their sense of belonging, security (Correll and Park 2005) and identity (Tajfel and Turner 1979). Social categorization is the process by which people restrict their perception of social objects (Hogg and Abrams 1988) and separate what is similar or dissimilar to themselves by coding others as ingroup vs outgroup (Tajfel 1969). Although it typically occurs in an automatic way (Brewer 1988; Fiske and Neuberg 1990), social categorization may be influenced by several variables such as the perceived warmth and competence of others (Ponsi et al., 2016), emotional reactivity (Ponsi et al. 2017), self-uncertainty (Wagoner and Hogg 2016), physical (Peck et al. 2013; Porciello et al. 2014) and personological similarity (Liuzza et al. 2013; Liuzza et al. 2011; Porciello et al. 2016), social interactions (Bufalari et al. 2014; Sacheli et al. 2015) and affect (Isen et al. 1992; Miller et al. 2010). These variables can in turn affect ethical, economic and social decisions (Azevedo et al., 2018; De Dreu et al., 2014; Panasiti et al., 2015; Ponsi et al., 2017a; Shalvi and De Dreu, 2014).

It has been found that a seemingly inevitable consequence of being part of a group (natural or created artificially for experimental purposes) is the so-called intergroup bias (Tajfel 1969), which leads one to favor the ingroup and derogate the outgroup through positive/negative evaluations, emotions and behaviors. While the study of positive bias towards the ingroup has received much more attention than the derogation of the outgroup, it has been reported that the latter mechanism is very important for characterizing the intergroup bias (Aquino and Becker 2005; Brewer 1999; Brown 2000; Hodson et al. 2003; Hogg 2003; Mummendey et al. 1992; Mummendey and Wenzel 1999; Park and Judd 2005). Studies suggest that the predominance of one aspect on the other depends on the salience of specific needs and motivations (Levin and Sidanius 1999). Outgroup derogation, often expressed by social and physical distance, negative emotions, intolerance, low cooperativeness and low pro-social behaviors (Haidt et al.

2003; Morgan et al. 2010; Mullen and Skitka 2006; Skitka et al. 2005), seems to play a fundamental role in the dynamics of the so-called Morality-based groups. In these groups -such as those surrounding the issue of abortion (Pro-life vs. Pro-choice)- the intergroup bias is the result of a differentiation from the "other" that is based on moral principles (Gray and Wegner 2009; Horberg et al. 2009; Krebs 2008; Parker and Janoff-Bulman 2013; Skitka et al. 2005). Here the intergroup bias is predominantly expressed by outgroup derogation, which can be displayed not only by directly harming others, but also by refraining from helping them (Weisel and Böhm 2015). What seems to drive outgroup derogation for morality-based groups is the perceived threat of the outgroup (Parker and Janoff-Bulman 2013). Importantly for the present research, in morality-based groups based on political affiliation, intergroup bias seems to entail a clear outgroup derogation (Janoff-Bulman 2009) that can be greater than the one driven by race (Iyengar and Westwood 2015). It is worth noticing that this pattern of results mainly derives from the study of political groups in contemporary Western context which is dominated by a natural opposition between two major ideologies: Conservatism and Liberalism (Heit and Nicholson 2010). These two ideologies differ not only in the personality traits their adherents display (e.g., Liberals more open to experience and Conservatives more conscientious; Carney et al., 2008), but also in basic and higher order cognitive mechanisms, such as motivations (Jost et al., 2004, 2007, 2009; Thórisdóttir and Jost, 2011), emotional processing (Oxley et al. 2008), attentional orienting (Carraro et al. 2015), conflict monitoring (Amodio et al. 2007) and behaviors (e.g., consumption behavior; Fernandes and Mandel, 2014; Shi et al., 2017).

Importantly, the two groups also differ in how they shape their morality: Conservatives tend more towards ingroup loyalty, while Liberals seem more heavily reliant on individual motives related to harm/care (Graham et al. 2009). System Justification Theory suggests that these cognitive, personality and moral differences combine to explain why Conservatives show more prejudice compared to Liberals, who, conversely, are thought to be more open minded, favorable to diversity (Chirumbolo et al. 2004; Thorisdottir, H. 2011; Zavala et al. 2010) and sympathetic towards outgroup minorities (Farwell and Weiner 2000; Robinson et al. 1995). Thus, while these studies hint at the existence of a difference in the level of prejudice shown by the two political groups (Jost 2017; Jost et al. 2004), the so called Ideological Conflict

Hypothesis suggests that Liberal and Conservatives are equally prejudiced since they both tend to favor those who share their own opinions and values, and derogate those who are in contrast with such values (Brandt et al. 2014; Chambers et al. 2013; Crawford 2014a). In this view, prejudice is one of the possible strategies a group can use to defend its own worldview when it is threatened (Brandt et al. 2014). Results from three independent laboratories testing this hypothesis showed that when facing a political counterpart openly opposed to their values – and thus perceived as threatening – both Liberals and Conservatives appear to be biased (i.e., they show equal dislike, political intolerance and willingness to discriminate (Brandt et al. 2014)).

It should be noted that, differently from countries in which the vast majority of the studies reported above was conducted (mainly USA and United Kingdom), Italy has a multi-party political system, in which tracing a net divide between Conservative and Liberal political parties is more difficult. Nonetheless, in the last 25 years – with the disappearance of the dominant catch-all party "Democrazia Cristiana", in which elements of both conservative and liberal ideologies were present (Paolucci 2008) - two big coalitions emerged with a more conservative ideology in the center-right coalition and more liberal in the center-left. We are aware that a perfect overlap of Italian left and right-wing with Liberalism and Conservatism respectively might still be inaccurate. Thus, we believe that using the left- vs right-wing dichotomy is more suitable for the Italian context and will refer to this in the following.

In the light of the multi-party political system, when collecting their political orientation we asked participants to self-define as right or left-wing. In doing so we asked them to answer by referring to their ideology and not the party they were voting for. This selection procedure was adopted also because some political parties in Italy (such as "Movimento 5 Stelle") declare not to follow any of the two predominant ideologies and thus selecting participants according to the parties they were voting for could have been misleading.

To characterize the intergroup bias among political groups in the contemporary Italian context (from September 2015 to May 2016, i.e., when a left-wing government was in power), we presented to right-wing and left-wing Italian voters pictures of left and right-wing Italian politicians (Study 1), words related to left

and right-wing ideologies (Study 2), and items referring to left and right-wing people (Study 3). We reasoned that varying the type of stimulus (pictures of politicians, ideological words and items referring to the two political groups) could affect different processes and thus change the expression of the bias. Indeed, it has been observed that - through mechanisms such as perceived voter-leader similarity (Cazzato et al. 2015; Liuzza et al. 2013; Liuzza et al. 2011) and attribution of authority and power (Porciello et al. 2016) - right-wing people tend to be more influenced than the left-wing ones by the presentation of their political leaders. Therefore, we expected that (Hypothesis 1) the use of pictures of politicians (Study 1) would lead the ingroup-outgroup distinction to be particularly relevant for right-wing participants, which, in turn, would exhibit higher intergroup bias, especially in the form of more positive emotions toward the ingroup (ingroup favoritism). In contrast, since ideological words (Study 2) might convey this political ingroup-outgroup distinction more directly and without the mediation of the aforementioned processes, we expected that (Hypothesis 2) the expression of the intergroup bias would follow the predictions of the ideological conflict hypothesis (Brandt et al. 2014), with the same level of prejudice for both groups. Finally, by presenting items related to participants' political ingroup and outgroup (Study 3), we expected that the lack of personalization and authority cues would lead to confirm the result of Study 2 and extend the characterization of the bias not only at the emotional but also at the cognitive and behavioral level (Hypothesis 3). Moreover, to describe in more details the process that lead to the intergroup among political groups we measured whether the same factors that have been observed to play a role either in natural and minimal groups would intervene also in these particular conditions(Effron and Knowles 2015; Gaertner and Schopler 1998; Rubini et al. 2007) and whether there is a more prominent one. Specifically, by relying on studies (those supporting the ideological conflict hypothesis and those on morality-based groups) that enlighten the role of perceived threat of the outgroup in the emerging of the bias (Brandt et al. 2014; Janoff-Bulman 2009; Parker and Janoff-Bulman 2013; Wetherell et al. 2013), we measured whether left and right-wing participants would exhibit a different level of perceived threat towards the outgroup and whether this could intervene in the expression of the bias. We expected that (Hypothesis 3.1) the more the outgroup was perceived as threatening the higher was the intergroup bias, expressed in particular in

the form of outgroup derogation (Dovidio and Gaertner, 2010). In this vein, we also investigated whether entitativity (the extent to which a group is perceived as a group; (Campbell 1958)) and agentivity (the extent to which a group is perceived as able to act as a group to achieve its goals; (Abelson et al. 1998)) could play a role and we expected that (Hypothesis 3.2) perceiving an outgroup as entitative and agentive could trigger an higher outgroup derogation. Conversely, perceiving the ingroup as entitative and agentive, and therefore able to defend its members, could enhance ingroup favoritism.

2.1 Study 1

In Study 1 we asked left and right-wing Italian participants to i) recognize, ii) politically categorize and iii) emotionally evaluate (by providing the valence of the elicited emotions) pictures of Italian politicians from both left and right-wing parties. Due to prior literature showing Conservatives to be more sensitive to authority – especially that of ingroup leaders (Liuzza et al. 2011; Porciello et al. 2016)– we expected right-wing participants to express more positive emotions than Liberals towards what they categorized as ingroup.

2.1.2 Materials and Method

Participants

66 participants (33 females; age: M=25.66 years, SD= ±7.15) were recruited by posting on social networks (e.g., Facebook) and by e-mail an invitation to complete an online survey regarding the categorization and evaluation of certain politicians. Participation to the survey was voluntary and not compensated. Sample size was determined following similar studies of our research group on social categorization (Ponsi et al., 2016). Thus, the stopping rule was set to around 30 participants for group (i.e., left and right-wing). All the participants were Italian. 31 were right-wing and 35 left-wing. The experimental procedures were approved by the independent Ethics Committee of the Santa Lucia Foundation in Rome (Scientific Institute for Research Hospitalization and Health Care) and were in accordance with the 1964 Declaration of Helsinki.

Materials and Procedure

The questionnaire was built and run through the online survey editor SurveyMonkey™. Before starting the

survey, participants were asked to read and accept the informed consent document by clicking with the mouse on a link which redirected them to the survey. Participants were presented with 58 pictures of Italian politicians in a randomized order, 29 left and 29 right-wing, with 17 males and 12 females in each group (for a complete list of the stimuli see Appendix). For each stimulus we asked participants 1) whether they recognized the politician (Recognition*: "Do you recognize the person in the picture?").* Participants could either answer "*Yes*" or "*No*". Those who responded affirmatively were asked to write the politician's surname in order to ensure their recognition. Participants were then asked to 2) politically categorize the politician in the picture (Political Categorization*:* "*How would you politically categorize the person in the picture*?"). They replied using a four-step scale (i.e., "*Right-wing, Centre-right, Centre-left, Left-wing*"). Finally, we asked participants 3) to rate the emotions evoked by the politician (Valence*:* "*What kind of emotions does the person evoke in you*?"). Participants replied by using a 9-point Likert scale (i.e., "*1= Extremely negative emotions; 9= Extremely positive emotions"*). Participants who had not recognized the stimulus were allowed to skip the questions concerning valence and political categorization. This measure was our principal dependent variable both in this study and in Study 2. Although consisting of a single item, methodological research in psychology showed no substantial differences in terms of reliability between single-item and multiple-items measures (Dolbier et al. 2005; Wanous and Hudy 2001). Importantly, although we checked for participants' ability to assign politicians to the correct political group (accuracy of 95%; SD= ± 0.18), we decided to use their response as a predictor rather than the actual political orientation of the politicians. The claims of this study are thus merely correlational, not causal, as both our dependent and independent variables are built on participants' responses (i.e., they are not experimentally manipulated). After evaluating all politicians' images, participants were asked to provide their demographic information (age, gender, nationality, occupation, education level, and country) and *Political Orientation* (henceforth named as *Group*) by indicating their ideology on a four-step scale (i.e., *Right-wing, Centre-right, Centre-left, Left-wing*).

2.1.2 Analysis and Results

Data analysis was performed with R, a free software programming language and software environment for

statistical computing (R Development Core Team, 2013). Trials in which participants did not recognize the politician were excluded from the analysis (Total valid trials=62%; range: min=13%, max=100% of valid trials per subject). We then performed a multilevel mixed linear regression analysis (LMM or "mixed-effects models"; (Garson 2013; Pinheiro and Bates 2000) through the package *lme4* Version 1.1–5 (Bates, D., Maechler, M., Bolker, B., & Walker 2014). Unlike traditional statistical methods, LMM are suitable for (a) analyzing hierarchical data structures (i.e., in which not all levels of a categorical factor co-occur at all levels of another categorical factor); (b) analyzing the whole data set (not just the mean observations for each subject and condition) to better evaluate the data variations that variance-style analyses (ANOVA) often leave out; (c) accounting for the non-independence of observations with correlated error; (d) separately treating the effects caused by the experimental manipulation (fixed effects) and those that were not (random effects) (Pinheiro and Bates 2000). We used Valence as the dependent measure of our model. The fixed effects were the Political Categorization of the stimulus, the Group and their respective interactions. Political categorization of the stimulus was recoded as follows: if the categorization of the stimulus made by the participant matched his/her Group (i.e., *left vs right-wing*), that stimulus was considered as *ingroup* (e.g., a stimulus categorized as left-wing by a left-wing participant was considered as ingroup). If the categorization did not match, that stimulus was considered as *outgroup* (e.g., a stimulus categorized as right-wing by a left-wing participant was considered as outgroup). We considered the random intercept over participants and the random slope of Political categorization over participants as random factors. Statistical significance of fixed effects was determined using type III Wald *F* tests with Kenward-Roger degrees of freedom (Kenward and Roger 1997) and the Anova function from R's *car* package. Post hoc pairwise comparisons (FDR corrected) were performed using least squares contrasts (lsc), as employed in R's *lsmeans* package. The analysis revealed a significant Group x Political Categorization interaction F (1, 70.025) = 48.31, p< .001. Post hoc analysis showed the slope of left-wing participants to be significantly different from zero (b= 3.11, SE= 0.26, df= 68.75, t.ratio= -11.94, p< .001), while that of right-wing participants was not (b= .41, SE= .28, df= 71.09, t.ratio= -1.43, p= .16). This indicates that, unlike left-wing, right-wing participants expressed no difference in emotional valence when evaluating ingroup or outgroup

stimuli (see Fig. 1). Furthermore, left-wing participants expressed more positive emotions towards ingroup stimuli (M= 5.17; SE= .23) than right-wing participants (M= 4.06; SE= .25; Mean difference= -1.1, SE= .35; t(65.98)= -3.177, p= .01, r= .36). Left-wing participants also made more negative evaluations of the stimuli they had categorized as right-wing (M= 2.08; SE= .18) than right-wing participants did with stimuli they had categorized as left-wing (M= 3.65; SE= .20; Mean difference= 1.58, SE= .27, t(69.59)= 5.83, p< .001, r=.57).

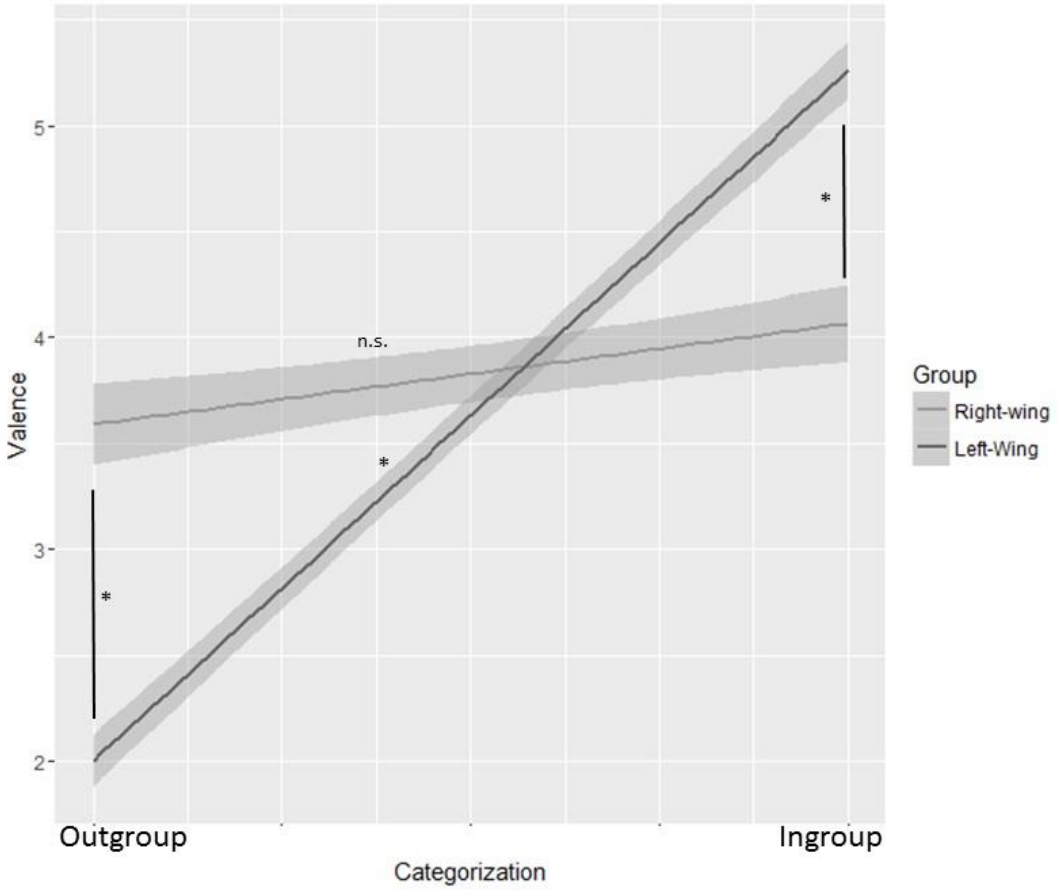

Figure 1

Mixed models interaction between Political Categorization and Group with politicians as stimuli.

Political Categorization is shown on the X-axis.

The slope was significantly different from 0 for left-wing participants (p< .001) but not for right-wing ones (p> .05). More specifically, left-wing participants expressed more positive emotions towards the stimuli categorized as ingroup and more negative emotions towards the outgroup stimuli compared to right-wing ones. The shaded bands represent 95% confidence intervals. *p< .001.

2.2 Study 2

Study 2 was identical to Study 1 except for the fact that words were used as stimuli instead of politicians' pictures. The words were chosen to represent either ingroup or outgroup by conveying a right or left-wing ideology. Differently from politicians' pictures, because they mainly refer to abstract concepts and not to actual and observable people, ideological words would not lead to the same processes of personalization that are, in turn, influenced by factors such as sensitivity to authority and perceived similarity (Porciello et al., 2016; Liuzza et al., 2011). Instead, by evoking those abstract concepts immediately referable to ideological values, we expected the ideological divide between the two political groups to be more salient and to emerge more easily. Relatedly, in line with studies on ideological conflict hypothesis, sacred values and morality-based groups (see Brandt et al., 2014, Tetlock, 2003; Parker and Janoff-Bulman 2013, Weisel and Bohm, 2015), when the ideological conflict is made relevant we expected both political groups to express similar level of intergroup bias, that is either positive emotional evaluations of the words referring to the political ingroup and negative ones for the political outgroup.

2.2.2 Materials and Method

Participants

82 participants (52 left-wings and 30 right-wings) were recruited with the same modalities used in Study 1, that is by posting an invitation to complete an online survey regarding the categorization and evaluation of political words. Although the stopping rule was again set to around 30 participants per group (i.e., left and right-wing) we received a higher number of responses. Thus, to have a better balance in the size of the two groups we selected through a random procedure a subsample of left-wing participants. Specifically, we generated a random list of numbers ranging from 1 to 52 and randomly assigned them to our left-wing participants. The participants having a number comprised between 1 and 30 were then selected. Therefore, the final sample consisted of 30 left-wing and 30 right-wing participants (33 females; age M= 28.96, SD= ± 9.67), in keeping with Study 1 and previous studies of this research group on social categorization (Ponsi et al., 2016). All the participants were Italian. The experimental procedures were approved by the

independent Ethics Committee of the Santa Lucia Foundation in Rome (Scientific Institute for Research Hospitalization and Health Care) and were in accordance with the 1964 Declaration of Helsinki.

Materials and Procedure

The questionnaire was built and run through the online survey editor SurveyMonkey™. Before starting the survey, participants were asked to read and accept the informed consent document by clicking with the mouse on a link which redirected them to the survey. 46 words were selected from specific political scales such as the Right-Wing Authoritarianism – RWA (Altemeyer 1998)– and the Social Dominance Orientation – SDO – (Tilly et al. 2001). The words were selected and categorized on the basis of the ideological policy expressed – half representing a right-wing, half a left-wing ideology – and tested by the questionnaire items (see Appendix for a complete list of the stimuli). The words did not differ for lexical frequency (M_{right}= 1.45, SD_{right}= ±.80; M_{left}= 1.51, SD_{left}= ±.80; t(44)= -.284, p= .81) or character length (M_{right}= 1.00, SD_{right}= ± .09; M_{left}= .98, SD_{left}= ±.14; t(44)= .520, p= .60). Both the order in which the words were presented and the questions within the survey were randomized.

Similarly to Study 1, for each stimulus we asked participants to 1) politically categorize the ideological word (Political Categorization: "*Which ideology do you think represents the word above?*"). Participants replied by using a four-option scale (i.e., "*Right-wing, Left-wing, Both of them, Neither of them"*). Participants were then asked 2) to rate the emotions evoked by the word (Valence: "*What kind of emotions does the word evoke in you*?"). Here replies were made by using a 9-point Likert scale (i.e., "*1= Extremely negative emotions; 9= Extremely positive emotions"*). As in Study 1, this measure was employed as dependent variable. Again, although we checked that participants were able to correctly assign the words to the corresponding political group (accuracy of 95%; SD= ± 0.18), we decided to use their responses as a predictor, rather than the actual political orientation of the words. Thus, the claims also of this study are thus merely correlational, not causal. Finally, we asked the same demographic information and question on *Political Orientation* (henceforth called *Group*) as in Study 1.

2.2.3 Analysis and Results

Trials in which participants could not assign the word to a specific political category (i.e., they indicated that the word was representing both or neither of the two ideologies) were excluded from the analysis (Valid trials= 57,1%; range: min=6%, max=95% of valid trials per subject). We performed the same linear mixed model as in Study 1, revealing a significant Group x Political Categorization interaction ($F(1,58.412)= 34.34$, $p< .001$). Post hoc analysis showed that the slopes of both left ($b= 3.56$, $SE= 0.31$, $df= 55.11$, $t.ratio= -11.24$, $p< .001$) and right-wing participants ($b= .86$, $SE= .33$, $df= 61.64$, $t.ratio= -2.59$, $p< .001$) were different from zero, indicating that with this type of stimuli (i.e., ideological words) both groups showed an intergroup bias. Once again, however, this bias was stronger for left than right-wing participants. Specifically, left-wing participants expressed more positive emotions towards the stimuli they categorized as belonging to their ingroup ($M=7.59$; $SE=.24$) than right-wing participants ($M= 6.64$, $SE= .18$); ($b= -.95$, $SE= .26$, $df= 56.51$, $t.ratio= -3.61$, $p= .003$; $r= .43$) (see Fig. 2). Furthermore, left-wing participants made less positive evaluations of the stimuli they had categorized as belonging to the outgroup ($M= 4.02$; $SE= .22$) than right-wing participants did ($M= 5.77$; $SE= .33$); ($b= 1.74$, $SE= .33$, $df= 57.35$, $t.ratio= 5.20$, $p< .001$, $r= .56$).

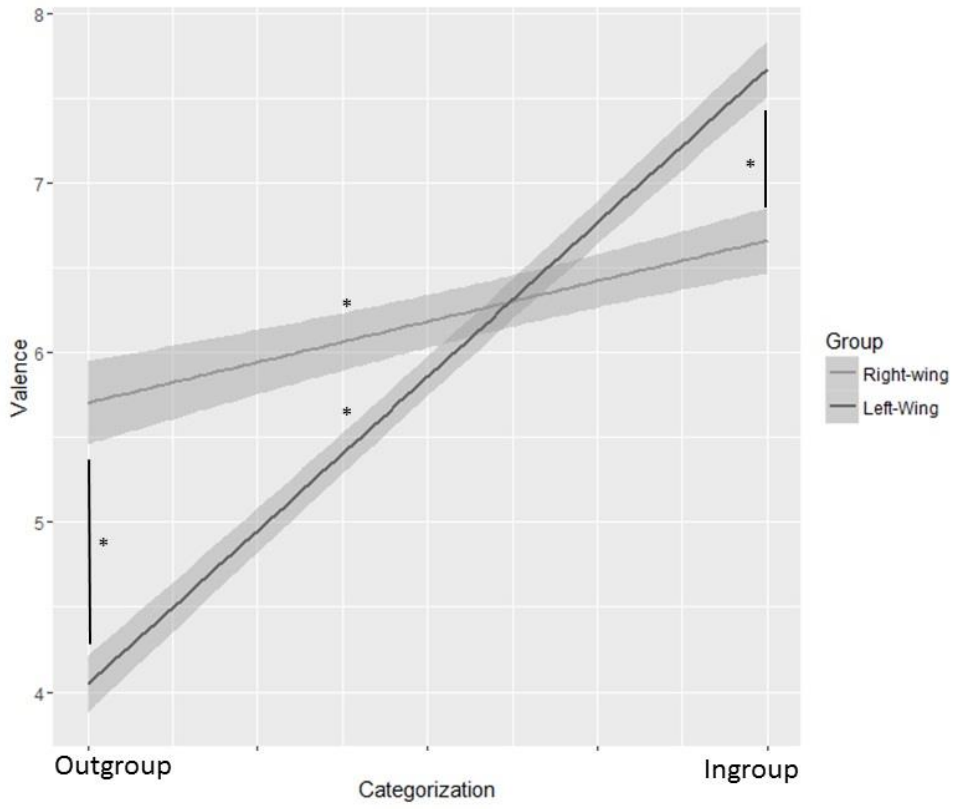

Figure 2

Mixed models interaction between Political Categorization and Group with ideological words as stimuli.

Political Categorization is shown on the X-axis. The slopes for both left and right wing participants differed from 0 (all ps < .003), but left-wing participants showed significantly more negative emotions towards the outgroup and more positive emotions towards the ingroup compared to right-wing ones. The shaded bands represent 95% confidence intervals. * p< .05.

2.3 Study 3

Study 3 was performed with the aim of i) replicating the findings of studies 1-2 and ii) revealing potential influencing factors that could play a role in the different expression of the bias between left and right-wing participants. Participants were presented with items that referred to people representing their political ingroup/outgroup (namely, left and right-wing people). Because of the lack of personalization and authority cue, we expected to replicate the findings of Study 2 regarding the emotional bias and to find additional evidence for cognitive and behavioral bias in both left and right-wing participants. Moreover, literature on morality-based groups and research on ideological conflict hypothesis have underlined how the interaction between two opposing groups is often characterized by the presence of a perceived threat of the outgroup (Brandt et al. 2014; Parker and Janoff-Bulman 2013). In addition, when perceiving a group as such (entitativity), that group could become more threatening if attributed with the ability to act (agentivity), as its capacity for harm increases. This perception often leads to an intergroup bias expressed by a more positive attitude towards the ingroup and a more negative attitude towards the outgroup (Dovidio and Gaertner 2010). We thus investigated whether these variables (i.e., entitativity, agentivity and perceived threat) could play a role in the process that leads to the emergence of the bias.

2.3.1 Materials and Method

Participants

Similarly to Study 2, we received more responses to participate to the study than the 30 per group set up by the stopping rule. The same invitation procedure employed in Study 1 and 2 gave us 71 participants (41 left-wing and 30 right-wing), from which we selected a subsample of 30 left-wing participants by means of

the same subsampling method used in Study 2. The final sample consisted of 30 left-wing and 30 right-wing participants (41 females, age M= 26.80; SD= ±5.44). All participants were Italian. The experimental procedures were approved by the independent Ethics Committee of the Santa Lucia Foundation in Rome (Scientific Institute for Research Hospitalization and Health Care) and were in accordance with the 1964 Declaration of Helsinki.

Materials and Procedure

The questionnaire was built and run through the online survey editor SurveyMonkey™. Before starting the survey, participants were asked to read and accept the informed consent document by clicking with the mouse on a link which redirected them to the survey. We asked participants the same demographic information and the same question on *Political Orientation* (henceforth called as *Group*). Depending on the answer to this question, they were directed to a specific survey, one for left-wing and one for right-wing participants. The only difference between the two was the measure of perceived threat, which was adapted for their respective outgroup. Then, participants were asked to answer questions on political opinions and evaluations that measured entitativity, agentivity, and perceived threat as related to their political ingroup and/or outgroup (see Appendix for a complete list of the items). We also measured their intergroup bias on three domains (see Measures paragraph for a more detailed description). Items for each measure were presented in a randomized order.

Measures

Entitativity of both the ingroup and the outgroup was assessed with 8 items (adapted by Spencer-Rodgers, Hamilton, & Sherman, 2007) asking participants to express their agreement or disagreement on a 7-point scale ("1= Strongly disagree; 7= Strongly agree"). *"How much group unity do you think left/right-wing people feel?"* and *"How much do left/right-wing people interact with one another?"* are two examples of the items.

Agentivity is a specific aspect of entitativity related to the ability to act as a group. It was assessed for both the ingroup and outgroup with 4 items (adapted by Spencer-Rodgers et al. 2007), in which participants were asked to express their agreement or disagreement with the sentences on a 7-point scale ("1= Strongly

disagree; 7= Strongly agree"). *"To what extent are left/right-wing people able to act collectively?"* and *"To what extent are left/right-wing people able to achieve their goals?"* are two examples of the items.

Perceived threat towards the outgroup was assessed with 5 items adapted from Schmid & Muldoon (Schmid and Muldoon 2015). In order to adjust this measure to the others, and to have a more sensible tool, we decided to use a 7-point scale instead of the original 5-point scale to assess participants' agreement or disagreement with the items ("1= Strongly disagree; 7= Strongly agree"). *"I feel threatened if left/right-wing are in power in Italy"* and *"When I see left/right-wing symbols I feel as though my identity is under threat"* are two examples of the items.

We also measured the *Intergroup Bias* on three different dimensions: emotional, cognitive and behavioral. Again, each measure was taken for the political ingroup and outgroup (i.e., left/right-wing).

Emotional Intergroup bias was assessed with the General Evaluation Scale, a feeling thermometer taken from Wright and colleagues (Wright et al. 1997). This measure is composed of 6 bipolar noun pairs separated by a 7-point scale. Participants were asked to express their feelings towards an ingroup (*Emotion Ingroup*) or outgroup (*Emotion Outgroup*) person. Examples of these pairs were *warmth-coldness* and *negativity-positivity.*

Cognitive Intergroup bias was assessed with 12 traits taken from Chambers and Melnyk (Chambers and Melnyk 2006). Participants were asked to indicate how much they thought each trait represented a person of the ingroup (*Cognition Ingroup*) or outgroup (*Cognition Outgroup*) on a 10-point scale ("*1= Not at all; 10= Very much"*). Examples of these traits were *Intelligent, Honest, Immoral* and *Radical*. *Behavioral Intergroup bias* was assessed with 2 items. One of these items – again taken from Wright and colleagues (Wright et al. 1997) – asked the participants to decide how they would distribute 500 euro between a left/right-wing person. As this measure, in our opinion, only took the ingroup favoritism aspect of the bias into account, we decided to create a second item which could address the behavioral outgroup derogation as well. Participants were thus asked to decide how they would take 500 euro from a left/right-wing person. Participants were reminded for both measures that the total amount given or taken away had to be 500 euro. Finally, *Political Orientation (Group)* was measured as in Study 1 and Study 2.

2.3.2 Analysis and Results

The analysis was conducted using IBM SPSS Statistics 22 and STATISTICA 7 softwares. Since we did not have multiple trials per condition per participant in this experiment, but single measurements per construct per participant, there was no need to use mixed models analysis. All our dependent measures were normally distributed except for the measure of Emotional Intergroup bias (ingroup and outgroup) (Kolmogorov-Smirnov d(60)= .145, p< .20), which had four outliers. Outlier participants were defined as those presenting mean values above ± 2.5 standard deviations from the grand mean of all participants in each single condition, and recoded by using the mean value of the respective condition ± 2.5 standard deviations as indicated by Field (2009). Separate 2 X 2 analysis of variance (ANOVA) with Target (ingroup vs outgroup) as within-subject factor and Group (left vs right-wing) as between-subject factor were performed on Entitativity, Agentivity, Emotional Intergroup Bias, Cognitive Intergroup Bias and Behavioral Intergroup Bias. Post hoc comparisons were conducted, when necessary, by means of the Duncan test. Finally, independent sample T-test was performed on Perceived Threat of the outgroup as dependent variable and Group (left vs right-wing) as between-subject factor.

Entitativity results

This scale had a high reliability both for the ingroup (Cronbach's α=.89) and the outgroup (Cronbach's α=.86). The ANOVA on Entitativity revealed no main effects of Target (F(1,58)= 0.003, p= .95, η_p^2= .00) or Group (F(1,58)=.809, p= .37, η_p^2= .01) and no Target X Group interaction (F(1,58)= 2.141, p= .14, η_p^2= .03), indicating that the two groups did not differ in their perception of ingroup vs. outgroup entitativity (see Fig.3).

Agentivity results

This scale had a high reliability for the ingroup (Cronbach's α=.83) and a medium reliability for the outgroup (Cronbach's α=.71). The ANOVA on Agentivity revealed no main effects of Target (F(1,58)= .609, p=.43, η_p^2 = .01) or Group (F(1,58)= .738, p= .39, η_p^2= .01) and no Target X Group interaction (F(1,58)= 1.147, p= .28, η_p^2= .01), indicating that the two groups did not differ in their perception of ingroup vs. outgroup agentivity (see Fig.3).

Perceived Threat results

This scale had a good reliability (Cronbach's α=.74). The independent sample t-test showed left-wing participants to be more threatened by the outgroup (M=4.30, SE=.22; SD= ±1.23) compared to right-wing participants (M= 3.22, SE= .21; SD= ±1.17) (t(1,58)= -3.471, p< .001, r= .41) (see Fig.3).

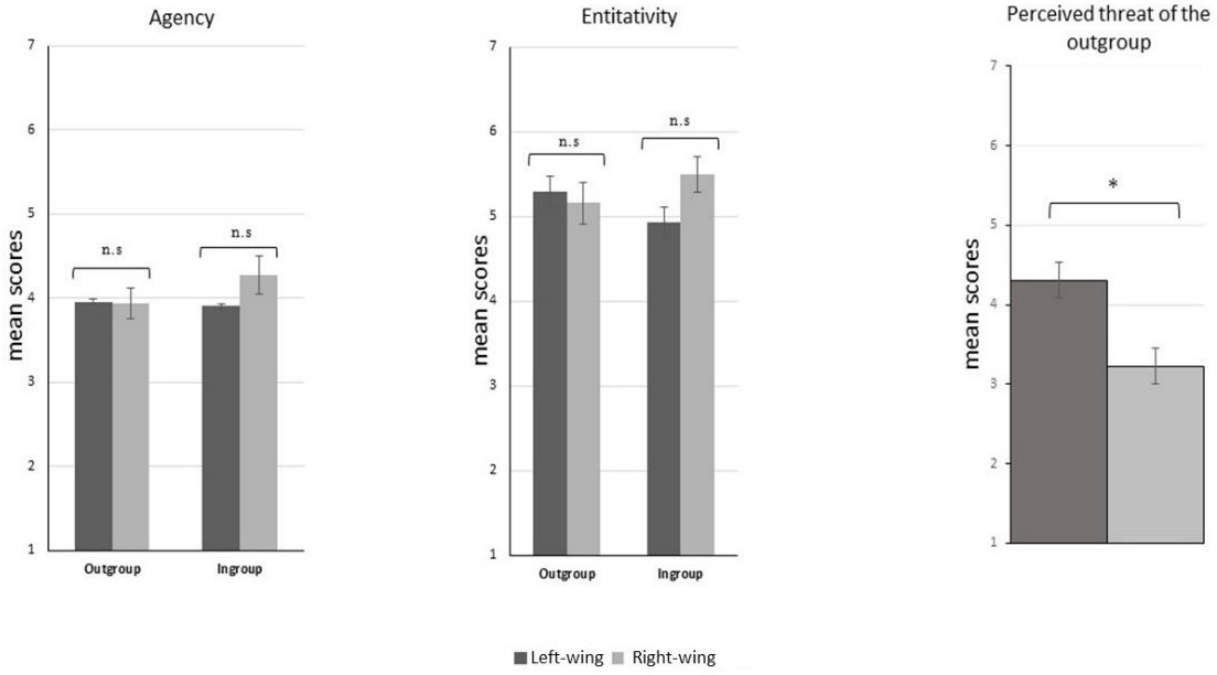

Figure 3

Agentivity, Entitativity, Perceived threat.

Comparisons of the mean scores between left and right-wing participants on ingroup/outgroup Agentivity, ingroup/outgroup Entitativity and Perceived threat of the outgroup. The only significant comparison between left and right-wing participants was on Perceived threat of the outgroup, with higher scores for former compared to the latter.

* p< .001.

Emotional Intergroup Bias results

This scale had a high reliability for the ingroup (Cronbach's α=.93) and the outgroup (Cronbach's α=.95). The ANOVA on Emotional Intergroup Bias revealed a main effect of Target (F(1,58)= 28.700, p< .001, η_p^2= 0.33) with the emotions toward the outgroup as more negative than those toward the ingroup and a main effect of Group (F(1,58)= 7.287, p< .05, η_p^2= 0.11) with left-wing participants reporting more intense

emotions compared to right-wing participants. The interaction was also significant ($F(1,58)= 13.443$, $p< .001$, $\eta_p^2= .18$), revealing, in particular, that left-wing participants expressed significantly less positive (and so more negative) emotions towards the outgroup than right-wing participants did ($p< .001$). Post-hoc analysis on emotions towards the ingroup revealed no differences between the two groups ($p= .20$) (see Fig.4).

Cognitive Intergroup Bias results

This scale had a medium-low reliability for the ingroup (Cronbach's $\alpha=.67$) and the outgroup (Cronbach's $\alpha=.64$). The ANOVA on Cognitive Intergroup Bias revealed a main effect of Target ($F(1,58)= 8.011$, $p< .001$, $\eta_p^2= .12$) with more negative evaluation of the outgroup compared to the ingroup, but no main effect of Group ($F(1,58)= .663$, $p= .41$, $\eta_p^2= .01$). The Target X Group interaction showed to be significant ($F(1,58)= 8.466$, $p< .001$, $\eta_p^2= 0.12$), again revealing that left-wing participants made significantly less positive evaluations of the outgroup ($M= 5.05$, $SD = \pm.79$) with respect to the ingroup ($M=5.67$, $SD= \pm.88$) ($p=.03$) than right-wing participants did (outgroup: $M=5.51$, $SD= \pm.84$; ingroup: $M=5.50$, $SD= \pm.67$) (see Fig.4).

Behavioral Intergroup Bias results

The ANOVA on Behavioral Intergroup Bias revealed no main effects of Target ($F(1,58)= 2.077$, $p= .15$, $\eta_p^2= .03$) or Group ($F(1,58)= .031$, $p= .86$, $\eta_p^2= .00$) or Target X Group interaction ($F(1,58)= 0.06$, $p= .79$, $\eta_p^2= .00$), indicating that there was no difference among the two groups in the way they behave towards the ingroup or the outgroup (see Fig.4).

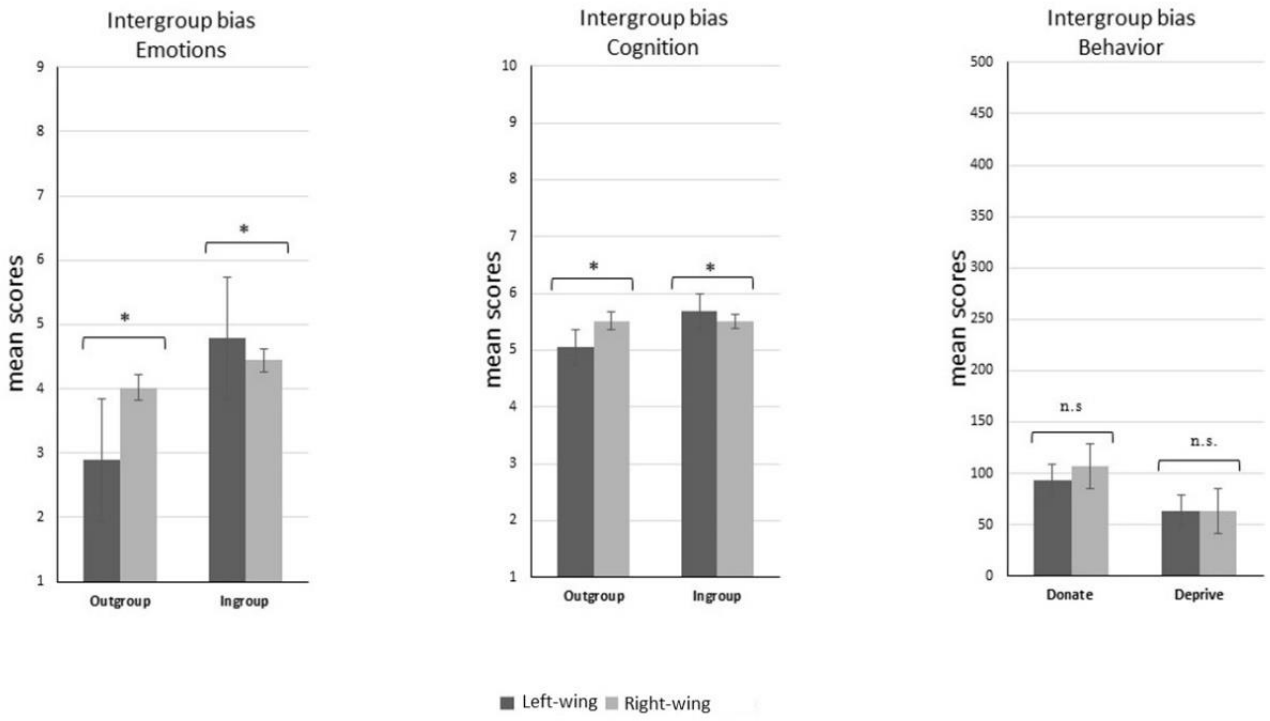

Figure 4

Intergroup bias on Emotions, Cognition and Behavior.

*Comparisons of the mean scores between left and right-wing participants on the three measures of intergroup bias: emotions, cognition and behavior. A significant difference between the two groups was found in emotions and cognitions (all ps< .001), but not in behavior (p= .79). This last measure was indexed in Donation using the formula ingroup donation – outgroup donation and in Deprivation using the formula ingroup deprivation – outgroup deprivation. * p< .001.*

Correlations

Bivariate correlation were computed between the variables of interest. The accepted alpha level of the p-value was Bonferroni corrected for the maximum number of comparisons for each variable: 0.05/3= .017. Results indicated that, while there was an inverse relationship between Perceived Threat and Emotion outgroup (r(60)= -.50, p< .001), this relationship was not significant with Cognition outgroup (r(60)= -.06, p= .62), indicating that threat seems to be involved at an emotional level of information processing related to the outgroup, rather than at a cognitive level. Moreover, Emotional bias towards the outgroup had no other relationships, neither with Agentivity (r(60)= .19, p= .14) nor with Entitativity (r(60)= .16, p= .20).

Differently, Cognition outgroup had a positive relationship with Agentivity (r(60)= .36, p= .004) but not with Entitativity (r(60)= .29, p>.017).

In addition, we tested correlations between Perceived Threat, Agentivity and Entitativity. Results showed Perceived Threat to have a significant (and positive) relationship with Agentivity (r(60)= .34, p= .007), but not with Entitativity (r(60)= .22, p= .09), indicating that a group can be perceived as threatening not because of its "groupness," but because of its potential to act (see Fig. 5).

Variables	Emotion_Outgroup	Cognition_Outgroup	Agency_Outgroup	Entitativity_Outgroup	Perceived_Threat
Emotion_Outgroup	-				
Cognition_Outgroup	.44**	-			
Agency_Outgroup	.19	.36**	-		
Entitativity_Outgroup	.16	.29*	.61**	-	
Perceived_Threat	-.50**	-.06	.34**	.22	-

Figure 5

Correlations matrix among Emotions, Cognition, Agentivity, Entitativity and Perceived Threat towards the outgroup.

r Pearson's coefficients are reported. N=60; ** p< .01; * p< .05, two-tailed pairwise correlation.

Mediation analysis

Since the two political groups differed in Perceived Threat of the outgroup in Emotional and Cognitive Intergroup Bias we used mediation analysis to assess whether the effect of Group on intergroup bias towards the outgroup (i.e., the dependent variable) was mediated by Perceived Threat. Moreover, although the two groups did not differ either in entitativity and agentivity, we run a mediation analysis also with Entitativty and Agentivity as mediators of the relationship Group and Emotional (and Cognitive) Intergroup bias. The product-of-coefficients strategy with bootstrapping was used to test strength and significance of the indirect effect (Preacher and Hayes 2004; Preacher, Rucker and Hayes 2007). In doing so we used the PROCESS macro implemented for IBM SPSS (Hayes 2012).

Mediation model with Emotional Intergroup Bias as dependent variable

We first determined that Group significantly predicted the hypothesized first mediator (Perceived Threat of the outgroup) (b= 1.08, p= .001, 95% Confidence Interval (CI)). Then we tested that Emotion outgroup was predicted by using participants' Group (left vs right-wing). The regression was significant (b= -1.20, p< .001, 95% CI), and this relationship remained significant even after inserting Perceived Threat as mediator (b= -.85, p= .002, 95% CI), but with a weaker effect, which indicates a partial mediation in the model. The 95% CI for the indirect path ranged from -.7492 to -.1120, indicating that the indirect effect was significantly different from zero at p< 0.05 (see Fig.6). This result suggests that Perceived Threat plays a crucial mediating role in the relationship between the two political Groups and the emotional aspect of the intergroup bias.

Conversely, the same model did not show any indirect effect of entitativity (Lower Confidence Interval=-.1235; Upper Confidence Interval=.1516) or agentivity (Lower Confidence Interval=-.1545; Upper Confidence Interval=.1571), indicating that these two factors did not play a role in modulating the emotional aspect of the intergroup bias depending on the political orientation of our participants.

Mediation model with Cognitive Intergroup Bias as dependent variable

As above, Group predicted Perceived Threat (b= 1.08, p= .001, 95% CI). Cognition outgroup was regressed on Group and showed a significant relationship (b= -.46, p= .03), even after inserting Perceived threat as mediator (b= -.50, p= .03). The indirect path was not significant, as indicated by the 95% CI ranging from -.1661 to .2792 with p> .05 (see Fig.6). Thus, Perceived Threat did not play any mediating role in this model. Similarly, as showed by their non-significant indirect effects, neither entitativity ((Lower Confidence Interval=-.1290; Upper Confidence Interval=.1768) nor agentivity (Lower Confidence Interval=-.1841; Upper Confidence Interval=.1750) played a role in this process. This suggests that, differently than for emotional bias, other variables not investigated here could account for the differences in cognitive intergroup bias between the two groups.

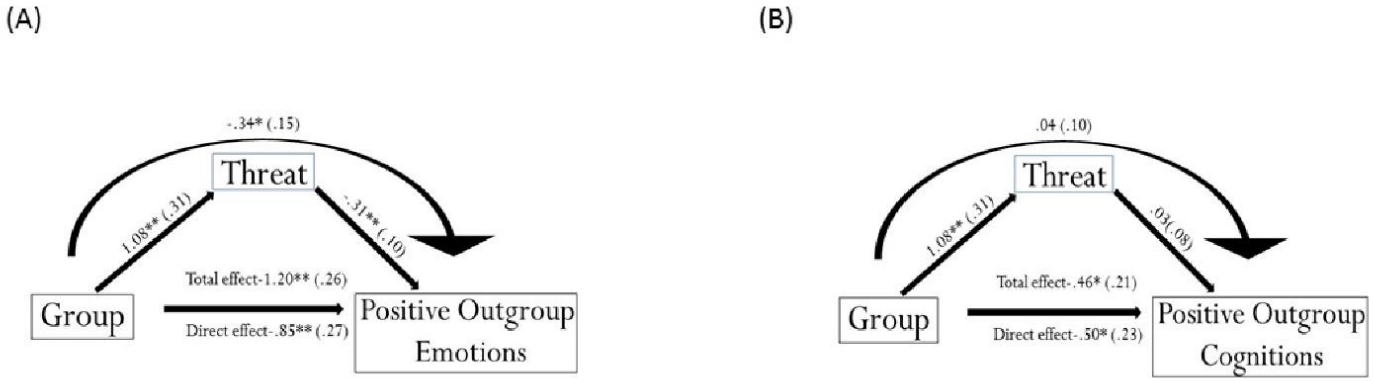

Figure 6

Panel A shows the Mediation model with Group, Perceived Threat and Emotions Outgroup.

The predictor variable Group was coded 1 for right and 2 for left-wing participants. This means that an increase of 1 political orientation – namely, being left-wing – indicates a decrease in positive emotions towards the outgroup (and thus an increase in negative ones). The direct path remained significant after inserting Perceived Threat, but the effect size decreased from -1.20 to -.85, p< .01. The indirect effect of X on Y mediated by M was significantly different from 0 (B=-.34, Boot Se .1592, BootLLCI -.7030, BootULCI -.1056, p= .02).

Panel B shows Mediation model with Group, Perceived Threat and Cognition Outgroup.

The predictor variable Group was coded 1 for right and 2 for left-wing participants. Thus, an increase of 1 political orientation – namely, being left-wing – indicates a decrease in positive traits assigned to the outgroup (and an increase of negative ones). The path from the mediator to the dependent variable was not significant p> .05.

The direct path was significant, but the indirect path was not (B=.0414, Boot SE .1097, BootLLCI -.1831, BootULCI .2573, p=.68).

* p< .05; ** p< .01.

2.4 General discussion

In three different studies we investigated the political intergroup bias showed by left and right-wing participants in the contemporary Italian context. As a main element of novelty we used different types of stimuli to represent the political target of evaluations with in mind the idea that changing nature of the political target could affect the expression of the intergroup bias. Classical studies indicate that Conservatives, because of their epistemic motives for cognitive closure, rely more often on stereotypes and

express more prejudice towards other groups than Liberals (Carney et al. 2016; Chirumbolo et al. 2004; Zavala et al. 2010). However, there is also evidence to suggest that both groups are equally capable of expressing prejudice towards groups that do not share their values or opinions, and that they perceive as a threat to their worldview (Brandt et al. 2014; Chambers et al. 2013). Motivated by the fact that both top-down and bottom-up mechanisms related to political perception can reciprocally affect each other (Alabastro et al. 2013; Castelli and Carraro 2011; M. T. Liuzza et al. 2011; Porciello et al. 2016), we presented different types of stimuli as categorization targets (i.e., politicians' pictures, ideological words and items referred to political ingroup/outgroup) in order to systematically investigate the bias. We thought that the use of politicians' pictures was particularly important because of personalization (McAllister 2007), i.e., the process by which electors come to rely more on personality-related variables of political leaders than on ideologies, policies and political programs (Caprara, Gian Vittorio, Vecchione 2016; Katz and Mair 1995). Indeed, thanks to the increasing influence of TV and social media over the last two decades, the relationship between electors and politicians has been fundamentally shaped by the latter's appearance. We hypothesized that the personalization process, together with one's sensitivity towards authority, would drive the categorization of politicians' pictures (Study 1), resulting in a higher bias for right-wing participants, while the other two stimuli -ideological words (Study 2) and written items referring to left and right-wing people (Study 3)- would induce a comparable bias in the two groups. In contrast with studies indicating that intergroup bias is stronger in Conservatives, our results showed left-wing participants to be more biased than right-wing ones, who did not express any bias in two of the three studies. It is worth noting that a prior study using surveys, focus groups and interviews also found more bias in left-wing Italian voters than in right-wing ones (Catellani 2006). Yet our results could be explained by the plasticity of the personalization process, which relies on the real, moment-by-moment social status of ingroup/outgroup political leaders. This would be in keeping with our previous research showing that right-wing people, differently from left-wing ones, reduce their leader-voter perceived similarity and their tendency to follow the gaze of the leader according to his/her social status (Porciello et al. 2016). We speculate that right-wing participants, being more sensitive to authority (Altemeyer 1998) and social

hierarchies than left-wing ones (Tilly et al. 2001), may take their leaders' current social status into account when evaluating them. The fact that there was a left-wing government during data collection may explain why, when politicians' pictures were presented in Study 1, right-wing participants did not show ingroup favoritism.

In Study 2, where ideological words were employed, intergroup bias was present in both left and right-wing participants. This result could be explained by the fact that words do not initiate the personalization process, allowing ideological opposition and the subsequent emotional activation to prevail, and intergroup bias to occur in both groups. Interestingly, though, left-wing participants' bias was actually greater than the one expressed by right-wing participants, showing either more ingroup favoritism and outgroup derogation. Study 3 provides clues on the factors that could have played a role in the different expression of the political intergroup bias in the two groups. We asked participants to answer items containing an emotional, cognitive and behavioral evaluation of the political ingroup/outgroup. Left-wing participants again showed a higher bias than right-wing ones at the emotional and cognitive levels, but no differences between the two groups were found in the behavioral domain. There are at least two problems with this measure: first, by referring to the intention to act in a certain manner rather than expressing an actual behavior, it might be influenced by experimenter demand effects. Second, as for every other aspect in the present study, we used a self-report measure, which suffers from limitations that have been deeply acknowledged in social psychology literature, such as participants' social desirability and scarce introspection skills (Nisbett et al. 1977). In addition, the two questions that we presented lacked specific contextual information (e.g., how much money they had before donating), which might have decreased the sensitivity of the measure and, thus, made it hard to justify such a deliberate and morally relevant decision. Conversely, when asked to express an emotional evaluation and to assign positive or negative traits to the ingroup and outgroup, left-wing participants again showed a greater bias, particularly in outgroup derogation. With this regard, in keeping with research on morality-based groups (Halevy et al. 2011; Parker and Janoff-Bulman 2013; Weisel and Böhm 2015) and on sacred values (Ginges et al. 2007; Tetlock 2003), we found outgroup derogation as the predominant expression of the bias throughout the three studies. In

fact, differences between political groups are based on moral values that are considered as “sacred”, that is transcendent from any trade-off or contamination with other values (Parker and Janoff-Bulman 2013; Tetlock et al. 1996). When these moral values are perceived as conflicting or being violated people experience threat (Weisel and Böhm 2015). In turn, threat leads to strong outgroup derogation, which in some cases assumes the form of moral outrage, namely a state characterized by particular negative emotions (e.g., anger and contempt) and behaviors (e.g., harsh punishment) (Tetlock 2003). Relatedly, we found a mediating role of perceived threat of the outgroup at the emotional level of the bias. Specifically, we showed how left-wing participants perceived the outgroup as more threatening than right-wing participants did and this led them to express less positive (i.e., more negative) emotions toward the political counterpart. This result, which is in line with previous research (Brandt et al. 2014), supports the idea that when the ingroup is threatened the motivation to protect the group (as well as one’s self) leads to express especially negative emotions towards the source of the threat, namely the outgroup. We also tested whether other variables besides threat could have played a role in the regulation of this process, possibly by interacting with perceived threat. We focused on perceived entitativity (the extent to which a group is perceived as a group; (Campbell 1958) and agentivity (the extent to which a group is perceived as able to act as a group to achieve its goals; (Abelson et al. 1998) (referred to ingroup and the outgroup), because these variables were observed to modulate the intergroup bias in minimal and natural groups (see e.g., (Effron and Knowles 2015; Gaertner and Schopler 1998; Rubini et al. 2007)). On the one hand, we hypothesized that the more an outgroup is perceived as acting group, the more participants would show outgroup derogation. On the other, we hypothesized that perceiving the ingroup as entitative and agentive could have increase ingroup favoritism.

No group difference or indirect effects of these two variables in mediating the relationship between the political group and the emotional and cognitive bias were found, making any further speculation regarding their role in influencing the intergroup bias impossible. We expected a bigger sense of entitativity attributed to the right-wing also because of the historical divisions characterizing Left-wing parties in Italy. This somewhat surprising result might be explained by the political situation at the time of the data

collection. In facts, after the 2014 political elections, both the big center-right coalition guided by “Popolo della Libertà” and the center-left one guided by “Partito Democratico” started fragmentizing into smaller parties, an event that could have undermined the sense of unity both in right and left-wing voters.

To sum up, our studies suggest that: i) in the Italian context left-wing people express in general more intergroup bias than right-wing people do. ii) Left- and right wings, show equal prejudice when the oppositional nature is made salient (as suggested by the ideological conflict hypothesis or the studies on the sacred values , (Brandt et al. 2014; Tetlock 2003); iii) The left-wing people’s higher prejudice seems to be mediated by perceived threat of the outgroup (as shown in Study 3); iv) the inability of politicians’ pictures and political items to induce the bias in right-wing participants may have been due to their sensitivity to the authority of ingroup leaders, who were not in charge at the time of the study.

Thus, by showing that political intergroup bias might depend less on being left or right-wing *per se* than on the wider political situation, the proposed model is useful in describing the political context in Italy, where the left-wing has historically been weak (Vampa 2009). The last three decades, in particular, which have seen left-wing parties across Europe transform from “catch-all parties” to “cartel-parties” (i.e., parties that are controlled and managed by professional politicians as an instrument aimed specifically at winning the elections; Vampa, 2009) has driven the Italian left-wing to renounce a part of its political identity. An open crisis and loss of consensus has resulted (Vampa 2009), perhaps lessening the threat of the Left as perceived by the Right. On the other hand, we might speculate that the loss of the original political identity by the Left could in turn, affect its voters by undermining their political (and social) identity. In this view, intergroup bias, might be just one strategy to reaffirm one’s own identity (Brewer 1999). Moreover, 2008 crisis has produced economic and social instability that has contributed to growing populism in Italy as well as all over the world. Most of these populistic political movements seem to have their roots in the right-wing ideology (see for instance “Golden Dawn” in Greece, “Lega Nord” in Italy and “Le Front National” in France). Thus, their spreading might have contributed to an increase of the perception of threat and, in turn, of outgroup derogation by left-wing people. Extreme examples of this are represented by the episodes reported by Italian Media of assaults by left-wing activists during right-wing manifestations [98].

All in all, our results seem to support the ideological conflict hypothesis (Brandt et al. 2014), which states that groups express prejudice toward each other because of perceived ideological dissimilarity and the perceived threat of the outgroup (Brandt et al. 2014; Crawford and Pilanski 2014). In addition to this, our research has demonstrated the importance of how the ideological message is conveyed since it can make the emergence of the bias more or less likely.

2.4.1 Limitations and Future directions

Although confirming solid recent findings and extending these contributions in an intriguing way, the present results should be taken with caution. The relative small sample size and the specificity of the context in which data were collected, should push researchers to look for further evidence that could be generalized or compared to other contexts. For instance, we speculated about the mismatch between our hypotheses and our results by calling into play the fact that a left-wing government was in power at the time of data collection. To turn this speculation into a real claim future studies should be performed during a period in which the Right is in charge.

Moreover, in countries with a bi-party system (e.g., USA) or with a less polarized political context (e.g., Germany, where left and right-wing parties lean more toward the center) researchers might find different results either with respect to the asymmetry that we found on political bias but also regarding how different stimuli are able to convey a certain ideology. Moreover, our study focused on the Left-Right ideological dichotomy and we did not investigate the single parties because of the high fragmentation of the current Italian political context. Future studies might focus on the political intergroup bias at the single party level. This would be particularly relevant because the last elections showed a fragmented political scenario in which a new –and ideologically not clearly defined- political movement gained a large consensus (e.g., the “Movimento 5 Stelle” became the first party). Relatedly, the complexity of the current political Italian context might be reflected in different expression of the bias depending on what parties are compared. This might result in different outcomes with respect to what we found by comparing ideologies rather than parties.

Another relevant aspect here not investigated relates to the characterization of the emotional intergroup

bias. In fact, the measures that we employed could discriminate only between positive and negative emotions without taking into account the variety of potential effects arising from specific emotions. In this regard, studies within the appraisal-tendency framework (Smith and Ellsworth 1985) observed that contrasting emotions can cancel out leading to specific behaviors (Lerner and Keltner 2001). Future studies might test this possibility and contribute to i) explain some of our unexpected results and ii) provide a more detailed description of the emotional intergroup bias in political groups.

Future studies should also take into account variables different from those considered in our studies (i.e., perceived threat, entitativity and agentivity). In facts, the partial mediation resulting from our model suggests that other variables may be at play in the process. Ingroup identification, for example, can moderate responses to threat, leading people who strongly identify with their ingroup to be more sensitive to those threats undermining the distinctiveness or values of the ingroup itself (Voci 2006). Moreover, people who strongly identify with the ingroup showed greater bias towards the outgroups (Hodson et al. 2003; Jetten et al. 2004; Schmid and Muldoon 2015). Thus, one further explanation of the difference found in the level of perceived threat between the two political groups could be that right-wing people might identify less with their ingroup than left-wing people, showing less threat and consequently a lower bias; indeed, it has been observed that people that strongly identify with their ingroup are also more sensitive to threats to the distinctiveness of the ingroup's identity (Voci 2006).

On the same line, political involvement could be another factor to consider since it might signal ingroup identification which, in turn, might affect the expression of the bias (Hodson et al. 2003; Jetten et al. 2004). Self-esteem, may also play a role, as people with low self-esteem may be more sensitive to threat directed at their own group; as a consequence, they could be more likely to protect the self by expressing ingroup favoritism (possibly also outgroup derogation) as posited by the Social Identity Theory (Tajfel and Turner 1979).

Another important limitation of the present work that might have prevented us to find results also at the behavioral level is the use of self-report measures. Asking directly to people about their psychological mechanisms is something that have been acknowledged to impair reliability and even the expression of

some effects because of their tendency to convey a positive image of themselves (i.e., social desirability) and because of their poor introspective abilities (Nisbett et al. 1977). Future studies might overcome this issue by combining more implicit measures (e.g., IAT Greenwald et al., 1998, or the AMP, Greenwald et al., 2009; Payne et al., 2005) and by employing tasks addressing directly the behavior of interest, such as economic investment games, e.g., dictator and trust game or prisoner's dilemmas (Bolton et al. 1998; Diekmann 2004; Halevy et al. 2006; Rapoport and Chammah 1965).

While gender differences may in principle play a relevant role in intergroup relations, studies on this issue does not provide univocal results. Indeed, on the one hand, there is evidence highlighting how men show higher intergroup bias than women (Hewstone et al. 2002), possibly because of men's higher social dominance tendencies (Pratto et al. 2011); on the other hand, other studies indicate that females express more ingroup bias when facing other females because their balanced gender identity allows them to have a cognitive mechanism that promote own-group preferences (Rudman and Goodwin 2004). Moreover, as predicted by ideological conflict hypothesis, when political groups are confronted (like in each of our three studies) intergroup bias should be equally expressed because conflicting values of the outgroup lead to perceive it as threatening (Brandt et al. 2014). In this regard, past research showed that females seem to be more sensitive to social cues and to threatening stimuli (McClure et al. 2004). Thus, we might speculate that left-wing females would perceived the political outgroup as more threatening and, in turn, express higher intergroup bias than their male counterparts. Despite interesting, the present research could not address this relevant issue; first because of its intrinsic characteristics (i.e., for certain stimuli that we used, such as ideological word, ingroup-outgroup own-gender preferences exhibited by females could not be tested because sex-based evaluations are not possible), second because of limitations due to our sample size.

3. Behavioural and oculomotor evidence that ideological priming affects deception

3.1 Introduction

Deciding whether to deceive another person or not activates a motivational conflict between the temptation to lie in order to obtain a personal benefit and the desire to behave according to social norms (Mazar et al. 2008). Seen as such, deception is not a static and univocal process, but one influenced by situational, dispositional and emotional factors that can promote either the temptation to deceive or the desire to be honest (Motro 2016; Panasiti et al. 2011; Panasiti and Ponsi 2017). On the one hand, the temptation to act dishonestly is enhanced by anonymity (Zhong et al. 2010), monetary priming (Gino and Mogilner 2014), unfavorable situations (Panasiti et al. 2011), sense of entitlement (Poon et al. 2013; Schurr and Ritov 2016) and the activation of positive self-concepts (Brown et al. 2011; Khan and Dhar 2006). On the other hand, the desire to act honestly increases when reputation is at risk (Azevedo et al. 2018; Panasiti et al. 2011, 2016; Panasiti et al. 2014) or when the concept of honesty is made salient. Examples of the latter include the presentation of statements having to do with the free-will (Vohs and Schooler 2008), the Ten Commandments (Mazar et al. 2008) or a code of honor (Shu et al. 2011). Interestingly, moral conflict can also be modulated by the target of deception, as indicated by the fact that the temptation to deceive is enhanced when the target of a lie is perceived as low in warmth or being highly competent (Azevedo, Panasiti, Maglio, & Aglioti, 2018).

Like other immoral acts, the decision to deceive depends on the centrality of moral values for each individual (Aquino et al. 2009). Similarly, political ideology can influence morality by determining which values people prioritize. A study conducted in the Italian context observed how right vs. left-wing voters rely on different sets of values, with the former supporting those more related to self-enhancement (like power and achievement) and the latter those more related to self-transcendence (like benevolence and universalism) (Caprara et al. 2006). Seen as such, political ideology can serve as the social regulator mechanism of morality (Janoff-Bulman 2009; Janoff-Bulman et al. 2008).

The Moral Foundations Theory (Haidt and Graham 2007) attempts to structure and describe this relationship between political ideology and morality by focusing on the moral differences expressed by

people who endorse the two major political ideologies in Western society, namely Liberalism and Conservatism. The authors suggest that while Conservative morality is constructed from each of the five moral foundations (i.e., Harm/Care, Fairness/Reciprocity, Loyalty/Betrayal, Authority/Subversion and Purity/Degradation), the Liberal one relies only on Harm/Care and Fairness/Reciprocity.

However, little is known about whether this difference in morality emerges when Liberals and Conservatives face social decisions with real consequences. Few evidence reported effects of political ideology on trust decisions and cooperation (Anderson and Mellor 2005; Ponsi et al. 2017), but almost none on deception. To our knowledge, the only study addressing this issue was performed a research group in the French context that found that politician primes increase deception compared to non-politician ones (i.e., clergymen), and that specific politicians (i.e., Sarkozy) can enhance cheating behavior more than other politicians (i.e., Holland) and political parties (i.e., French Republican party) (Celse and Chang 2017).

In order to understand whether political information can affect deceptive behavior, and how it may do so, we combined an adapted version of the Temptation to Lie Card Game (Panasiti et al. 2011) with a priming procedure and eye-tracking. We also attempted to understand how the conveyance of a political value could differentially modulate the moral conflict related to deception.

Over the last two decades we have witnessed the rise of a phenomenon known as the "*personalization of politics*". Accordingly, the image of a political leader seems to have become more prominent than parties and collective identities (Caprara and Zimbardo 2004; Karvonen 2010; Garzia 2011), and such images may now influence voters' implicit social attitudes more than the party itself (Liuzza et al. 2011; Porciello et al. 2016). Data from two surveys in the Italian context showed that 50% of respondents believe all those in power to be corrupt and dishonest, regardless of political partisanship (*Trendsetting* survey, SWG-Affaritaliani.it, 2010). Moreover, 48% perceive this tendency toward corruption in politicians as increasing over time (Istituto Demopolis, 2017). Based on this general suspect of politicians, we hypothesized that images of politicians would increase dishonesty more than ideological words, and that they would do so independently from their ideological affiliation. We called this hypothesized effect the "*caste effect.*"

One important aspect of our game design was that participants could face opponents with a different

socio-economic status. Past research using investments games, such as the ultimatum and the dictator game, showed that the socio-economic status of the interaction partner represents a fundamental piece of information when people have to decide how to allocate monetary resources (Liebe and Tutic 2010; Smeets et al. 2015). Moreover, the above-mentioned moral differences between the two political ideologies have important implications on how social and economic inequality is addressed. In fact, according to the System Justification Theory (Jost, Banaji & Nosek, 2004), right-wing ideology endorses the acceptance and legitimation of inequalities by supporting the existing order. Conversely, left-wing ideology tends to object social disparity by promoting values such as social change and resource redistribution (Jost et al. 2004). Because people exhibit more prosocial behavior toward people with a lower socio-economic status (Liebe and Tutic 2010; Smeets et al. 2015), we expected our participants to lie in a way that favored low-status opponents and disadvantage high-status ones. But more importantly, we expected political priming to modulate this process such that right-wing primes would induce an equal level of deception toward high vs. low status opponents, while left-wing primes would enhance deception toward high status ones.

To better characterize the process that lead to deceptive behavior we recorded participants' oculomotor behavior by means of an eye-tracking system. Since (moral) decisions are the result of information search and processing, we recorded participants' oculomotor behavior to have a measure of how people engage in these processes during moral decision-making. With its high temporal and spatial resolution eye-tracking reliably allows to get access to conscious and pre-conscious levels of information processing by providing a measure of how people allocate their attention. In doing so, eye-tracking not only contributes to a detailed description of the decision-making process, but it also permits researchers to overcome certain issues that might cause biases in the results, such as people's social desirability, self-deception and scarce introspection skills (Nisbett et al. 1977). Although used to investigate attentive mechanism in broad decision-making (for a review, see Orquin and Mueller 2013), more recently eye-tracing was employed in studies focusing on the domain of moral decisions. For instance, it has been showed that people tend to allocate their attentive resources by avoiding undesirable information, namely information that can

enhance guilt, anxiety and cognitive dissonance (Fiedler et al. 2013; Fiedler and Glöckner 2015; Gino et al. 2008; Hochman et al. 2016; Kastner 2010; Pittarello et al. 2015).

In the present study, before having to decide whether to lie or not, participants were simultaneously presented with two pieces of information, one having to do with the outcome of the game (henceforth referred to as *personal* information, as it had to do with participants' gain/loss) and the other with the status of the opponent (henceforth referred to as *social* information, as it had to do with participants' interaction partner). Since left-wing ideology conveys concepts of equality and social support (Jost et al. 2004), we expected left-wing primes to drive participants' attention toward the social information. Conversely, when primed with a right-wing stimulus, we expected participants to direct their attention toward the personal information, as right-wing ideology seems to be associated with individualism and autonomy (Jost et al. 2004; Zettler & Hilbig, 2010; Zettler, Hilbig, & Haubrich 2011). Furthermore, we expected attention allocation to modulate participants' deceptive behavior differently according to where it was directed. Specifically, we thought that participants who looked more at the social status would make less self-gain lies and more other-gain lies to the low (vs. high) status opponents, and those who looked more at the outcome of the game would produce more self-gain lies regardless of their deception target. Finally, after each trial, participants were presented with a picture of their opponents and tested for whether their decision to lie or not would affect how long they looked at them. We chose to focus on the eyes because they represent a fundamental source of information during interaction and communication (Emery 2000). Moreover, after behaving in ways that lead to guilt, people react to the resultant arousal by avoiding eye contact with the target of their behavior (Yu et al. 2017). Accordingly, we expected participants to look less at their opponent's eyes after having lied (vs. having told the truth), especially when facing low status (vs. high status) opponents. Furthermore, we expected this effect to be stronger when participants were primed with a left-wing (vs. right-wing) stimulus, because the concepts such as resource redistribution and social support evoked by this ideology should induce participants to experience more cognitive dissonance after their immoral action (Festinger 1962).

Finally, we also explored whether inter-individual differences in personal dispositions could modulate these

processes. Specifically, we measured two personality traits previously associated with deception, namely machiavellianism and social desirability (Panasiti et al. 2011, 2016; Panasiti, Pavone, Mancini, Merla, Grisoni, et al. 2014). Past research highlighted how Machiavellians tend to lie more often (Jonason et al. 2014), more strategically (Jones and Paulhus 2011), in multiple context (Baughman et al. 2014) and without caring about possible reputational risks (Panasiti et al. 2011) possibly because they are more prone to maximize their self-interest (Sakalaki and Fousiani 2012), less inclined to pro-social behavior (Becker & O'Hair 2007) and have lower Theory of Mind-related skills (Bagozzi et al. 2013). Conversely, because they are concerned about their self-image (Jones and Paulhus 2011; Meston et al. 1998), people high in social desirability tend to decrease their deceptive behavior, especially when their reputation is at risk (Panasiti et al. 2011; Panasiti, Pavone, Mancini, Merla, Grisoni, et al. 2014), and for this might be more and influenced when certain social norms are more salient.

3.2 Materials and Methods

Participants

Based on the effect sizes obtained in previous research where the same experimental paradigm was used and similar manipulations employed (R^2=0.43) (e.g., Azevedo et al. 2018), we performed a power analysis (power= 0.80; α= 0.05) for multiple regression (*pwr* R package) that showed a sample of N= 39 to be adequate. We collected data from fifty Italian participants (26 females, age M=23.04; SD= ±3.13) to guard against possible data loss due to technical or other issues (see below). Ten participants were excluded because they answered "*no"* to the question "did you feel involved in the interaction?", showing they did not believe the cover story used to convince them they were playing a real interaction game. One participant was discarded because of loss of eye tracker signal. The final sample thus consisted in thirty-nine participants (23 females, age M= 22.71; SD= ±2.91) with normal or corrected to normal vision.
Only participants with no clearly defined political orientation were selected. Specifically, this meant only those who described themselves as "*Neither left-wing nor right-wing"* on a 5-point self-placement scale ranging from "*Left-wing*" to "*Right-wing*." Please note that to address potential misunderstanding in the question we specifically referred to their political ideology rather than the political party they supported".

This choice was made due to experimental evidence indicating that ideologically polarized people – particularly Conservatives – tend to resist change (Jost et al. 2007) and because the priming procedure we employed may have been too weak to induce a sufficient modulation in the behavior of polarized voters. The experimental procedures were approved by the independent Ethics Committee of the Santa Lucia Foundation in Rome (Scientific Institute for Research Hospitalization and Health Care) and were in accordance with the 1964 Declaration of Helsinki. Subjects read and signed the informed consent and were paid a fixed amount of 15 euro for their participation, while an additional, variable amount (between 2.50 and 10 euro) was given according to what they gained during the game.

Stimuli

We selected both the images of certain Italian politicians and various words representing left and right-wing ideologies as prime stimuli. To strengthen the cover story used to avoid participants to find out our experimental hypotheses (see Procedure section) we inserted as prime stimuli also some images of famous people not belonging to any political category and words not ideologically-related (for a list see Supplementary materials). Images of random men and women were also chosen to represent the fictitious opponents in the Temptation to Lie Card Game. A detailed description of the selected stimuli is provided in the following paragraphs.

In this study we refer to political ideologies using the Left vs. Right dichotomy rather than the Liberal vs. Conservative one. We do so because we hold these terms to be more suitable to the Italian context, where a clear divide between liberal and conservative parties (and their corresponding ideologies) has historically been difficult to discern. However, the two coalitions that have emerged in the last 25 years – the Center-left and Center-right – do seem to adhere to the aforementioned ideologies, allowing us to match our research with past literature on the topic.

Prime stimuli

Politicians

To select the politicians whose images would be used in the task, we implemented an online survey (SurveyMonkey©) in which Respondents (N=102) were presented with an image (taken from the Internet)

of fifty-eight Italian politicians (twenty-nine left-wing/ twenty-nine right-wing; twenty-three females/thirty-five males) and asked to i) indicate whether they recognized the person by writing his/her surname, and ii) indicate his/her political orientation (*Left-wing, Centre-Left, Centre-Right, Right-wing*).We then selected the seven left-wing (one female, six males) and seven right-wing (one female, six males) politicians who were recognized and assigned to the correct political category with the highest percentage (for the list of the stimuli, see Appendix).

At least two images for each politician were taken from the internet. Images featured only the face, from a frontal position and with a neutral expression. The neutrality of facial expressions was checked through Microsoft™ API Cognitive Services, an application that assigns a percentage to each of the eight basic emotions (i.e., anger, contempt, disgust, fear, happiness, neutral, sadness, surprise) that indicates to what extent they are present in the image. The two images with the highest neutrality percentage (> 84%) for each politician were edited with Adobe Photoshop© to delete the background and any contextual information. Images were then included in an online survey and validated by an independent sample of non-Italian people (N= 81, 48 females, age: M= 24.67; SD= ±8.00). Coherently with the API procedure, respondents were asked to indicate, using percentages, to what extent the same eight emotions were expressed by the person in the image. Finally, we selected the image in which neutrality was significantly more present than the other emotions (see Supplementary). If both the images were significantly neutral, we used a two-tailed t-test to choose the more neutral one.

Ideological Words

The ideological words used as right and left-wing prime stimuli in the Temptation to Lie Card Game (TLCG) (see below) were selected using an online survey that contained a pool of forty-six nouns (twenty-three left-wing, twenty-three right-wing) taken from political questionnaires (e.g. RWA by Altemeyer and SDO by Sidanius & Pratto).

Respondents (N= 82, 47 females, age: M= 29.36; SD= ±9.50) were asked to indicate which ideology the words represented by selecting one of four options: *Left-wing, Right-wing, Both of them, Neither of them*. We selected seven left-wing and seven right-wing words that were consistently assigned to the correct

political category. (For a list of the stimuli, see Appendix).

No difference in lexical frequency and syllabic/font length between right-wing and left-wing words was found (CoLFIS, Bertinetto, Burani, Laudanna, Marconi, Ratti, Rolando, Thornton, 2005. *Corpus e Lessico di Frequenza dell'Italiano Scritto (CoLFIS)*; http://linguistica.sns.it/CoLFIS/Home.htm) (See supplementary).

Images of the participants' opponents in the TLCG

We selected sixteen free-licensed images (eight females, eight males) from the internet with the purpose of representing the fictitious opponents in the card game. The images depicted only the person's face in a frontal position and were edited to delete any contextual information. The images were then assigned to two groups, one of high status (four females, four males) and one of low status (four females, four males). The two stimuli groups were counterbalanced across subjects.

To better test the effect of our manipulation, we took a baseline measure of participants' oculomotor behavior when observing these pictures that we would later subtract from the analysis.

All the Stimuli (i.e., politicians, ideological words and opponents) were resized and implemented in the adapted version of the "Temptation to Lie Card Game" (TLCG; Panasiti, Pavone, Merla, & Aglioti, 2011) using E-Prime 2.0 (Psychology Software Tool, PA).

Main Experimental Task

The Temptation to Lie Card Game (TLCG)

The game was a modified version of the paradigm developed by Panasiti and colleagues (2011) that allows for the investigation of spontaneous deception. The original task consists in two players interacting in a card game. One is the Participant, while the other is his/her Opponent. To start, the Opponent picks one of two cards that can be either a winning or a losing card. At this stage, the Opponent does not know which card s/he picked. The participant is then shown which card was picked and communicates the outcome of the game to the Opponent. In so doing, the participant can decide whether to tell the truth or to lie, thus changing the original outcome of the game. This paradigm is a zero-sum game in which only one of the two players can obtain the unknown and fixed monetary reward associated to each trial. Importantly, the TLCG presents two possible situations to the participant, and each gives lying a different purpose. First, when the

opponent picks the winning card, the situation is *unfavorable* from the participant's point of view, and thus lying is a *self-gain lie* that leads to a personal reward. Conversely, when the opponent picks the losing card, the participant faces a *favorable* situation, and lying becomes an *other-gain lie* that leaves the reward with the opponent.

We modified this paradigm in several ways for the purposes of our study. We added one card symbolizing the opponent's status and presented it simultaneously with the other card related to the outcome of the game. We also changed the symbols on the card: 1 or B vs 9 or A (see below for details) cards represented the equivalent of spade (loss) and heart (win) cards respectively. (See Fig.1).

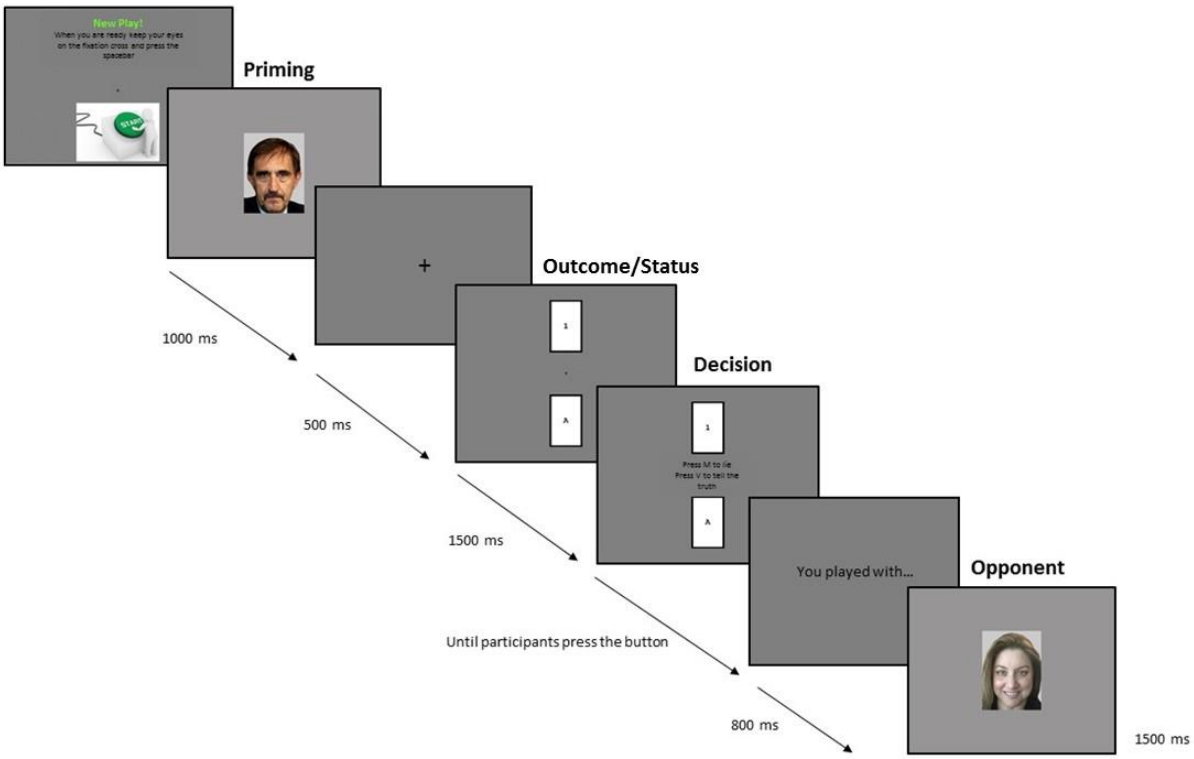

Figure 1

Exemplary timeline trial of the adapted version of the TLCG with a right-wing politician as prime stimulus.

In the Outcome phase, and depending on the counterbalanced condition, the participant was shown both the status of the opponent and what card s/he picked. In this example, the participant played against a high-status Opponent (card A) who lost the trial (card 1). In the Decision phase, the participant could either tell a lie or the truth by pressing the M or V button, reversing or accepting the outcome, respectively. The image of the Opponent was then shown at the end of the trial.

Design

The study was divided in four blocks presented in an incomplete counterbalanced order. Blocks with the same type of stimuli (e.g., words or politicians) were presented in pairs, namely we presented one type of stimuli (e.g., politicians) in the first two blocks and the other type (e.g., words) in the other two. Each block had sixty-four trials presented in a randomized order, for a total of two hundred and fifty-six trials. Participants played 50% of trials against high status opponents and 50% against low status ones. Similarly, 50% of the trials were favorable situations and the other 50% unfavorable.

Political category (i.e., *left vs. right-wing*) of the prime stimulus was counterbalanced across blocks.

The following elements were counterbalanced across subjects: the meaning of the symbols on the cards (i.e., *winning/losing card or high status/low status opponent*), the buttons on the keyboard used for indicating the decision (*V* and *M* for *truth/lie)* and the pictures of the fictitious opponents (i.e., high status opponents for some participants were low status opponents for other participants).

The card presentation order was counterbalanced within subjects: at the beginning of each block, participants were informed that half the trials would feature the outcome card (*win/lose*) on top and the status card (*high/low*) on bottom, while in the other half of trials this order would be reversed.

Procedure

Participants began by sitting in front of an LCD monitor (1280 x 1024 resolution) placed 60 cm from their eyes. After sitting they received information about the experiment and were asked to sign the consent form. Then came the experimental instructions. Participants were told that the aim of the study was to test how social interaction could influence the perception of different stimuli that they would be evaluating at the end of the task. They were also told that the interaction would consist in playing a card game with some employees of a big company, and that the responses of these people had been previously recorded. We described the meaning of the symbols on the cards and presented the participants with two brief descriptions of their opponents: high status opponents were managers with a permanent position at the company, while low status opponents were office workers (employees) with a fixed-term contract.

We recorded participants' oculomotor behavior monocularly at a sampling rate of 250 Hz by means of an infrared video-based eye-tracking system (SMI RED 500, Sensomotoric Instruments, GmbH, Germany). Participants performed a brief practice session consisting of six trials to familiarize themselves with the task. Then the experimenter turned off the light and began the eye tracker's calibration procedure. The same 9-points calibration procedure was performed before starting each of the four experimental blocks. Although this procedure ensured good accuracy (< 1°, indicating an error radius of around 5 pixels on the screen), an additional and more specific calibration procedure was performed by asking participants to accurately explore the colored geometric shapes placed at the Areas Of Interest (AOI) that were used for the analysis of the oculomotor behavior.

Before starting the experimental task, the images of the sixteen TLCG opponents were presented to participants in a random order. This was done in order to obtain a baseline measure of participants' oculomotor behavior that could then be compared to the one measured later during the TLCG.

Participants then performed the adapted version of the "Temptation to Lie Card Game". Participants' hands were covered with a panel while they played in an attempt to discourage the automatic tendency to look at one's fingers, something that could cause the eye tracker to lose its signal.

At the beginning of each trial participants started to play by pressing the spacebar, which caused the prime stimulus to appear on the screen for 1000 ms. The stimulus could either be the image of a politician (366 x 492 pixels) or an ideological word (685 x 180 pixels). A fixation cross (500 ms) appeared before the card (190 x 300 pixels) chosen by the opponent (winning vs. losing) and the card (190 x 300 pixels) representing his/her status (high vs. low) were revealed. This outcome stayed on the screen for 1500 ms before participants were able to decide whether to lie or tell the truth to the opponent. They did so by pressing either the "m" or "v" keys on the keyboard, respectively. There was no time limit to make this choice. Then, 800 ms after deciding, the picture of the opponent appeared on the screen, where it stayed for 1500 ms (See Fig. 1 for the illustration of a typical trial's timeline).

At the end of the TLCG, participants were asked to respond to the following two control questions to determine whether they had believed the cover story: i) "*did you feel involved in the game?"* ("yes" or

"no") and ii) "*how involved did you feel*?" (5-point scale with 1 being "not at all" and 5 "very much"). Participants then performed two further tasks. The first was a recognition task in which they looked at various stimuli and tried to recognize which ones had been shown during the TLCG.

In the second task, only the actual experimental stimuli (i.e., the prime stimuli) were shown to the participants. For politician stimuli, participants were asked to indicate i) whether they recognized the person by writing his/her surname, ii) which ideology better represented the stimulus by selecting one of four options (*Left-wing, Centre-Left, Centre-Right, Right-wing*) and iii) the emotional valence evoked in them by the stimulus on a 9-point scale (*1=Extremely Negative; 9=Extremely Positive*). For ideological words stimuli, participants were only asked the last two questions.

Personality Measures

Finally, participants were asked to respond on a 7-point scale (*1=False; 7=True*) to the Balanced Inventory of Desirable Responding (BIDR, Meston, Heiman, Trapnell, & Paulhus, 1998) and on a 5-point scale (*1=Strongly Disagree; 7=Strongly Agree*) to the Machiavellianism Scale (MACH IV, (Christie & Geis, 1970).

3.3 Data Handling and Analysis

Data handling

We analyzed: i) behavioral responses (i.e., lie vs truth) related to the tendency to lie during each TLCG trial and ii) participants' oculomotor responses by looking at the duration of the fixations spent on each selected Areas of Interest (AOIs) in each trial. Oculomotor responses were extracted using the software BeGaze 3.6 (SMI, Sensomotoric Instruments, GmbH, Germany). Fixations were recorded at the following three moments during the trial: when participants viewed i) the *prime stimulus,* ii) the *outcome of the game* and the *opponent's status,* iii) the picture of the *opponent*. Relative AOIs were drawn for each stimulus.

AOI drawing

Prime stimulus

For the images of politicians, we drew the averaged AOI related to the politicians' *eyes.* For ideological words we drew the averaged AOI that contained the whole *word*.

Outcome of the game and Opponent's status

The AOIs were the two cards that appeared on the screen, one indicating the outcome of the game ("*Outcome* AOI") and the other indicating the status of the opponent ("*Status* AOI").

Opponent

Similarly to what we did for politicians, we drew the averaged AOI that included the opponents' *eyes.*

Data analysis

Data analysis was performed using R, a free software programming language and software environment for statistical computing (R Development Core Team 2013). We used the package *lme4* Version 1.1–5 (Bates, D., Maechler, M., Bolker, B. and Walker 2014) to run multilevel mixed linear regression (LMM or "linear mixed-effects models") and multilevel log-linear regression analyses (GLMM, "generalized mixed-effects models") (Garson 2013; Pinheiro and Bates 2000) for continuous and dichotomic dependent variables respectively.

The random effects structure of each statistical model was built by means of a Principle Components Analysis (PCA; R, package *RePsychLing*, function *rePCA*), an analysis that tests the overparameterization of the maximum random structure, something that can affect the interpretability and reliability of the parameters' estimates (Bates et al., 2015). PCA reveals the amount of variance captured by each random effect. Thus, by-subject random effects that explained zero amount of variance were removed. Post-hoc comparisons were performed with the R package *lsmeans* with "FDR" correction.

3.4 Results

Factors influencing the tendency to lie

To test how the decisional process involving moral choices is influenced by contextual factors, such as the socio-economic status of the interaction partner, the situation in which the decision is taken and the prime stimulus used to influence a certain behavior, we ran a multilevel mixed log-linear regression analysis on the model with the *Tendency to lie* as our dependent dichotomic variable (i.e., lie/truth) and *Priming type* (ideological word vs. politician), *Political orientation of the priming* (left vs. right-wing), *Outcome of the game* (favorable vs. unfavorable), *Opponent's Status* (low vs. high) and their respective interactions as our fixed effects. After i) the principle Components Analysis run on the model with the maximum random structure and ii) the removal of the by-subject random effects that explained a near-zero amount of variance, the resulting model included the *subject* as a random factor (i.e., random intercept) and the random slopes of *Priming type*, *Political orientation* o*f the priming, Outcome* and *Opponent's Status* over subjects. Type III Wald *Anova* function from the *car* package in R was used to determine the statistical significance of the fixed effects.

The significant *Outcome of the game* X *Opponent's Status* interaction (X^2 = 23.152, p<.001) confirmed our prediction about the role of the status of the interaction partner in the decision to lie for personal vs altruistic purposes. Post-hoc comparisons revealed that participants tended to favour their opponents when these had a low (vs. high) socio-economic status by producing more other-gain lies (z-ratio=4.802, p<.001), while they tended to favour them-selves and disadvantage their opponents when these had a high (vs. low) socio-economic status by producing more self-gain lies (z-ratio= -5.264, p<.001) (See Fig. 2, panel A).

Importantly, the role of political priming in this process was qualified by the significant *Priming type* X *Political Orientation* o*f the priming* X *Outcome of the game* interaction (X^2 =5.184, p=.02), which however did not take into account the socio-economic status of the opponents (X^2 =0.015, p=.90). Post-hoc comparisons revealed that participants produced more other-gain lies when primed with left-wing words than with left-wing politicians (z-ratio=2.755, p=.009) and right-wing politicians (z-ratio=2.656, p=.01). They

also produced more self-gain lies when primed with right-wing words with respect to left-wing words (z-ratio=2.108, p=.04), and when primed with left (z-ratio= -3.277, p=.002) and right-wing (z-ratio= -3.280, p=.002) politicians with respect to left-wing words. Confirming our hypothesized "caste effect" we found no differences in how left and right-wing politicians affected participants' tendency to lie (z-ratio= -.0239, p=.82) (See Fig. 2, panel B).

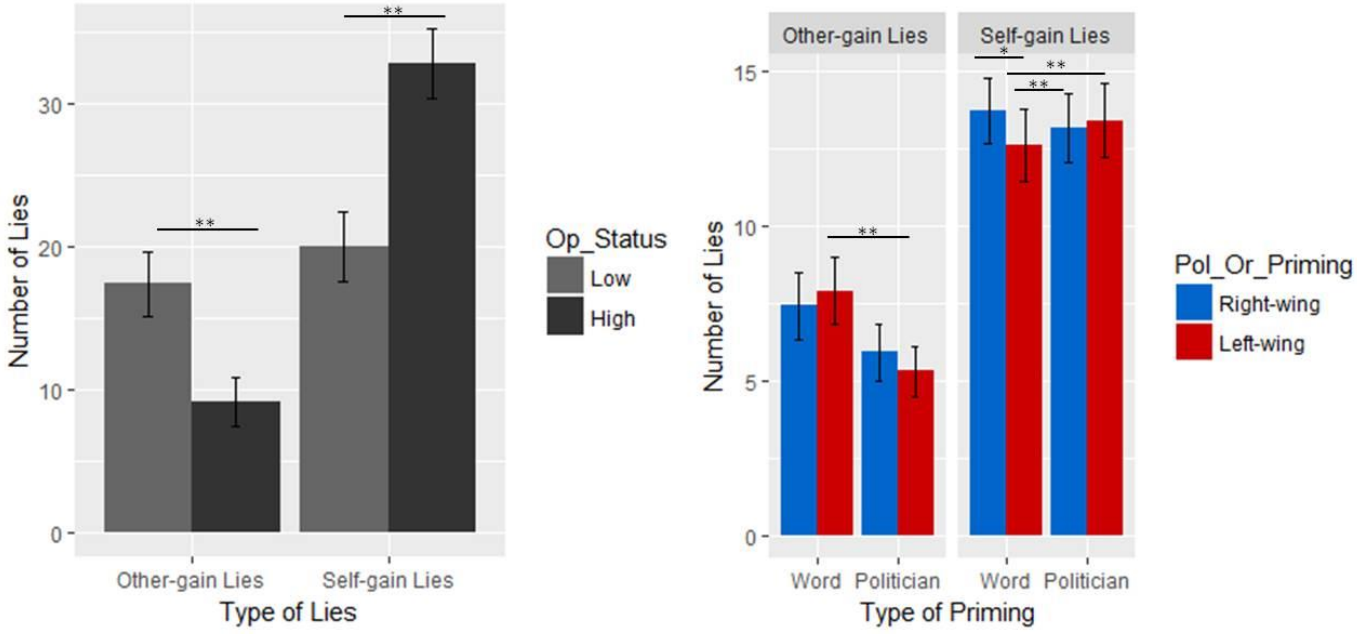

Figure 2

Factors influencing deceptive behavior.

The Left Panel shows the modulation of the *Tendency to Lie* (on the Y-axis) depending on the *Outcome of the game* and *Opponent's Status*. The X-axis is the type of lies: other-gain when the outcome of the game is favorable for the participant, self-gain when it is unfavorable. Participants produced more other-gain lies when facing a low status opponent and more self-gain lies when facing a high status opponent.

***p < 0.01; *p<.05*

The Right Panel shows the effect of the *Priming type* (politician vs. ideological word) and *Political Orientation of the priming* (left-wing vs. right-wing) depending on the *Outcome of the game* on the *Tendency to Lie*. The left grid shows lies produced when the outcome of the game was favorable for the participant (other-gain lies), the right grid when

the outcome was unfavorable (self-gain lies).

***p < 0.01; *p<.05*

Oculomotor behavior and its effects on deceptive responses

Here we investigated whether participants' oculomotor behavior could provide some information of how they engage in the decisional process and whether it can predict the subsequent moral choices. We expected that the political orientation (and the type) of the priming would impact how participants allocate their attentive resources, with right-wing primes leading our participants to focus on the personal information, while left-wing primes to the personal one. We thus ran a multilevel mixed linear regression on the ratio relative to the time spent fixating the "*Outcome AOI*" to the "*Status AOI*". Higher values for this ratio indicated that participants spent more time looking at the personal compared to the social information (*Personal first*). Since, in principle, the scan path of images of politicians vs. words requires different exploration patterns, we transformed the fixation durations of the two prime stimuli in zeta scores and created a new regressor called *Priming Fixations Duration.* Thus, *Priming Fixations Duration*, *Priming type* (politicians vs ideological words), *Political Orientation* o*f the priming* (left-wing vs. right-wing) and their respective interactions were the fixed effects of our model. The same PCA procedure explained above was used to select the random effects. The resulting model included the subject as a random factor (i.e., random intercept) and the random slopes of *Priming type* and *Political Orientation of the priming* over subjects.

Confirming our predictions, the analysis revealed a significant *Priming Fixations Duration* X *Priming type* X *Political Orientation of the priming* interaction (χ^2=4.610, p=.03), indicating that participants allocated their attention toward specific information depending on the time spent looking at the specific type of priming stimulus and its political orientation. To qualify the significant interaction of this regression model we tested its simple effects using the *simple slopes* function included in the R package *reghelper*. The analysis indicated that the longer participants looked at a left-wing prime, the more they directed their attention toward the social information (i.e., the status of the opponent). In contrast with our hypotheses, this occurredonly for left-wing politicians (b=18.443, SE=4.621, t-value=3.990, upper CI= -9.385, lower CI= -

27.501), while left-wing words did not show any effect (b= -7.305, SE=7.716, t-value= -0.946, upper CI=9.515, lower CI= -22.430). Similarly, neither right-wing politicians (b=0.613, SE=4.542, t-value=0.134, upper CI= 9.515, lower CI= -8.289) nor right-wing words (b= -15.547, SE=8.353, t-value= -1.861, upper CI= 0.824, lower CI= -31.919) had any effect (See Fig. 3, panel A).

Following this result, we tested on the one hand, whether paying more attention to social information would lead participants to make less self-gain lies and more other-gain lies toward low (vs high) status opponents, and, on the other hand, whether paying attention to the personal information would lead them to produce more self-gain lies regardless of the status of the opponents.

We ran a multilevel mixed log-linear regression with the *Tendency to Lie* (*Lie/Truth*) as our dependent variable and *Opponent's Status*, *Outcome of the game*, the ratio between the fixations towards the outcome or the status (*Personal first*), and their respective interactions as our fixed effects. The same PCA procedure explained before was used to select the random effects. The resulting model included the subject as a random factor (i.e., random intercept) and the random slopes of *Outcome of the game* and *Opponent's Status* over subjects. As predicted, the analysis revealed a significant *Personal first* X *Opponent's Status* X *Outcome of the game* interaction (χ^2=6.244, p=.01). We tested the simple slope of *Personal first* for the interaction of *Opponent's Status* and *Outcome of the game* on the *Tendency to Lie.*

Partially in line with our hypothesis, analysis revealed that the more participants looked at the social information (i.e., the card depicting the opponent's status), the less they tended to produce self-gain lies directed at low status opponents (b=0.0005, SE=0.0001, t-value=3.195, upper CI=0.0008, lower CI=0.0002), but no effect on other-gain lies was found (b= -0.0001, SE= 0.0001, t-value=-0.710, upper CI=0.0002, lower CI=-0.0004) (See Fig. 3, panel B).

Moreover, and in contrast with our prediction, no effects were found for high-status opponents neither for self (b=-0.0002, SE= 0.0001, t-value=-1.335, upper CI=0.0001, lower CI=-0.0005) nor for other-gain lies (b=0.0002, SE=0.0002, t-value=0.108, upper CI=0.0004, lower CI=-0.0004).

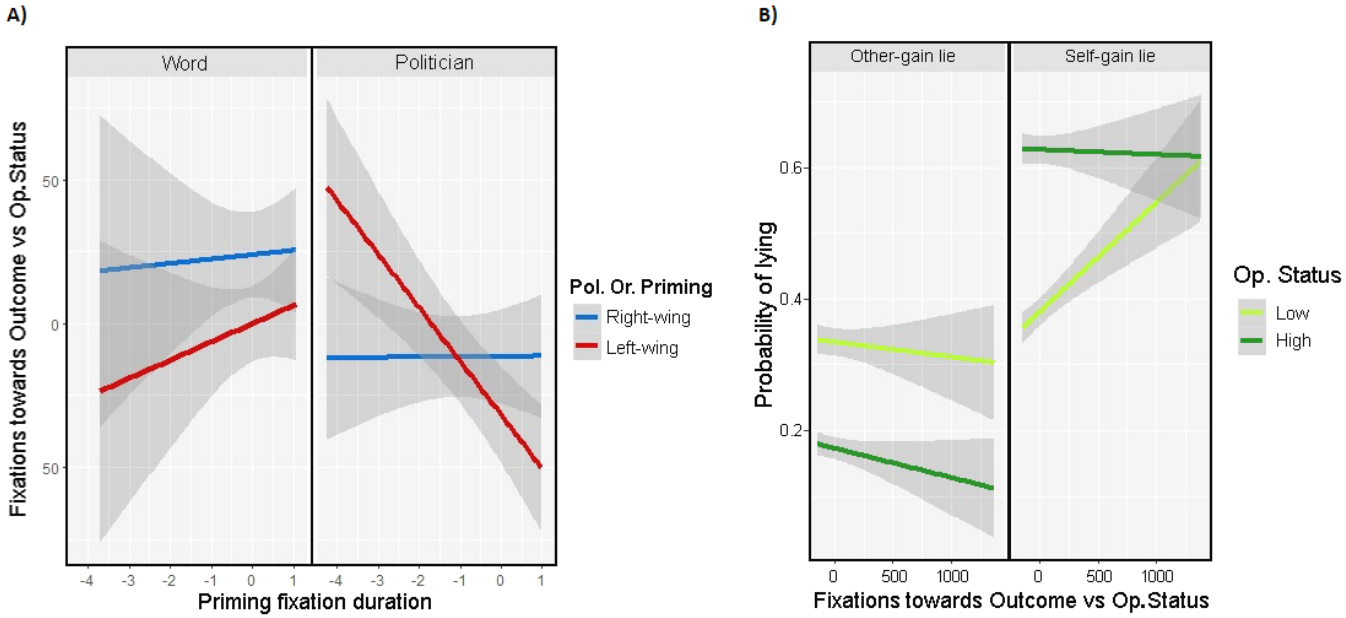

Figure 3

Oculomotor behavior related to the preference for social vs. personal information and deceptive behavior.

Panel A shows the effect of the fixation durations of the political orientation's priming on attention allocation towards the outcome of the game vs. the status of the opponent. The X-axis is the amount of time spent looking at the priming (*Priming Fixation Duration*) centered to the mean. The Y-axis is the ratio of the fixation duration towards the card depicting the outcome to that depicting the status of the opponent (*Personal First*). Results indicated that the more participants looked at left-wing politicians, the more their gaze shifted towards the social information (i.e., status of the opponent).

Panel B shows the effect of attention allocation towards the social information following a left-wing politician on the *Tendency to Lie*. The X-axis is fixations toward social vs. personal information (*Personal First*) centered to the mean. Moving towards the right indicates fixation toward the status of the opponent, moving on the left indicates fixations toward the outcome of the game. The more participants looked at the social information, the less they lied to low status opponents.

For the last step of our analysis, we tested whether participants' gaze toward their opponents was affected by their previous decision to lie and by the other factors tested in our experiment (i.e., opponents' status and outcome of the game). Specifically, we obtained the dependent variable by subtracting participants' fixation durations towards the AOI containing the eyes of the opponents taken before the beginning of the

TLCG from those taken in the same AOI during the game.

With *Opponent Status*, *Outcome of the game*, *Lie/Truth, Priming type* and *Political Orientation of the priming* as our fixed effects, we ran a multilevel mixed linear regression on the baseline-corrected fixations toward the AOI that included the eyes of the opponent (*"Fixations towards opponents' eyes")*. The same PCA procedure explained above was used to select the random effects. The resulting model included the subject as a random factor (i.e., random intercept) and the random slopes of *Priming type* and *Political Orientation of the priming* as well as *Opponent's Status* and *Outcome of the game* over subjects.

We found an *Opponent's Status* X *Lie/Truth* interaction (χ^2=4.713, p=.02). Post-hoc comparisons revealed that, after lying, participants tended to avert their gaze from high status opponents while maintaining it with low status opponents (z-ratio=2.555, p=.04) (See Fig. 4). The *Opponent's Status* X *Lie/Truth X Outcome of the game* was only marginally significant (χ^2=3.463, p=.06), thus we cannot say whether participants' gaze aversion could depend on the type of lie they made (i.e., self vs other-gain lie). The interaction with *Political Orientation of the priming* was not significant (χ^2=1.353, p=.24). We found a significant *Opponent Status* X *Lie/Truth X Priming type* interaction (χ^2=4.097, p=.04), but it was not qualified by any significant post-hoc comparison (z-ratios>2.976, ps>.17).

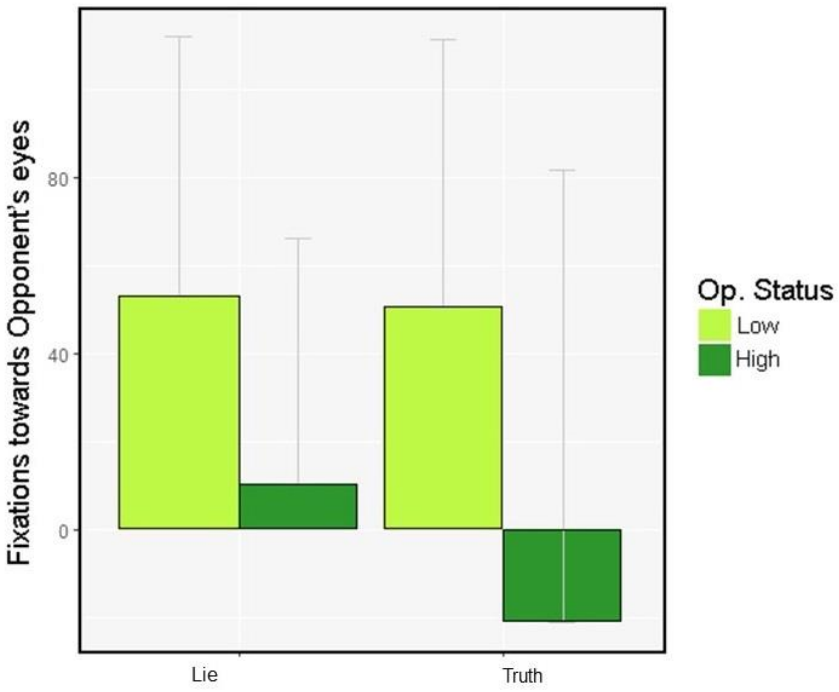

Figure 4

Oculomotor behavior towards opponents' eyes.

Figure 4 shows the effect of deceptive behavior on participants' gaze toward their opponents' eyes. The dependent variable was obtained by subtracting the fixation durations made by the participants toward the AOI containing the eyes of the opponents before the TLCG from those during the game.

Personality traits

As exploratory analyses we correlated participants' personal dispositions (measured by self-report questionnaires) and their deceptive and oculomotor behavior during the TLCG.

For each participant we extracted the individual-specific slope for each significant interaction (i.e., the so-called 'BLUPs', best linear unbiased predictors; Bates & Pinheiro, 1998) by using the *coef* function in R, which gives the fixed effect of that interaction plus the by-subject random effect. BLUPs for each interaction were correlated with participants' scores on the Machiavellianism scale (MACH IV) and on the Balanced Inventory of Desirable Responding (BIDR). The correlations between the two personality measures and the *Opponent's Status X Personal First X Outcome of the game* interaction BLUPs turned out to be significant. This interaction referred to how participants' tendency to decrease their self-gain lies aimed at low status opponents was affected by looking more at the social information than the personal one. Specifically, while a positive score refers to the tendency to look more at the outcome of the game, a negative score refers to the tendency to look more at the opponents' status. Results revealed that the more participants were manipulative (i.e., higher scores in MACH IV scale), the less the preferential looking for the social information (positive scores) induced differences in the tendency to lie to low vs. high status opponents ($r(38)=.37$, $p=.019$, two-tailed) (See Fig. 5, panel A). Conversely, the more participants gave importance to conveying a positive image of themselves (i.e., higher scores in BIDR), the more the preferential looking for the social information (negative scores) decreased deception toward low status opponents ($r(38)= -.37$, $p=.021$, two-tailed) (See Fig. 5, panel B).

Finally, we tested whether these personality traits (i.e., Machiavellianism and Social Desirability) were also associated with the tendency shown by participants to avert their gaze from the eyes of high status

opponents vs. maintain eye-contact with low status ones after lying (the *Opponent's Status* X *Lie/Truth* interaction on fixation durations). We observed no association with the Machiavellianism scale (r(38)= -.07, p=.64, two-tailed). Conversely, the more participants were concerned about conveying a positive self-image, the less they tended to maintain eye-contact with low status opponents (and the less they tended to avert their gaze from high status ones) (r(38)=.42, p=.008, two-tailed), (See Fig. 5, panel C).

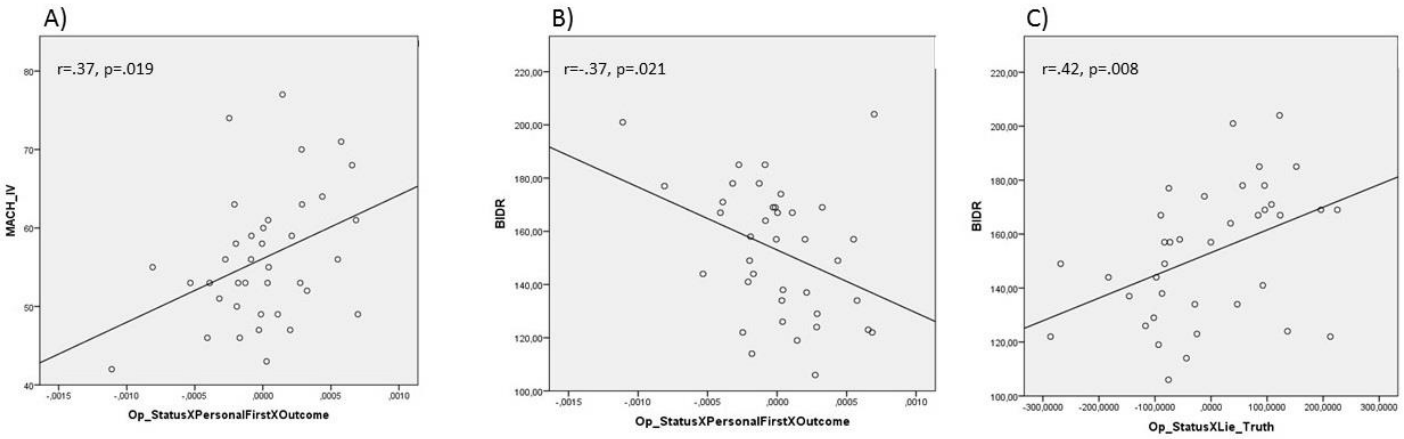

Figure 5

Correlations between personality traits and BLUPs of significant interactions.

A) This panel shows the association between the measure of Machiavellianism (MACH IV) and the *Opponent's Status X Personal First X Outcome* interaction BLUPs on deceptive behavior. Higher scores in manipulative traits are associated with a weaker tendency to lie less to low status opponents after having looked more at the social than the personal information.

B) This panel shows the association between the BIDR scale and the *Opponent's Status X Personal First X Outcome* interaction BLUPs on deceptive behavior. Higher scores in social desirability and impression management traits are associated with a stronger tendency to lie less to low status opponents after having looked more at the social than the personal information.

C) This panel shows the association between the measure of social desirability (i.e., the Balanced Inventory of Desirable Responding, BIDR) and the BLUPs of the Opponent's Status X Lie/Truth on participants' gaze towards the picture of the opponent.

3.5 Discussion

With the present study we aimed at investigating how the exposition to different type of stimuli referring to different political ideologies can affect how politically non-aligned people decide whether to deceive or not another person. To do so we modified our original paradigm for investigating situational and dispositional determinants of spontaneous lies (i.e., the TLCG, Panasiti et al. 2011), by including a priming procedure in which we exposed politically non-aligned people to images of politicians and ideological words representing left and right-wing ideology before deciding whether to lie or not to partners with a different socio-economic status (i.e., high vs. low). Moreover, to have a comprehensive understanding of how political priming affects information search and processing during moral decision-making, we recorded participants' oculomotor behavior.

One key finding is represented by the fact that participants lied differently according to the socio-economic status of their interaction partners. We observed that participants produced less self-gain and more other-gain lies directed to low (vs high) status opponents. This result expands previous findings in two ways: on the one hand, we added a new key element to those situational factors, such as reputational concerns (Azevedo et al. 2018; Panasiti et al. 2016, 2011; Panasiti et al. 2014), affecting the decision to deceive for personal interest (i.e., self-gain lies). On the other hand, we showed that altruism toward low-status individuals can be exhibited not only by donating money directly (Liebe and Tutic 2010; Smeets et al. 2015), but also indirectly by deceiving on the real distribution of that money (i.e., other-gain lies).

Besides this result, the main purpose of the present study was to explore whether and how political priming contribute to people's deceptive behavior. In contrast with our hypothesis, results show that its effects were not dependent on the socio-economic status of the opponents,. What we show, instead, is that participants were in general more willing to produce other-gain lies when primed with left-wing words compared to both left and right-wing politicians, and, importantly, that left-wing words also decreased the tendency to produce self-gain lies compared to the other prime stimuli. In this and in other situations in which the conflict between self and other's interest is particularly salient social norms often play a major role by directing people's behavior toward pro-sociality. A recent integrative model proposes that norm-

based decisions arise from model-based computations that are integrated from the surrounding context and that change the value assigned to a certain action (Buckholtz 2015). In such vein, we suggest that, by referring to social norms that promote appropriate social interactions -such as fairness, reciprocity and cooperation (Civai and Ma 2017)-, left-wing words might facilitate and reinforce the non-conscious activation of a norm-based system of decision making resulting in pro-social behavior toward low-status individuals. It is worth noting that this effect might have been fostered also by the intrinsic characteristics of the task. Indeed, in the TLCG the participants can act in three main ways: i) fairly, without the intention to harm, by not deceiving at all, ii) altruistically, by making other-gain lies or iii) selfishly, by making self-gain lies. Each of these three behaviors involve moral values that constitute two of the five foundations upon which morality of left-wing ideology is built, namely harm/care and fairness/reciprocity. Conversely, right-wing ideology's morality was less called into play as it seems to rely more on values that refer to ingroup loyalty, purity and authority (Graham et al. 2009; Haidt and Graham 2007; Zettler et al. 2011; Zettler and Hilbig 2010).

Crucially, the fact we observed no differences in the way left and right-wing politicians affected participants' deceptive behavior confirms our hypothesized "caste effect," the expression of a general mistrust towards the political system, at least in the Italian context. This result follows what was recently found in a study conducted in France that also employed politicians as prime stimuli (Celse and Chang 2017). By using a dice game paradigm, the authors found that people tend to produce more frequent and severe lies (i.e., they report higher numbers more often in order to get a higher reward) when primed with stimuli representing politicians than when primed with non-politician stimuli (i.e., clergymen) (Celse and Chang 2017). In fact, while clergymen triggered a sort of moral reminder – something already seen to promote honesty (Mazar et al. 2008) – politicians may have triggered concepts of corruption that led participants to lie for personal purposes. This idea was confirmed by subsequent participant ratings of the stimuli, as politicians were evaluated as less honest and trustworthy than clergymen (Celse and Chang 2017).

The other aim of this research was to explore participants' oculomotor behavior to better characterize the

mechanism leading to deception. With this in mind, we analyzed participants' fixations duration to obtain an implicit measure of i) the influence of the political priming on participants' attention allocation (i.e., preferential looking towards personal vs. social information), ii) the influence of participants' preferential looking on their decision to lie or tell the truth and iii) the influence of deception on the subsequent visual contact with the target of the lie.

In contrast with our expectations, neither left nor right-wing words exerted any effect on participants' attention allocation toward the specific information provided (i.e., personal vs. social information). Conversely, we found that the more participants looked at left-wing politicians, the more they rested on the social information present on the card. In light of previous studies showing that right-wing politicians implicitly affect the social behavior of voters (i.e., gaze following) through a perceived authority-related mechanism (Liuzza et al. 2011; Porciello et al. 2016), we did not expect this stronger modulation triggered by left-wing leaders. Nonetheless, to explain this unexpected result we might consider the political context in which the data were collected and two factors closely related to authority, namely power and perceived social status. We speculate that, since the experiment was conducted while a coalition guided by a left-wing party was in power, left-wing politicians might have perceived as having a higher status, which, in turn, as suggested by past research on humans and primates on the effect of social status on gaze cueing (Dalmaso et al., 2012, Sheperd et al., 2006), might have affected participants' gaze behavior more than other stimuli. Supporting this explanation, other effects of power were observed on basic and more complex behavior (Keltner, Gruenfeld, & Anderson, 2003). For instance, power-related primes were observed to change people's attentional focus by selectively process environmental information in line with the demands of the tasks, especially when this serves to achieve personal goals (Guinote 2007; Overbeck and Park 2001). In this vein, we speculate that focusing on the social information (i.e., the social status of the opponents) was the best strategy to achieve their goals, thus, power-related stimuli -such as left-wing politicians- led the participants to focus on that information. . In addition, our politically non-aligned participants might be more sensitive to power than people with a clear and polarized political ideology. This attentional shift toward the social information, in turn, modulated participants' deceptive behavior

according to the socio-economic status of the opponents. In fact, the more participants looked at the information related to social status, the less they tended to lie to low status opponents. In other words, the greater the focus on the social information, the more participants decreased their deceptive behavior towards disadvantaged people.

As a last step, we tested how participants reacted to their opponents after the decision to deceive was made. In contrast with our hypothesis, we found that participants engaged in two different but complementary actions after deceiving, that is, they tended to avert their gaze from the eyes of high status opponents, while they maintained eye contact with low-status ones. We proposed two -not necessarily mutually exclusive- explanations: on the one hand, gaze aversion toward high-status opponents could reflect the way in which participants tried to reduce their guilt (Yu, Duan, & Zhou 2017; Pivetti, Camodeca, & Rapino 2016). Indeed, as showed by the results related to their general tendency to lie, our participants deceived more often high-status opponents than low-status ones. On the other hand, the consequences of lying to high status individuals might represent a social threat to which people react with submissive gaze aversion (Terburg et al. 2012)**.**

The use of personality questionnaires allowed us to identify also some inter-individual differences that contribute to the process that lead to deceptive behaviour based on the personal dispositions of our participants. We showed that the more manipulative they were (i.e., high in Machiavellianism) the less our participants tended to reduce their deceptive behaviour toward low-status opponents after looking at the social information. These and other results -such as their tendency to lie more often (Jonason et al. 2014), more strategically (Jones and Paulhus 2011), in multiple context (Baughman et al. 2014) and without caring about possible reputational risks (Panasiti et al. 2011)- may be explained by the fact that Machiavellians are more prone to maximize their self-interest (Sakalaki and Fousiani 2012), less inclined to pro-social behavior (Becker & O'Hair 2007) and have lower Theory of Mind-related skills (Bagozzi et al. 2013). Specularly, this effect (i.e., lying less to low status opponents after looking at the social information related to their status) was stronger for people of high social desirability, namely individuals who seek to maintain a positive self-image (Paulhus 1984). In keeping with this result, we observed that, when they did not succeed in adjusting

their behavior by decreasing their lies toward low status opponents, these participants showed a weaker tendency to avert their gaze from high status opponents and maintain it with low status ones.

We argue that, since deceiving people in need, such as those having a low socio-economic, is usually seen as the violation of a moral standard and, for this, less acceptable (Azevedo et al. 2018; Smeets et al. 2015), both types of behavior (i.e., lying less and maintaining less the eye contact with low status opponents) might reflect the big concern that this violation represents for these people's self-image. This interpretation is supported by previous studies that showed how individuals high in social desirability are more sensitive to reputational concerns when deciding to deceive (Panasiti et al. 2011) and how they have a stronger inhibition of the cortical motor preparation when producing self-gain lies (Panasiti et al. 2014).

3.5.1 Future Directions

With the present study we opened up to the possibility of influencing people's moral behavior by priming values that refer to specific political ideologies. Specifically, we showed that words referring to certain values typical of left-wing ideology influenced how people with no clear political orientation decide whether to lie or tell the truth to other people. Moreover, we showed that this process is dependent on how people search and process specific information. The decision to test this specific sample of the population was due in part to the importance that these individuals have in the electoral context and in part to the expected low and ambiguous effects deriving from using a priming procedure on people with strong ideological beliefs. Nonetheless, the variety and consistency of the observed effects allow us to consider whether the same procedure might work also with polarized people. Because we would convey values either in contrast or consonant with those of one's own political ideology, we might expect different and contrasting behaviors. For instance, to resolve the cognitive dissonance arising from contrasting values (Festinger 1962) people might: on the one hand, surrender to the behavior "suggested" by the primed values; on the other hand, because those contrasting values might be perceived as a threat to their identity (Brandt et al. 2014), people might react by strengthening their behavior against them.

Other developments could take into account changes in the experimental setting. As we mentioned above,

the intrinsic characteristic of the TLCG might have foster the tendency to act accordingly to some moral values that are strongly related to left-wing ideology, such as those of fairness, reciprocity and care about the others (Graham et al. 2009; Haidt and Graham 2007). Thus, in an experimental setting where other moral values are emphasized results might change. For instance, in a competitive intergroup context (De Dreu 2010; Halevy et al. 2006, 2008; Halevy et al. 2011), values related to ingroup loyalty and respect of the authority might be more salient and, in turn, have a stronger effect of people's deceptive behavior.
Finally, future studies might investigate whether the observed effects of political priming might be dependent also on the socio-economic status of the participants. Indeed, previous research highlighted the predictive power of this factor on a wide range of unethical behaviors (Piff et al. 2012), with high-status individuals being more unethical than low-status ones. Given that, future studies might test whether left-wing primes, here observed as decreasing self-serving lies and increasing lies for altruistic purposes, would make high-status individuals less prone to act unethically. On the same vein, future venues might test whether some sort of ingroup-outgroup dynamics could influence this process by observing high-status individuals less willing to lie to high-status opponents or confirm and extend findings that show high-status people as more generous and altruistic toward low-status ones.

Conclusions

Given the growing number of people with no defined political ideology, and their importance in the electoral context, it is crucial to investigate how different types of political information might influence moral decisions. Our findings showed how political priming can affect the tendency of politically non-aligned people to lie, leading them towards more altruistic or selfish behavior depending on the type of the prime stimulus and its ideology (i.e., left vs. right-wing). Left-wing ideology activated by ideological words turned out to be effective in guiding participants' behavior during a moral decision-making task. Moreover, oculomotor behavior revealed the mechanism by which priming affects participants' tendency to lie, a process involving modifications to how participants allocate their attentive resources.

4. The role of political ideology and ethnicity in self-other discrimination: behavioral and EEG evidence

4.1 Introduction

The world we live in is populated by an impressive number of social stimuli, too big to be handled with the limited resources of our mind (Simon 1972, 2000). To face this complexity we developed some strategies aimed at simplifying the social world. One of these strategies is social categorization, which is in its classic definition the cognitive process of gathering together social entities to form categories in a way that elements of the same category are maximally similar among them and maximally different from those of other categories (Tajfel et al. 1971; Tajfel and Turner 1979). Traditionally social categorization has been seen as a the result of a feed-forward process that follows a bottom-up pathway (Freeman and Johnson 2016). An emblematic example is race, in which perceptual cues, such as the skin tone and other facial features, are used to assign a person to a racial category (Dunham et al. 2015). Recently this view has been challenged by the influential dynamic theory of person construal (Freeman and Ambady 2011). According to this theory, social categorization results from the interaction of both feed-forward and feed-downward processes in which bottom-up factors, such as perceptual cues, and top-down ones, such as motivations and attitudes, contribute to the process.

Importantly for the present research, faces represent one fundamental source of information in social cognition and perception. Faces can quickly and efficiently communicate many important aspects during social interactions, from emotions, to intentions and -crucially- to group membership (Hugenberg and Wilson 2013). On the basis of perceptual cues extracted from the face we can correctly assign a person to a racial or a gender category within 170 milliseconds (Ito and Urland 2005). Interestingly, faces allow us to categorize people in categories that apparently have no perceptual features, such as sexual orientation, religious identity and political affiliation (Alaei and Rule 2016; Rule and Ambady 2010). Results from these studies indicate that people still use subtle perceptual cues but they integrate them with pre-existing beliefs (stereotypes) that allow them to extract the correct social category well above chance (Freeman et al. 2010; Rule and Ambady 2010). For example, people seem to use masculine or feminine facial traits to

infer whether the other is gay or straight, or those related to power and warm to distinguish between a Republican and a Democrat (Freeman et al. 2010; Rule and Ambady 2010).

Nonetheless, as we previously mentioned, social perception and social categorization are not uniquely built upon bottom-up factors, such as facial features, but they rely on the interaction between those factors and top-down ones. Among these, researchers have investigated the role of expectancies, motivations and -importantly- prejudice. It has been observed that prior knowledge about a category can influence the perception that we have of a social entity, which interactively can affect how we categorize it. An example comes from the so-called "own group bias" (OGB), which shows how people are worse at recognizing outgroup faces compared to ingroup ones (Bernstein et al. 2007; Golby et al. 2001).

OGB is just one of the numerous systematic biases that seem to appear automatically as a consequence of the social categorization process. Those biases are classically gathered under the broad term of intergroup bias (Dovidio and Gaertner 2010; Kawakami et al. 2017). According to its definition, intergroup bias is "an unfair evaluative, emotional, cognitive, or behavioral response toward another group in ways that devalue or disadvantage the other group and its members either directly or indirectly by valuing or privileging members of one 's own group" (Dovidio and Gaertner 2010). Interestingly, intergroup bias occurs even when there is no functional relation between the groups, such as in the minimal group paradigm (Brewer 1979; Tajfel and Turner 1979). Nonetheless, when two groups share a particularly meaningful relation the strength and the expression of the intergroup bias can be dramatic.

In this vein, political groups represent an emblematic case. These groups are particularly relevant for people's identity as the sense of belonging to one of these groups is rooted on moral convictions (Parker and Janoff-Bulman 2013). As a consequence, the divide between political groups entails a strong expression of intergroup bias (Halevy et al. 2011; Parker and Janoff-Bulman 2013; Weisel and Böhm 2015).

Classic literature refers to political groups as those representing the two main ideologies of Western society, namely Conservatism and Liberalism or -more broadly- Left and Right wing.

While it is classically held that right-wing people are more prone to express higher level of intergroup bias because of differences in personality and epistemic motives (Jost 2017; Jost et al. 2004; Jost and Amodio

2012; Jost and Hunyady 2005; Jost and Thompson 2000; Kemmelmeier 2007; Carney et al. 2008), a recent theorization suggests that both left and right-wing people can equally express intergroup bias depending whether the group they are facing has contrasting values with their own (Brandt et al. 2014; Chambers et al. 2013; Crawford 2014; Crawford and Pilanski 2014; Wetherell et al. 2013).

The present research aimed at contributing to this debate by looking at how the bias associated to two fundamental group categories such as ethnicity and ideology can affect the perception of the Self (vs. the Other) in left and right-wing people. Specifically, we morphed participants' face with those of other Black and White people that could have either their same or their opposing political ideology. We then presented the resulting morphings and asked participants to indicate whether they perceived more them-selves or the other person. The idea behind this study is indeed that the degree to which one perceive him/her- self or the other person could signal the presence of a biased perception due to prejudice toward the specific group category (i.e., ethnic or political). One the most basic form of bias is, indeed, perceiving the outgroup as deeply different from the self (Kawakami et al. 2017; Phills, Kawakami, et al. 2011; Phills, Santelli, et al. 2011). To the same extent, the Self and the Ingroup are often perceived as overlapping (Tropp and Wright 2001) at the point that they seem to activate similar brain region but different from those activated by the outgroup (Mitchell et al. 2006) . In fact, we expect that negative prejudice toward the outgroup would lead our participants to exclude the other from their self-representation by indicating that they perceive more often the other than them-selves.

Moreover, given past research showing right-wing people as particularly biased toward ethnic outgroups (Jost et al. 2003), we expect information related to ethnicity to be dominant and to lead them to exclude Blacks more often from the self. Conversely, because of their lower ethnic bias we, expect left-wing people to focus more on the ideological information, which is something that was observed to affect left-wing expression of the bias (Brandt et al. 2014). Specifically, we expect them to exclude more often from the self those people that conflict with their political ideology.

To understand how these two sources of social information are processed in the brain and how this is reflected in the behavior we recorded participants' cortical activity by using electroencephalography (EEG)

and event-related potentials (ERPs) arising after morphings were presented.

We will focus on components that were observed to emerge during face processing.

One of the most studied is the N170 component, a negative deflection that peaks about 170 ms after stimulus onset, that is thought to reflect the activity of a network of brain areas -such as the fusiform face area (FFA), the occipital face area (OFA) and the superior temporal sulcus (STS)- specifically coding for face processing (Haxby 2001; Hoffman and Haxby 2000). While some evidence point to a larger N170 amplitude for faces categorized as ingroup (Ito and Urland 2005), other studies observed a larger amplitude for outgroup faces (Ofan et al. 2011, 2014; Stahl et al. 2008; Walker et al. 2008). Other studies found no modulation at all of the N170 (Caldara et al. 2004; He et al. 2009; Wiese et al. 2009).

Another component associated with face processing is the P200, peaking at around 200 ms and thought to reflect the recruiting of attentive resources. For this reason, it is often thought to indicate vigilance and alert (Hillyard and Munte 1984; Luck 1994) and it is usually larger for outgroup (Ito and Urland 2003, 2005; Kubota and Ito 2007; Willadsen-Jensen and Ito 2006; Dickter and Bartholow 2007; Willadsen-Jensen and Ito 2008).

Moreover, studies focusing specifically on self-recognition showed modulation in other early and late components. For instance, N250 component, a negative deflection peaking at about 250 ms, was observed to be larger for one's own face and familiar faces compared to other faces (Tanaka et al. 2006).

Other studies found larger P300 when self-relevant stimuli were presented (Gray et al. 2004; Ninomiya et al. 1998). Similarly, Late Positive Potential (LPP) was usually observed to be larger for self-face (Gunji et al. 2009).

We then combined the observed results with those related to participants' behavior during the self-other discrimination task to test whether the hypotheses made for the behavioral outcomes can find confirm also at the level of the information processing within the brain.

For the sake of clarity we here described the specific hypotheses related to the comparison between the two political groups, but it should be noted that these very preliminary result, described in the next sections, refers only to a small sample of left-wing participants.

4.2 Materials and Method

Participants

We collected data from thirteen white Italian participants. All participants were university students recruited from our database of volunteers. They had a normal or corrected-to-normal vision and reported no history of neurological or psychiatric diseases.

Due to technical problems during EEG recording we discarded one participant from both EEG and behavioral analyses. Thus, the final sample consisted of twelve participants (ten females, age M= 23.66, SD= ± 1.66). All participants were left-wing as emerged from the measure of ideological self-placement (see below for description).

The experimental procedures were approved by the independent Ethics Committee of the Santa Lucia Foundation in Rome (Scientific Institute for Research Hospitalization and Health Care) and were in accordance with the 1964 Declaration of Helsinki. Participants read and signed the informed consent and were paid 7.50 euro per hour.

Stimuli

Participants' images

During a photo-shooting session that took place some days before the experiment, for each participant we took a photo that depicted his/her face in a neutral expression. Male participants were depicted without their beard and mustache. These extra-facial features, indeed, might have represented a confounding element as participants could have used them as cues during the self-other discrimination task. For the same reason, female participants were depicted with no make-up.

We then took these photos and edit them with Adobe Photoshop® to delete background, contextual information and other potential extra-facial cues (e.g. visible moles).

The resulting images (456 X 480 pixels) depicted only the oval of the face on a grey background.

Other Identities' images

We took the images of the other identities to be morphed with our participants from the Chicago Face

Database (Ma et al. 2015). This database provides photos of people of different ethnicities (i.e., white, black, latino, asian) validated by an independent sample.

We selected 32 photos depicting 16 white (8 males, 8 females) and 16 black people (8 males, 8 females) in a neutral facial expression. Preliminary analysis showed no differences between selected whites and blacks on the ratings related to *age, attractiveness, trustworthiness, threat, fear, anger, disgust, happiness, sadness and surprise*.

For these images we employed the same editing procedure used for those of the participants. Thus, the resulting images (456 X 480 pixels) depicted only the oval of the face on a grey background.

Morphings

To create the morphings used in the experimental task we used the software Abrosoft Fantamorph® version 4.0. This software automatically detects and mixes facial features of two faces to compose a virtual face. We mixed each participant's image with those of 16 identities (8 black and 8 white, only same-sex identities). The presence of facial features related to of one of the two people that we morphed could range from 0% to 100%.

We presented only those morphings ranging from 45% to 55%. Since each morphing represents one percentage point, from each identity we obtained 11 morphings.

Similarly to the images of both participants and other identities, morphings depicted only the oval of the face on a grey background.

Political attitude measures

Before coming to the Lab and performing the experimental task, we administered online to the participants one measure of political attitude (i.e., Right-Wing Authoritarianism; RWA, Altemeyer 1998) and a measure of political ideology.

-Right Wing Authoritarianism scale (RWA, Altemeyer 1998) is a measure of political and social attitude in which participants are asked to respond on a 7-point scale (*1=Strongly disagree, 7=Strongly agree*) to items

related to specific social issues. In this study we administered an Italian translation of the 10-items short version of the questionnaire.

-Political Ideology was measured with a 5-point Likert scale ranging from 1 “Extreme-Left” to 5 “Extreme-Right”.

Experimental Task

We presented our participants with a self-other discrimination task implemented in E-Prime 2.0 (Psychology Software Tool, PA). In this task participants were presented with an image (morphing) in which their faces were combined with faces of other people having different ethnicities (i.e., black vs white) and different political ideology (same vs opposing compared to that of the participants). During the task they had to indicate in what percentage they perceived their face to be present in each morphing.

While ethnicity was perceptually evident, we manipulated the political ideology of the other identities by presenting to the participants an adapted version of the *identity fusion*’s graphic representation (Swann et al. 2009). This representation depicted participants’ ideological proximity with the other identities on a 7-step scale. We only used the extremes of this scale such that in one of the two blocks (see Design section) the graphic representation showed our participants very close to those identities -almost overlapping-, while in the other block it showed our participants very distant from those identities (Fig.1).

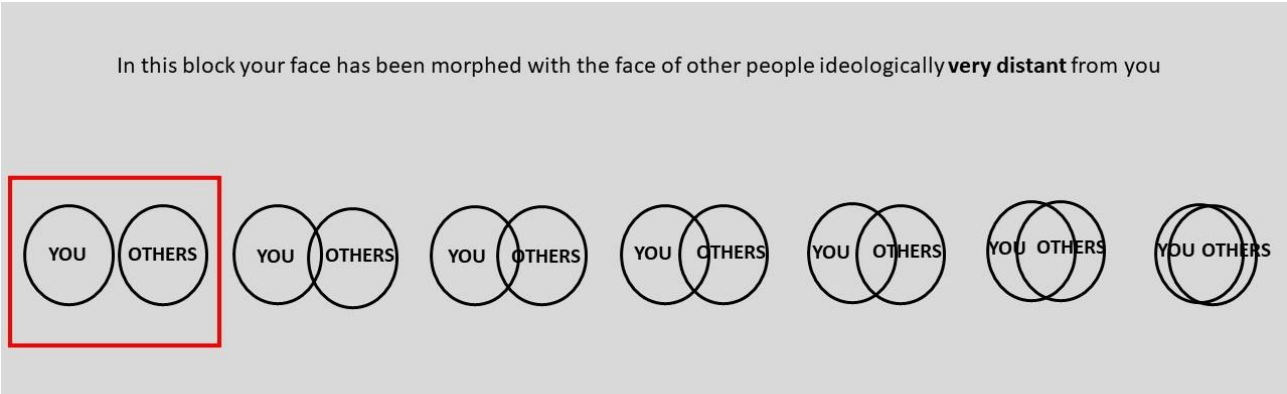

Figure 1

Graphic representation with which we manipulated ideological proximity. In this block participants were morphed with

identities maximally distant from them (i.e., Opposing ideology).

Each trial was structured as follows: participants first saw the image of their face (1496 ms). This image was followed by the face of one of the other identities (1496 ms), which anticipated the presentation of the morphing (1496 ms). Finally, participants had to respond -with no time constraint- to the question "in what percentage is your-self present in the morphing?" using a VAS (Visual Analogic Scale) ranging from 45 to 55. A response close to 45 indicated that participants recognized in the morphing more the other person than them-self; on the contrary, a response close to 55 indicated that participants recognized more them-self than the other person. A fixation cross (799 ms) anticipated every stimulus.

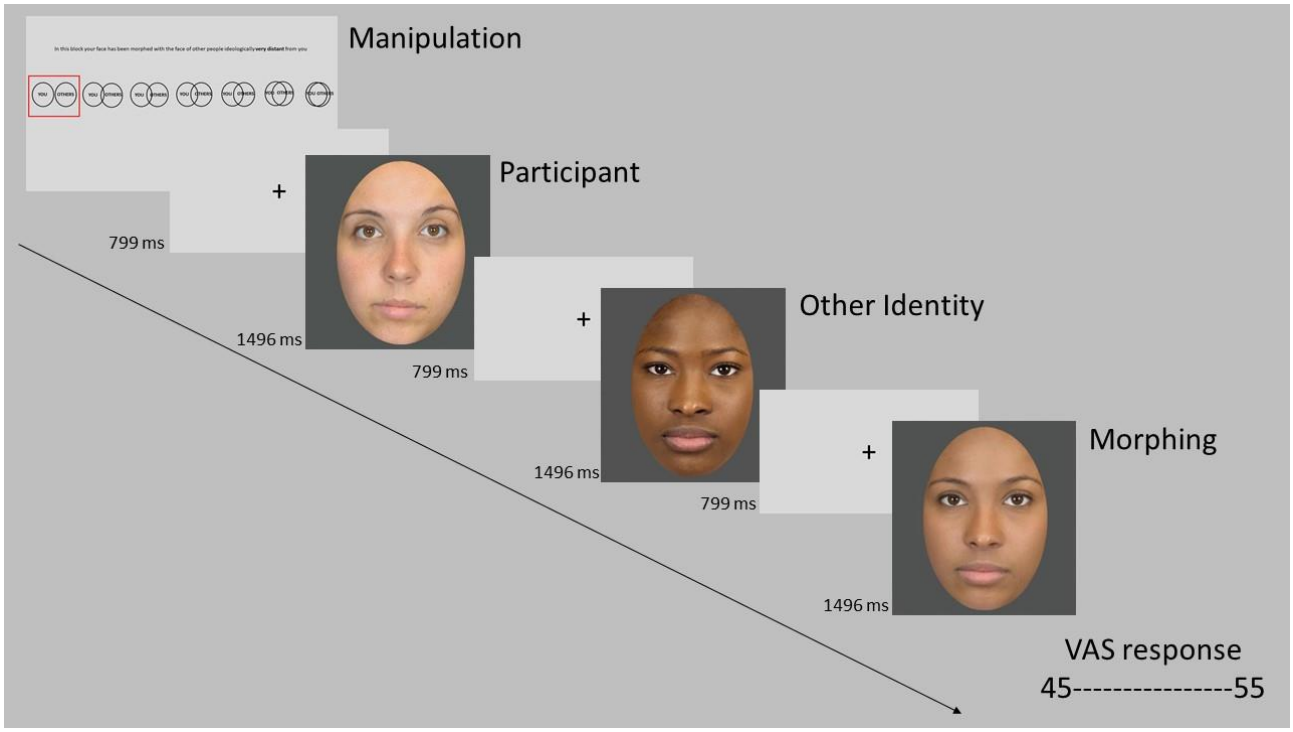

Figure 2

Example of trial. The ideological manipulation was presented at the beginning of the block. For each trial then we presented participants with an image depicting i) their face, ii) the other person, iii) the morphing. In the morphing participants' facial features could be present in a percentage ranging from 45 to 55.

At the end of the trial participants were asked to respond the question related to their self-perception in the morphing with a VAS ranging from 45% to 55%.

Design

The study was divided in two blocks presented in a counterbalanced order. In one block participants were morphed with black and white people having the same political ideology, while in the other block black and white people had the opposing political ideology.

In each block participants were morphed with eight identities (four black and four whites) counterbalanced across subjects. This means that the same group of eight identities for one subject had the same political ideology, while for another subject the opposing ideology.

As already mentioned, participants' facial features could range within the morphing from 45% to 55%. Since every percentage point corresponded to a morphing, for each of the sixteen identities the morphings were eleven. Thus, the total number of trial in the experiment was one hundred and seventy-six, eighty-eight trials per block.

Procedure

The study was divided in two sessions that took place in two different days. The time elapsed time between the two sessions was variable.

In the first session we took the photos of our participants. During the photo-shooting participants seated on an adjustable chair in front of two headlights and a camera at a distance of about 1,50 m and with a black cardboard on their back as background.

Before coming to the lab for the second session, we asked participants to respond online to the RWA questionnaire and to the measure on political ideology.

During the second session participants performed the experimental task. Here, after receiving a brief explanation of the study, participants signed the written informed consent.

Then, the experimenter mounted the EEG cap on the participants and explained them the instructions of the task.

Before starting the task, we recorded five minutes of participants' EEG during resting state (two and half minutes eyes-open resting state; two and half minutes eyes-closed resting state).

Then participants performed the task with a short break between the two blocks. We recorded the scalp

electrical activity of our participants throughout the experimental task and we stopped recording only once they completed it.

Finally, we removed the EEG cap and debriefed them.

4.3 Data Analysis and Results

EEG Recording and Pre-processing

We recorded the EEG signal using a BrainVision actiCHamp 24-bit amplifier and 64 scalp electrodes embedded in a fabric cap (Easycap GmbH), arranged according to the international 10-10 system. We recorded horizontal electro-oculogram bipolarly from electrodes placed on the outer canthi of each eye. We recorded vertical electro-oculogram from an electrode placed below the right eye.

We recorded EEG signal continuously in alternating current mode with at a sampling rate of 1000 Hz. Impedances were kept under 5 kΩ. We physically referenced all the electrodes to an electrode placed on the nose.

We used the software Brain Vision Analyzer 2.0 (Brain Products, GmbH, Germany) to perform ERP analysis. Dataset included data recorded from 12 of the 13 subjects. We discarded one subject to due technical problems.

We applied a pass-band filter (0.01-30 Hz) to the raw signal. We performed an independent component analysis (ICA) to detect artifacts resulting from eye movements (i.e., blinks and saccades). Once identified, we subtracted those components (on average, 2) from the analysis. Moreover, we excluded from averaging those trials contaminated with EOG artifacts or artifacts due to amplifier clipping, bursts of electromyographic activity or peak-to-peak deflection exceeding ±50 μV, by using a semi-automatic rejection procedure. Then, we divided the EEG signal in epochs ranging from -800 ms to 1500 ms stimulus-locked to the onset of the morphing presentation. We baseline-corrected the epochs to the 500 ms preceding the presentation of the morphing.

We averaged each trial per each condition per each participant to obtain the Grand Average. The visual inspection of the grand average allowed us to detect three main components: the P100 component peaking

maximally at 120 ms on parieto-occipital electrodes P8, P08, 02; the P200 component peaking maximally at 220 ms on parieto-occipital electrodes P6, PO4, PO8, O2; the N170 component peaking maximally at 160 ms on the temporal electrode TP7. To calculate the amplitude of these components, we extracted their mean amplitude on a time window of 20 ms (±10) around the peak: P100: 110-130 ms; P200: 210-230 ms; N170: 150-170 ms (see Fig. 3).

To check for lateralization effects, for each component we extracted mean amplitude both from the electrodes mentioned above and from their hemispheric counterparts (P5, P7, PO3, PO7, 01, TP8).

No other components showed in literature and considered in the introduction emerged.

Exported mean amplitudes were analyzed using STATISTICA 8.0 (Stats Soft. Inc.).

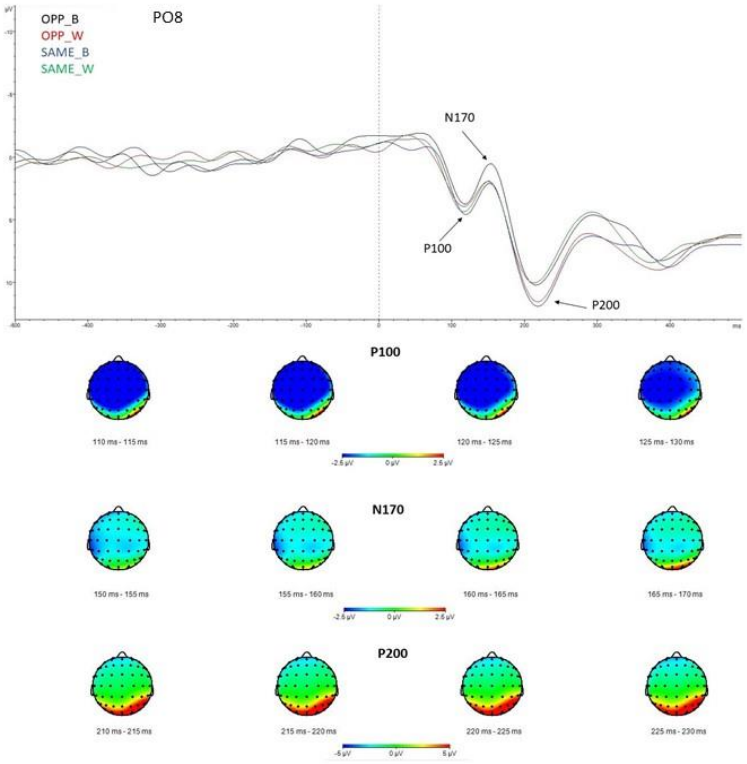

Figure 3

ERPs components.

Top: ERPs waveforms at PO8 for OPP_B, OPP_W, SAME_B, SAME_W conditions.

Bottom: mapping view of the distribution of P100, N170 and P200 components at different time ranges within the ±20 ms time window around the peak.

ERPs Results

P200

To test the effects of our manipulations related to the Ideology and Ethnicity of the identity with which our participants were morphed, we ran a 2 (Ideology: Opposing vs Same) X 2 (Ethnicity: Black vs. White) X 2 (Hemisphere: Left vs. Right) X 4 (Electrodes: P5-P6, PO3-PO4, PO7-PO8, O1-O2) repeated measures ANOVA with Mean Amplitude as our dependent variable. All factors were within subject. Post-hoc comparisons were Bonferroni corrected.

The analysis revealed a main effect of Hemisphere $F(1,11)=22.03$, $p<.001$, indicating higher mean amplitude of the electrodes placed on the right side of the scalp (M=9.62 μV, SD=± 25.30) compared to those on the left side (M=5.75 μV, SD= ± 20.15).

Moreover, a main effect of the Electrodes ($F(1,11)=8.27$, $p<.001$) indicated that in the right hemisphere PO4 (M=7.77 μV, SD= ± 16.11), PO8 (M=8.61 μV, SD= ± 17.64) and O2 (M= 8.52 μV, SD= ± 16.83) had a higher mean amplitude compared to P6 (M=5.84 μV, SD= ± 13.59).

The Ideology X Ethnicity interaction was not significant ($F(1,11)=2.99$, $p=.11$), but we found a significant Ethnicity X Ideology X Hemisphere X Electrodes interaction ($F(1,11)=3.94$, $p=.017$).

To better interpret this interaction, we focused on specific electrodes of interest on the basis of the two main effects explained above. We confronted the effects of Ideology and Ethnicity on the right electrodes placed in the parieto-occipital and occipital areas, namely PO4, PO8 and O2. (Notably, the pattern is the same for all the electrodes, also those that we are not reporting in these results).

In PO8 the mean amplitude was the highest when participants viewed their face morphed with the one of a Black person having the Same political ideology (SAME_BLACK, M=11.75 μV, SD= ± 6.44) compared to a White person having the Opposite ideology (OPP_WHITE, M= 11.39 μV, SD= ± 6.47), but this difference was not significant (p=1) (see Fig. 4).

Nonetheless, the mean amplitude in both SAME_BLACK and OPP_WHITE conditions was significantly higher compared to that in the conditions in which participants were morphed with a Black person having an Opposite ideology (OPP_BLACK, M=9.97 μV, SD= ± 8.45) ($p<.001$) and a White person having the Same

ideology (SAME_WHITE, M=9.89 µV, SD= ± 8.24) (p<.001). The difference between these two conditions was not significant though (p=1) (see Fig. 4).

We found a similar, but not totally overlapping, pattern both in PO4 and O2.

In PO4 the SAME_BLACK condition (M=10.36 µV, SD= ± 5.65) showed the highest mean amplitude followed by OPP_WHITE condition (M=9.85 µV, SD= ± 6.50), from which -nonetheless- was not significantly different (p=1). These two conditions showed a higher amplitude compared to both SAME_WHITE (M= 8.21 µV, SD= ± 7.05) (p<.001) and OPP_BLACK (M= 8.30 µV, SD= ± 8.04) (p<.001) conditions, which are not statistically different between them (p=1) (see Fig. 4).

Similarly to PO4, in O2 the SAME_BLACK condition (M=10.87 µV, SD= ± 5.51) showed the highest mean amplitude followed by OPP_WHITE condition (M=10.49 µV, SD= ± 5.72), from which -nonetheless- was not significantly different (p=1). These two conditions showed a higher amplitude compared to both SAME_WHITE (M= 9.30 µV, SD= ± 7.73) (p<.001) and OPP_BLACK (M= 9.25 µV, SD= ± 7.89) (p<.001) conditions, which are not statistically different between them (p=1) (see Fig. 4).

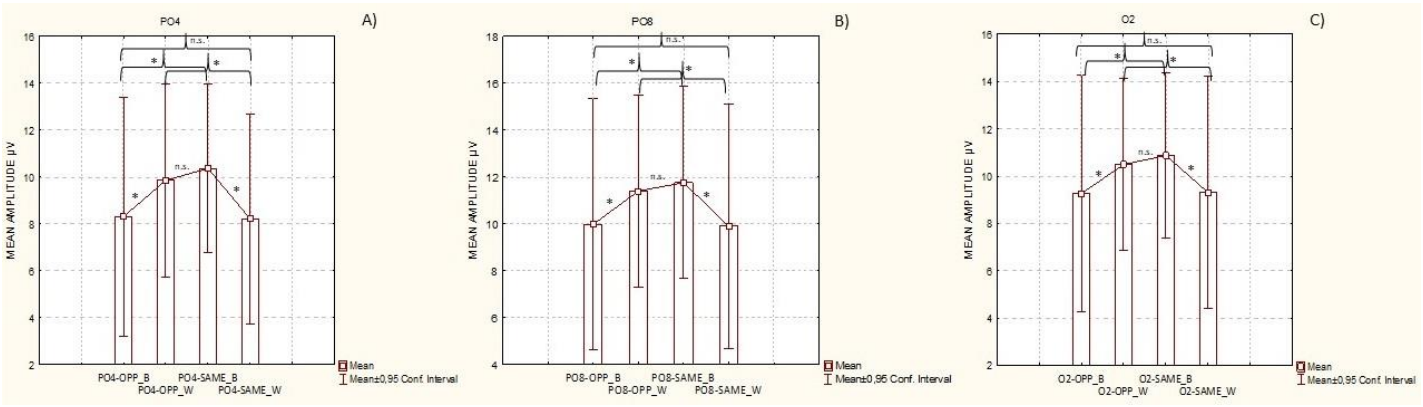

Figure 4

P200 mean amplitude in PO4 (Panel A), PO8 (Panel B) and O2 (Panel C) electrodes for each condition.

P200 is significantly larger in the conditions in which participants were morphed with a Black person having the Same ideology and a White person having the Opposite ideology.

*p<.001

P100

We ran a 2 (Ideology: Opposing vs Same) X 2 (Ethnicity: Black vs. White) X 2 (Hemisphere: Left vs. Right) X 3

(Electrodes: P7-P8, PO7-PO8, O1-O2) repeated measures ANOVA with Mean Amplitude as our dependent variable. All factors were within subject.

We found no significant main effects or interactions (all Fs < 4.25, all ps > .06), indicating no effects of our experimental manipulation on this component.

N170

We ran a 2 (Ideology: Opposing vs Same) X 2 (Ethnicity: Black vs. White) X 2 (Electrodes: TP7-TP8) repeated measures ANOVA with Mean Amplitude as our dependent variable. All factors were within subject.

Similarly to the analysis on the P100 component, we found no significant main effects or interactions (all Fs < 2.32, all ps > .12), indicating no effects of our experimental manipulation on this component.

Behavioral results

We performed data analysis using R, a free software programming language and software environment for statistical computing (R Development Core Team 2013). We used the package *lme4* Version 1.1–5 (Bates, Maechler, Bolker and Walker 2014) to run multilevel mixed linear regression (LMM or "linear mixed-effects models") (Garson 2013; Pinheiro and Bates 2000) for continuous dependent variables.

In keeping with EEG analysis, we excluded the subject that was previously discarded. Nonetheless, including data from this subject did not affect the results.

We employed a Principle Components Analysis (PCA; R, package *RePsychLing*, function *rePCA*) to define the random effects structure of the statistical model. We used this procedure as it tests for overparameterization of the maximum random structure, something that can affect the interpretability and reliability of the parameters' estimates (Bates et al., 2015). Specifically, PCA reveals the amount of variance captured by each random effect. Thus, we removed *by-subject* and *by-identity (*the person with whom the participants were morphed) random effects that explained zero amount of variance.

As a first step we built a model with the maximum random effects structure. To test the effects of our manipulation on how much participants recognized them-selves or the other identities in the morphings, we ran a multilevel mixed log-linear regression analysis with participants' *Response* to the VAS as our dependent continuous variable and identities' *Ideology* (Opposite vs. Same) and *Ethnicity* (Black vs. White),

participants' score on the *RWA* (centered to the mean; Kreft et al. 1995) and their respective interactions as our fixed effects.

After i) the principle Components Analysis run on the model with the maximum random structure and ii) the removal of the by-subject and by-identity random effects that explained a near-zero amount of variance, the resulting model included the *subject* and *identity* as random factors (i.e., random intercept) and the random slopes of Ethnicity over subjects, and the slopes of *Ideology* and *Ethnicity* (i.e., main effects and interaction) over identity. We used Type III Wald *Anova* function from the *car* package in R to determine the statistical significance of the fixed effects.

This choice was supported by the model comparison between the maximum model and the simplified model resulting from the PCA. As marked by the Likelihood Ratio Test ($\chi^2(7) = 10.88$, p=.14) the maximum model did not improve the goodness of fit of the simplified model.

From the analysis of this model we found a significant *Ideology* X *RWA* interaction ($\chi^2(1)=5.60$ p=.017), indicating that RWA scores moderated the responses of our participants according to the ideology of the person with whom they were morphed (Fig. 5). Specifically, when morphed with a person of the Opposite ideology, the higher their scores on the RWA the more participants tended to perceive the other than them-selves.

We found no other significant interactions or main effects ($\chi_s^2 < 0.86$, ps>.35).

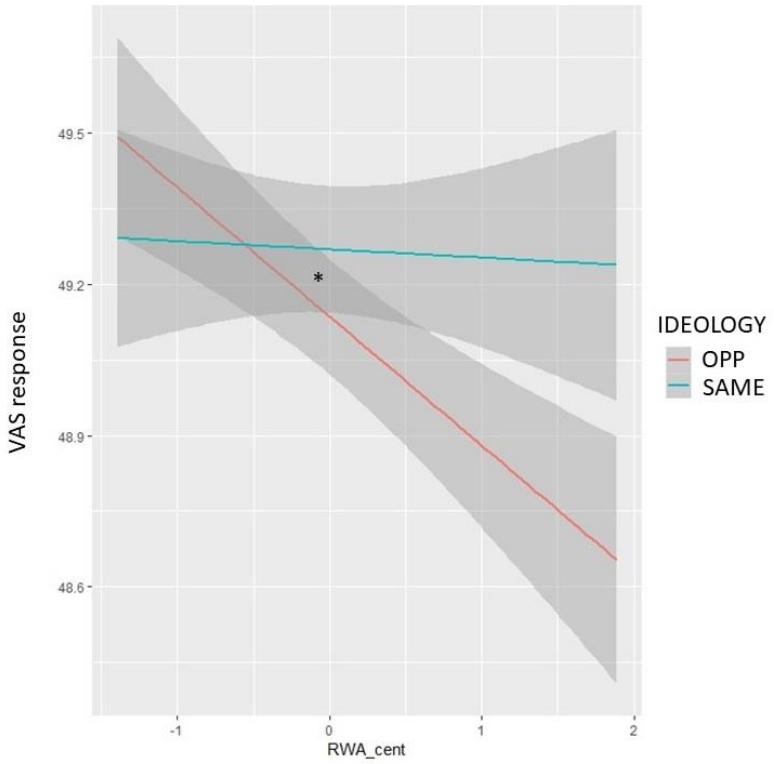

Figure 5

On the X-axis participants' scores on the RWA centered to the mean; higher scores indicate endorsement of right-wing political attitude.

On the Y-axis participants' responses to the VAS; lower scores on this dependent variable indicate that participants perceived in the morphing more the other person that them-selves.

The shaded bands represent 95% confidence intervals. * p< .05.

Combining EEG and Behavioral results

To test the relation between the effects that we observed at the information processing stage and the behavior that our participants acted we combined the ERPs results with the responses to the task.

We averaged participants' responses to the VAS for each condition and used this measure as our dependent variable. We ran a multilevel mixed log-linear regression analysis with participants' *Response* to the VAS as our dependent continuous variable and identities' *Ideology* (Opposite vs. Same) and *Ethnicity* (Black vs. White), participants' score on the *RWA* (centered to the mean; Kreft et al. 1995), *P200* mean amplitude for each condition and their respective interactions as our fixed effects.

Due to the low number of observations we added as random effect only the intercept over subject.

We used the same Type III Wald *Anova* function from the *car* package in R to determine the statistical significance of the fixed effects.

We found no significant main effects or interactions $\chi_s^2 < 1.61$, ps>.20 indicating no relation at this level of analysis.

4.4 Discussion

With this study we aimed at exploring whether two fundamental source of social information such as political ideology and ethnicity, each associated to a specific bias, could differently affect how left and right-wing people perceive them-selves in an ambiguous context.

Here we presented very preliminary results hat refer to a sample of left-wing people only.

We presented participants with a self-other discrimination task, in which we morphed their face with those of Black and White people that could have their same or opposite political ideology. Participants then had to indicate how much of them-selves they could recognize in the morphed images (morphings). Moreover, by recording cortical activity with electroencephalography (EEG) we attempted to explore the neural underpinnings of this process by looking at the ERPs components evoked during the processing of the morphings.

Neural processing of morphings

ERPs analysis revealed the presence of three components: P100, P200, N170. Among them only one showed significant results. We found that Ideology and Ethnicity both interacted in modulating the P200, a component emerging in the parieto-occipital areas that has been observed to reflect general vigilance and attention (Hillyard and Munte 1984; Luck 1994) and that is implicated in social categorization (Fabiani 2007). Specifically, our participants showed: i) the largest P200 amplitude when they were morphed with Black people having the same political ideology and with White people having the opposite one; ii) and the smallest amplitude when morphed with Black people having the opposite ideology and White people having the same one. It has been observed how neural responses to racially ambiguous faces may change depending on the context in which those faces are perceived. In fact, people tend to anchor to a reference group that is more salient in a given moment (Willadsen-Jensen and Ito 2008). In such vein, while knowing

that the other person had the same political ideology might have directed participants' attention toward the racial category, knowing that the other person had the opposite ideology might have anchored their attention to this contrast. We speculate that a possible explanation for this attentive shift in the two conditions might be related to the perception of threat. In general, previous studies showed that when seeing faces of racial outgroups people exhibit a larger P200. For instance, White people show larger P200 to Black and Asian targets than to White ones (Ito and Urland 2003, 2005; Kubota and Ito 2007; Willadsen-Jensen and Ito 2006) and the reversed pattern for Blacks and Asians toward White targets (Dickter and Bartholow 2007; Willadsen-Jensen and Ito 2008). Moreover, Correll and colleagues (2006) found that larger P200 amplitude for Black compared to White targets was correlated to a greater bias toward Blacks; in this study the authors found that people tended to decide more quickly to shoot to armed Black targets and not to shoot to unarmed White targets, and this was related to their tendency to associate Blacks with violence-related stereotypes (Correll et al. 2006). This is also supported by a study that found a larger P200 for negative stimuli (Eimer and Holmes 2002, 2003).Thus, we speculate that when the ideological conflict was not salient (i.e., same ideology condition), the implicit racial bias toward Blacks might still have affected our left-wing sample. Similarly, when the ideological divide was salient (i.e., opposing ideology condition) the attention might have been directed to the most realistic threat, here represented by the White person. This would be in keeping with recent theorization on political intergroup bias, which posits how left-wing people show intolerance at the same degree of right-wing ones because of the threat arising from the contrasting values (Brandt et al. 2014; Chambers et al. 2013; Crawford 2014).

Our analysis focused also on the P100 and N170 components, but we found no modulation in the present study. This might be somehow surprising given their role in research on facial perception, especially of the N170 component. In fact, N170 is thought to be an index of early configural face processing (Bentin et al. 1996) and face categorization (Kawakami et al. 2017). This component seems also specifically related to racial stimuli and implicit bias. Indeed, Ofan and colleagues found larger N170 to Black than White faces especially for those with a stronger automatic racial bias (Ofan et al. 2011) and for those feeling higher social anxiety related to a higher racial prejudice (Ofan et al. 2014). Nonetheless, findings related to this

component are various and conflicting. For instance, while some evidence point to a larger N170 amplitude for faces categorized as ingroup (Ito and Urland 2005), other -as we mentioned- observed a larger amplitude for outgroup faces (Ofan et al. 2011, 2014; Stahl et al. 2008; Walker et al. 2008), and other indicate no modulation at all, in line with our preliminary results (Caldara et al. 2004; He et al. 2009; Wiese et al. 2009). There are some differences that must be considered between these studies and ours that could explain the divergent findings. For instance, those studies did not involve ambiguous stimuli related to the Self and, relatedly, they used mostly simple categorization and memory tasks, while here we used a self-other discrimination paradigm.

Behavioral responses to morphings and self-other discrimination

While at the neural level the information about ethnicity and political ideology were differently processed, at the behavioral level the degree to which participants could discriminate between them-selves and the other person seemed modulated by ideological factors only. In fact, participants' responses were modulated both by the political ideology of the person they were morphed with and by their political attitudes (i.e., participants' score in the RWA). What we observed is that the higher their scores in the RWA the more participants tended to perceive the other than them-selves, but this was true only when the other person had an opposing ideology. In other words, it seems that the less our participants endorsed left-wing political attitudes the more they tended to set stricter boundaries and exclude the political outgroup from their self-representation (Notably, this does not imply that our participants were right-wing; indeed, the most "rightist" participant obtained a score of 3.6, which is immediately after the middle point in the 7-point scale that we used here). We interpret this result as an expression of the well-known ingroup over exclusion effect (Yzerbyt et al. 1995). This effect refers to a biased tendency to exclude more often than legit new members from the ingroup to protect it from potential external threats. Relatedly, *hypodescent* refers to the tendency to perceive people belonging to multiple categories to the most socially subordinate one (Ho et al. 2011; Krosch et al. 2013). The key factors in these two phenomena is ethnicity, while in our behavioral results we found an effect of ideology. This is in line with what we expected about the dominant role of ideological factor in left-wing because of their lower racial bias (Jost 2017; Jost et al.

2003). Additionally, the recent framework of the *ideological conflict hypothesis* pointed out how left-wing people are not as tolerant as we are used to think. Conversely, they show particular intergroup bias toward those groups that contrast their own world view, such as those groups representing their political counterpart (Brandt et al. 2014; Chambers et al. 2013; Crawford 2014; Crawford and Pilanski 2014). With this regard, perceiving the outgroup as threatening was observed to be an important moderating factor of the expression of the bias (Parker and Janoff-Bulman 2013; Weisel and Böhm 2015; Brandt et al. 2014), at the point that in specific context left-wing people can even be more intolerant and biased (confront with Chapter 1 of this thesis).

In this regard, we have no data related to right-wing people so far, thus, we cannot make any real comparison between the two political groups. It is interesting to notice though that those who expressed a bigger ingroup over exclusion effect are those leaning more toward the right side of the RWA scale. This might suggest that right-wing people could exhibit a similar behavioral pattern or even accentuated.

Limitations and Future directions

These are very preliminary data with a small sample size constituted only by left-wing participants. Thus, the conclusion drawn here are provisional and cannot take into account any comparison with the missing part of the sample constituted by right-wing people. More data need to be collected both among left and right-wing people in order to strengthen our results and to confirm or disconfirm the negative findings that we presented, especially those involving the relation between information processing within the brain and the explicit observed behavior.

Provisional conclusions

With these preliminary data we were able to explore the role of ethnicity and political ideology in social perception both at the neural and behavioral level. Although referring only to a sample of left-wing participants, these results gave precious indications of how two important sources of social information such as ethnicity and ideology can impact self-perception in an ambiguous context. So far, we observed how at the neural level the two information interact and shape the information processing; while at the behavioral level the prominent one appears the be the ideological one.

4. General Discussion

The aim of the present work was to extend the current knowledge on how political ideology affects social cognition by considering different processes and aspects involved, such as perception, categorization, cognitive and emotional evaluations, and decision-making.

With the present work we confirmed that all those differences that strongly divide left and right-wing political ideology have an important impact on social cognition at different levels, from how we perceive other social entities, to how we evaluate them, to how we interact with them.

We showed that this impact is significantly dependent on how political ideology is presented. In the second chapter we showed that the level of intergroup bias between left and right-wing people was strongly affected by how the political ingroup and outgroup were presented. On the one hand, when the political ingroup and outgroup were presented in the form of images of politicians and items referring to general people belonging to the ingroup or the outgroup our left-wing participants showed a higher level of intergroup bias, especially in the form of outgroup derogation (i.e., negative emotional and cognitive evaluations). On the other hand, when political ingroup and outgroup were presented in the form of ideological words both left and right-wing people expressed a similar level of intergroup bias.

Interestingly, although they are thought to be more tolerant and less biased toward outgroups compared to right-wing people (Jost et al. 2003), overall left-wing people exhibited a higher intergroup bias. Study 3 in this chapter helped us to understand the reason for this surprising result as we found that an important mediator in this process was the perception of threat toward the outgroup. In line with previous research showing the major role of threat perception in outgroup derogation (Halevy et al. 2011; Parker and Janoff-Bulman 2013; Weisel and Böhm 2015), we found that left-wing participants perceived the political counterpart as more threatening, thus, explaining why they showed more intergroup bias.

Nonetheless, we showed also that when the ideological divide was particularly salient and relevant -as in the case of word directly addressing ideological differences- the level of intergroup bias between the two groups was not significantly different, confirming what has been found in the studies related to the *ideological conflict hypothesis* (Brandt et al. 2014; Chambers et al. 2013; Crawford and Pilanski 2014).

The importance of how political ideology is conveyed and represented was demonstrated also in different process than the evaluative one. In the third chapter we showed that the way political groups were presented and their ideology could influence people's information search processing and, ultimately, their decision-making.

We showed that our sample of politically non-aligned participants was influenced in its decision to deceive other interaction partners by the presentation of left-wing ideological words used as primes. Specifically, when presented with these type of political information, our participants tended to lie more for altruistic motives and less for self-serving purposes. Differently from what we observed in politically polarized participants (see Chapter 2), when political ideology was presented in the form of politicians we observed no significant difference in participants' behavior, either the politicians were left or right-wing.

This result, that we called *caste effect,* was not unexpected: we hypothesized this effect as the reflection of the flattered perception of part of the Italian population toward the ideological representativeness of politicians. The emergence of political movements self-defining as *"anti-caste"* (e.g. Movimento 5 Stelle in Italy, Podemos in Spain, etc.), indeed, represent this part of the electorate that does not perceive politicians as representative neither of the Left nor of the Right, rather as generally untrustworthy and dishonest regardless of their political ideology.

With this study we were able to show how political ideology can also affect social cognition at the level of information processing. Analysis of oculomotor behavior revealed that the more participants fixated a left-wing politician the more they tended to look toward a type of information that we called *social,* as it was related to the status of their interaction partners. In turn, this preferential looking for the social information led participants to reduce their deceptive behavior, but only toward low status interaction partners. With this regard, finding an effect of politicians on participants' information processing and not of ideological words was somewhat surprising, also in the light of the results on deceptive behavior. Moreover, previous research showed that the more people endorse altruistic values (or better, the more they deviate from individualistic ones) the more they tend to focus on information related to the others, for example, by increasing the proportion explored and the number of fixations related to that information (Fiedler et al.

2013b). We argued that power, combined to ideology, might explain this surprising result. Indeed, at the time of data collection the Left was in power. Relatedly, previous research observed how power is able to affect people's information processing by leading their attention towards those information that are useful for achieving personal goals (Guinote 2007; Overbeck and Park 2001).

Oculomotor behavior helped us also to explore how people implicitly react after they commit an immoral act. It has been widely observed that when deceiving people exhibit increased arousal as a signal of their wrongdoing (Hochman et al. 2016). To manage arousal, bad feelings and cognitive dissonance arising when committing an action that contrasts their moral values, people engage in a series of strategies and behaviors. One strategy refers to engage in different and specific information search patterns such as avoiding the undesirable information, even when it is diagnostic for the task (Hochman et al. 2016; Pittarello et al. 2015). Another strategy refers to avert the gaze from the target of deception (Pivetti et al. 2016; Yu et al. 2017). In turn, while anger was observed to increase unethical behavior, guilt was observed to reduce it (Motro et al. 2018). Contrary to our hypothesis, after deceiving our participants averted their gaze from high status interaction partners and kept eye contact with low status ones. This deviation in our results might be linked either to the fact that high status interaction partners were effectively deceived more often, and thus leading participants to experience more guilt, or to the higher level of anxiety produced by deceiving someone with a high status (Terburg et al. 2011; Terburg and van Honk 2013).

Finally, in the third chapter we provided very preliminary evidence of how political ideology could interact with another important source of social information, such as ethnicity. Specifically, we explored whether biases associated to political and ethnic membership could affect another fundamental aspect of social cognition, such as the perceptual discrimination between the Self and another social entity. We tested a small sample of left-wing participants by presenting them some images in which their face was morphed with those of Black and White people having the Opposing or the Same political ideology and asked them to indicate whether they perceived more them-selves or the other. To understand how these two pieces of information are processed in the brain and how this could be reflected at the behavioral level we recorded participants' cortical activity using electroencephalography (EEG) from which we extracted even-related

potentials (ERPs).

Overall, political ideology was again showed to be a factor able to modulate social cognition, in this specific case at the level of how we perceptually discriminate the Self from the other.

While at the neural level political ideology exerted its influence by interacting with ethnicity, at the behavioral level political ideology had a predominant role.

Specifically, ERPs analysis revealed a modulation of the P200, a component related to vigilance and alert, exerted by political ideology and ethnicity. We observed that this component was largest when participants saw their face morphed with Black people having the Same ideology and White people having the Opposite ideology. In contrast, P200 was lowest when participants were morphed with Black people with the Opposite ideology and White people with the Same ideology.

To interpret this result, we have to consider that the perception of ambiguous stimuli, such as the morphings that we presented, is largely dependent on the context. Thus, we argue that this result depends on what information was considered as more salient in a specific condition. Specifically, we argue that in the condition where participants' ideology was not in contrast with the one of the other person, ethnicity became the predominant factor, while in the condition in which participants' ideology was in contrast with that of the other person, it was this factor that became salient and anchored participants' attention. With this in mind, past studies suggest that P200 reflects the recruiting of attentive resources also in response to negative and threatening stimuli (Correll et al. 2006; Eimer and Holmes 2002). Thus, we speculate that, when the ethnic category was salient, left-wing participants expressed some sort of implicit bias toward black people, while, when their attention was focused on the ideological category, their bias became political. Relatedly, we might argue that the higher P200 found in this study could reflect left-wing people's perception of threat that we that documented in the second chapter.

This interpretation could be strengthened by considering participants' behavioral responses to the task. Here, while ethnicity showed no effects, political ideology had a predominant role, either when related to participants and when related to the person with whom they were morphed. In fact, we found that the more our left-wing participants endorsed political attitude toward the Right (i.e., higher scores on the RWA)

the more they tended to see the other person than the Self. But this was true only when they were morphed with people having the opposite ideology. Again, left-wing people showed to be sensitive to people with contrasting values, even though this tendency seems to be in some ways more accentuated by political attitudes leaning on the right.

It is worth saying that with these very preliminary evidence we were not able to link how people process the information in the brain and how they respond to it; indeed, the analysis that combined EEG data and behavioral responses were inconclusive so far. Relatedly, we are collecting more data, also from right-wing participants, in order to strengthen these results an answer to those questions that are still open.

Conclusions

With the present work we tried to unfold part of the complexity surrounding the interactive process through which political ideology affects our social cognition. In doing so we provided neural, physiological and behavioral evidence of how political ideology plays a major role in this process by affecting our perceptions, evaluations and even interactions with other social entities. Nonetheless, further research is needed to study other potential factors that could interact with political ideology and that could contribute to a better understanding of how we manage the complexity of our social world.

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8. Appendix A: overview of publication status of chapters in thesis

Chapter number and title	Original text (not published before)	Submitted: no feedback received	Submitted: revision requested or revision submitted	Accepted/published (specify journal or book)
1. General Introduction	X			
2. Left threatened by Right: political intergroup bias in the contemporary Italian context				X
3. Behavioural and oculomotor evidence that ideological priming affects deception		X		
4. The role of ethnicity and political ideology in self-other discrimination: behavioral and EEG evidence	X (experiment ongoing)			
5. General discussion	X			

9. Appendix B: List of the stimuli of the studies in Chapter 2

Study 1

Right-wing Politicians:

Angelino Alfano, Mara Carfagna, Nunzia De Girolamo, Maurizio Gasparri, Maria Stella Gelmini, Ignazio La Russa, Roberto Maroni, Giorgia Meloni, Alessandra Mussolini, Stefania Prestigiacomo, Laura Ravetto, Antonio Razzi, Matteo Salvini, Daniela Santanchè, Denis Verdini, Anna Maria Bernini, Laura Comi, Micaela Biancofiore, Beatrice Lorenzin, Clemente Mastella, Silvio Berlusconi, Roberto Formigoni, Maurizio Lupi, Pier Ferdinando Casini, Mario Borghezio, Roberto Calderoli, Renato Brunetta, Paolo Romani, Raffaele Fitto, Umberto Bossi.

Left-wing Politicians:

Nicola Vendola, Pierluigi Bersani, Rosaria Bindi, Laura Boldrini, Maria Elena Boschi, Paola Concia, Giuseppe Civati, Stefano Fassina, Anna Finocchiaro, Marianna Madia, Ignazio Marino, Matteo Renzi, Emma Bonino, Simona Bonafè, Paola Picerno, Alessandra Moretti, Federica Mogherini, Stefania Giannini, Giuliano Poletti, Paolo Gentiloni, Antonio Di Pietro, Dario Franceschini, Graziano Delrio, Walter Veltroni, Romano Prodi, Enrico Letta, Giorgio Napolitano, Sergio Mattarella.

Study 2

Right-wing Words:**

Tradition, Hierarchy, Authority, Competition, Conservatism, Control, Dominance, Order, Conformity, Preservation, Religiosity, Safety, Chastity, Obedience, Patriotism, Nationalism, Certainty, Dogmatism, Convention, Stability, Meritocracy, Protection, Individuality.

Left-wing Words:**

Progress, Cooperation, Hospitality, Assistance, Help, Multiculturalism, Peace, Mobility, Equality, Liberalism, Change, Reform, Flexibility, Tolerance, Secularism, Community, Diversity, Solidarity, Freedom, Sharing, Ecology, Redistribution, Innovation.

**words presented in Italian, here translated in English.

Study 3

Entitativity items*: rated on a scale ranging from 1 (*not at all*) to 9 (*extremely*) (Spencer-Rogers, 2007)

(a) “Some groups have more the “group characteristics” than others do. To what extent do left/right-wing people qualify as a ‘group’?”
(b) “To what extent do you think left/right-wing people feel that they are part of their group?”
(c) “How cohesive are left/right-wing people?”

(d) “How organized are left/right-wing people?”
(e) “How much group unity do you think left/right-wing people feel?”
(f) “How much do left/right-wing people interact with one another?”
(g) “To what extent are left/right-wing people interdependent (i.e., dependent on each other) for achieving the group’s goals?”
(h) “How important is the group to left/right-wing people?”

Agentivity items*: rated on a scale ranging from 1 (*not at all*) to 9 (*extremely*) (Spencer-Rogers, 2007).
(a) “To what extent are left/right-wing people able to influence other people (i.e., non-Conservatives/Liberals)?”

(b) “To what extent are left/right-wing people able to achieve their goals?”

(c) “To what extent are left/right-wing people able to act collectively?”

(d) “To what extent can left/right-wing people make things happen (e.g., produce outcomes)?”

Perceived Threat items*: rated on a scale ranging from 1 (strongly disagree) to 7 (strongly agree) (Schmid & Muldoon, 2015).

a) “If left/right-wing people were to take power, they would work towards the benefit of their group.”

b) “I feel threatened when left/right-wing people are in power in Italy”

c) “In certain areas I would be afraid of being identified as left/right-wing people.”

d) When I see left/right-wing people symbols in an area, I feel as though my left/right-wing people identity is under threat.”

e) “I feel threatened when left/right-wing people express their identity and celebrate their cultural traditions.”

*Adaptation from the original items. Items were then translated and presented to participants in Italian.

Emotional Intergroup Bias**: rated on a 7 points scale with the two words representing the extremes of the scale (Wright et al., 2007).

Warmth-Coldness, Negativity-Positivity, Friendliness-Hostility, Suspicion-Trust, Respect-Contempt, Admiration-Disgust.

Cognitive Intergroup Bias**: rated on a 10 points scale ranging from 1 (not at all) to 10 (very much) (Chambers & Melnyk, 2006).

Intelligent, Trustworthy, Honest, Ignorant, Friendly, Stubborn, Aggressive, Ethical, Considerate, Immoral, Tolerant, Radical.

10. Appendix C: Supplementary materials of the study in Chapter 3

Cover story

To avoid the possibility that the participants could find out our experimental hypotheses we set up a cover story that was presented during the instructions phase.

Here we report the part of the instructions relative to the cover story:

"The aim of this project is to investigate how being involved in a social interaction could influence the perception of different types of stimuli (words, faces etc.).

Past research showed that being involved in specific cognitive or motor processes could affect how we perceive surrounding stimuli. Let's consider the distractive effect that talking on the phone has on our activities, such as when we have to buy some products at the supermarket.

With this research we aim at expanding these studies by investigating whether interacting with other people -which is a daily process characterizing our lives- could affect how we perceive different types of stimuli.

We will ask you to perform two tasks: one involving the stimuli that you will be observing, and one involving an interaction with other people.

The interaction will consist of a simple card game.

The stimuli that you will see are words and images selected because of their relevance in advertising. Indeed, advertising has made massive use of testimonials and attractive words in the domains of marketing and mass persuasion…

…At the end of the game you will be asked with some questions regarding the images of famous people and words that you have seen at the beginning of each play. Therefore, it is very important for you to pay a lot of attention on those stimuli."

Catch Trials

To make the cover story more believable we inserted some catch trials representing famous people not belonging to any political category and words not ideologically related.

Famous people:

Massimo Boldi (comedian)

Maria De Filippi (Tv Presenter)

Lorenzo Cherubini (Singer)

Alba Parietti (Tv Presenter)

Non-ideological words:

Education

Engineering

Personality

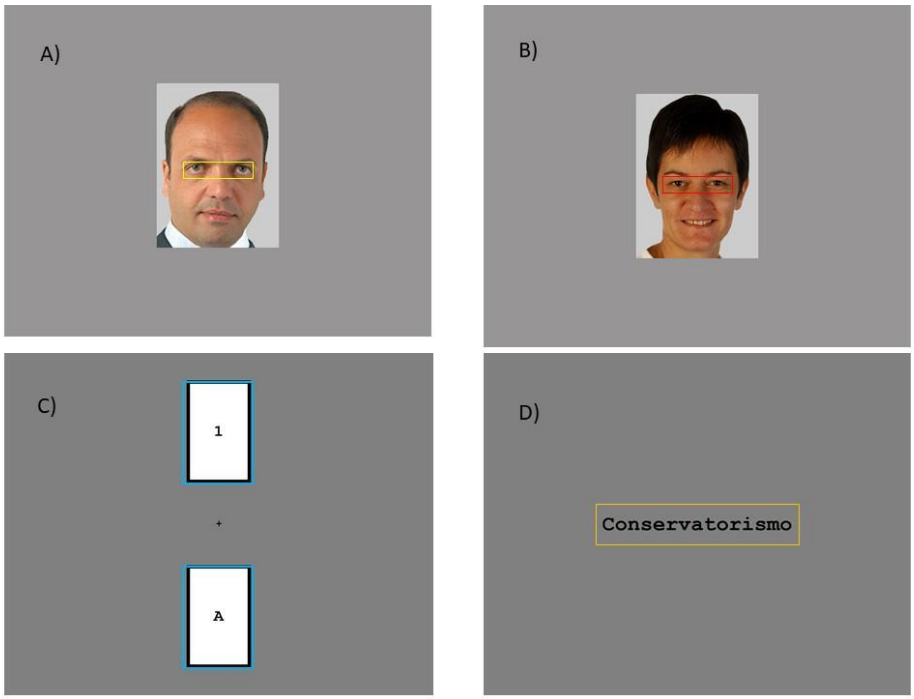
Biology

Payment for participation

We paid our participants by means of the same procedure employed in all the other studies where the TLCG was used (Panasiti et al., 2011; Panasiti et al., 2014; Panasiti et al., 2016; Azevedo et al., 2018). Specifically, we compensated them with a show-up fee of 15 euro and an additional variable amount ranging between a minimum of 2,50 and a maximum of 10 euro that was based on their performance during the task. Put simply, the more trials they won, the more money they could get. In fact, by losing every trial the participant could win 15 euro; by winning every trial the participant could win 25 euro. When calculating the payment, we divided the 256 trials in four bands each progressively rewarded with 2,50 euro. For instance, if a participant won from 0 to 64 trials, he/she earned 17,50 euro (15 fixed plus 2,50 euro); if he/she won from 64 to 128 trials, he/she earned 20 euro, and so on so forth. Notably, our participants did not know neither what was the maximum amount of money they could win nor what was the fixed amount of money assigned to single trials. As reported in the rules of the game, we told participants that the payment relative to their opponents would have been assigned according to their decisions during the task.

AOI definition

Here we report a figure and the description of how we defined the AOIs.



AOIs were generated on the software IviewX by superimposing a rectangle on the area that included the element we were interested in. The result was a box having certain X-Y coordinates that corresponded to the area in which the element of interest was located.

In the case of Politicians and Opponents' eyes the AOI the rectangle included the eyes of the person represented in the image.

In the case of the cards representing the outcome and the status of the opponents the rectangle included the portion of the image in which the two cards were located.

In the case of the words the rectangle included a portion of space that could contain all the words in their different lengths.

For the analysis we then extracted participants' fixations duration that fell in the X-Y coordinates that were delimiting each AOI.

Validation Procedure Analyses

Here we report the analyses for the validation and selection of the stimuli (i.e., images of politicians and ideological words) used in the TLCG.

Politicians' selection

To select the politicians used as stimuli during the TLCG we created an index, ranging from 0 to 1, that resulted as the mean between the percentages of respondents that recognized and assigned to the correct political category each politician.

In bold the politicians that we selected. Some politicians that resulted in having very high scores on the index were not selected because we struggle in finding pictures that we could have easily edit for the purposes of our study.

Politician	*Index of recognition and correct political orientation*
BERLUSCONI	**,99**
MUSSOLINI	,96
VENDOLA	**,95**
ALFANO	**,93**
SALVINI	**,93**
SANTANCHE'	,93
RENZI	**,93**
PRODI	**,93**
LA RUSSA	**,92**
BOSSI	,92
BRUNETTA	**,91**
MELONI	,88
GELMINI	**,87**
BINDI_PO	**,85**
GASPARRI	**,84**
MARONI	,84
BERSANI	**,84**
DI PIETRO	**,79**
VELTRONI	**,79**
CARFAGNA	,77
MARINO	,76
CASINI	,74
BONINO	,73
BOLDRINI	,72
LETTA	,72
BOSCHI	,68

CALDEROLI	,67
FRANCHESCHINI	,64
RAZZI	,61
FORMIGONI	,58
LUPI	,55
CIVATI	,51
CONCIA	,46
FINOCCHIARO	,44
MASTELLA	,43
BORGHEZIO	,41
FASSINA	,39
LORENZIN	,32
MADIA	,31
POLETTI	,31
DEL RIO	,30
DE GIROLAMO	,28
MOGHERINI	,28
FITTO	,27
RAVETTO	,25
MORETTI	,24
PRESTIGIACOMO	,22
GENTILONI	,22
COMI	,20
ROMANI	,20
BIANCOFIORE	,19
GIANNINI	,17
VERDINI	,16
BERNINI	,15
BONAFE'	,11
PICERNO	,10

Images of politicians' validation and selection

We then selected and validated the images of the politicians to be presented during the TLCG.

The two images that through the Microsoft™ API Cognitive Services application resulted in having the highest percentage of neutrality were evaluated by an independent sample of foreigner people.

For each stimulus we ran a repeated-measure ANOVA with Emotion as the within-subject factor (eight levels: anger, contempt, disgust, fear, happiness, neutral, sadness, surprise). Post-hoc comparisons were Bonferroni corrected.

Here we report the Analysis related only to the picture that we used during the task.

Angelino Alfano

Results indicated a significant main effect of emotion (F(2.38, 186.33)= 119.96, p<.001). Post-hoc comparisons revealed that neutral emotion was significantly more present than the other seven emotions (M=63.92, SD=±31.61, all Mean differences >48.10, SEs<5.29, all ps<.001).

Silvio Berlusconi

Results indicated a significant difference in how the eight emotions are present in this image (F(2.32, 102.39)= 27.29, p<.001). Post-hoc comparisons revealed that neutral emotion was significantly more present than the other seven emotions (M=47.88, SD=±5.57, all Mean differences >26.00, SEs<8.66, all ps<.002).

Pierluigi Bersani

Results indicated a significant difference in how the eight emotions are present in this image (F(3.22, 258.24)= 48.42, p<.001). Post-hoc comparisons revealed that neutral emotion was significantly more present than the other seven emotions (M=71.41, SD=±33.21, all Mean differences >29.13, SEs<5.66, all ps<.001).

Rosy Bindi

Results indicated a significant difference in how the eight emotions are present in this image (F(2.35, 186.33)= 185.90, p<.001). Post-hoc comparisons revealed that neutral emotion was significantly more present than the other seven emotions (M=63.92, SD=±29.74, all Mean differences >62.78, all SEs<4.71, all ps<.001).

Renato Brunetta

Results indicated a significant difference in how the eight emotions are present in this image (F(2.35, 188.16)= 102.60, p<.001). Post-hoc comparisons revealed that neutral emotion was significantly more present than the other seven emotions (M=62.09, SD=±34.49, all Mean differences >52.71, all SEs< 5.12, all ps<.001).

Antonio Di Pietro

Results indicated a significant difference in how the eight emotions are present in this image (F(2.47, 195.11)= 121.16, p<.001). Post-hoc comparisons revealed that neutral emotion was significantly more present than the other seven emotions (M=64.25, SD=31.65, SE= ± 3.53, all Mean differences >49.81, all SEs< 5.27, all ps<.001).

Maurizio Gasparri

Results indicated a significant difference in how the eight emotions are present in this image (F(2.61, 206.62)= 62.57, p<.001). Post-hoc comparisons revealed that neutral emotion was significantly more present than the other seven emotions (M=54.18, SD=35.46, SE= ± 3.96, all Mean differences >40.65, all SEs< 5.60, all ps<.001).

Walter Veltroni

Results indicated a significant difference in how the eight emotions are present in this image (F(2.89, 224.54)= 30.78, p<.001). Post-hoc comparisons revealed that neutral emotion was significantly more present than the other seven emotions (M=37.69, SD=33.64, SE= ± 3.76, all Mean differences >17.25, all SEs< 5.85, all ps<.004).

Maria Stella Gelmini

Results indicated a significant difference in how the eight emotions are present in this image (F(2.52, 202.20)= 44.16, p<.001). Post-hoc comparisons revealed that neutral emotion was significantly more present than the other seven emotions (M=41.17, SD=33.27, SE= ± 3.69, all Mean differences >22.59, all SEs< 5.46, all ps<.001).

Ignazio La Russa

Results indicated a significant difference in how the eight emotions are present in this image (F(2.18, 174.70)= 92.91, p<.001). Post-hoc comparisons revealed that neutral emotion was significantly more

present than the other seven emotions (M=60.74, SD=35.39, SE= ± 3.93, all Mean differences >48.39, all SEs< 5.56, all ps<.001).

Romano Prodi

Results indicated a significant difference in how the eight emotions are present in this image (F(2.50, 190.19)= 48.49, p<.001). Post-hoc comparisons revealed that neutral emotion was significantly more present than the other seven emotions (M=49.42, SD=35.32, SE= ± 4.02, all Mean differences >25.90, all SEs< 6.58, all ps<.005).

Matteo Renzi

Results indicated a significant difference in how the eight emotions are present in this image (F(1.92, 212.37)= 69.86, p<.001). Post-hoc comparisons revealed that neutral emotion was significantly more present than the other seven emotions (M=75.58, SD=30.56, SE= ± 3.48, all Mean differences >64.28, all SEs< 5.35, all ps<.001).

Matteo Salvini

Results indicated a significant difference in how the eight emotions are present in this image (F(2.65, 195.11)= 121.16, p<.001). Post-hoc comparisons revealed that neutral emotion was significantly more present than the other seven emotions (M=55.56, SD=34.04, SE= ± 3.78, all Mean differences >34.81, all SEs< 6.04, all ps<.001).

Nichi Vendola

Results indicated a significant difference in how the eight emotions are present in this image (F(2.48, 196.56)= 61.82, p<.001). Post-hoc comparisons revealed that neutral emotion was significantly more present than the other seven emotions (M=51.81, SD=34.44, SE= ± 3.85, all Mean differences >38.31, all SEs< 5.45, all ps<.001).

Words' selection

We select the words used as stimuli during the TLCG based on the percentage of respondents that assigned each word to the correct political category. In bold the words we selected.

Word-Italian	*Word-English*	*Index of correct political orientation*
nazionalismo	**nationalism**	**85%**
conservatorismo	**conservatism**	**84%**
patriottismo	**patriotism**	**78%**
ordine	**order**	**74%**
accoglienza	**hosting**	**71%**
multiculturalismo	**multiculturalism**	**70%**
tradizione	**tradition**	**68%**
autorità	**authority**	**67%**
condivisione	**sharing**	**67%**
ecologia	**ecology**	**67%**
laicità	**secularism**	**64%**
tolleranza	**tolerance**	**64%**
diversità	**diversity**	**63%**
religiosità	**religiosity**	**63%**
obbedienza	obedience	60%
uguaglianza	equality	60%
collettività	collectivity	59%
controllo	control	59%
ridistribuzione	redistribution	59%
solidarietà	solidarity	57%
cooperazione	cooperation	56%
dominanza	dominance	54%
gerarchia	hierarchy	52%
preservazione	preservation	52%
sicurezza	safety	52%
individualità	individualism	51%
cambiamento	change	48%
conformismo	comformism	46%
assistenza	assistance	43%
pace	peace	43%
protezione	protection	42%
progresso	progress	39%
dogmatismo	dogmatism	37%
competizione	competition	36%
libertà	freedom	36%
riforma	reform	35%
flessibilità	flexibility	34%
stabilità	stability	34%
innovazione	innovation	31%
aiuto	help	30%
castità	chastity	30%
certezza	certainty	30%

convenzione	convention	29%
liberalismo	liberalism	26%
mobilità	mobility	26%
meritocrazia	meritocracy	24%

Furthermore, we checked that there were no differences in characters and syllabic length and in lexical frequency between left and right-wing words.

We ran three independent t-tests on each of these variables and found no difference between left and right-wing words.

Characters length: left-wing (M_{left}=10.57, SD_{left}=3.30); right-wing words (M_{right}=10.57, SD_{right}=±2.93) (t(12)=0.00, p=1).

Syllabic length: left-wing (M_{left}=4.57, SD_{left}=1.27); right-wing words (M_{right}=4.42, SD_{right}=±.97) (t(12)=-.23, p=.81).

Lexical frequency: left-wing (M_{left}=28.14, SD_{left}=27.56); right-wing words (M_{right}=167.14, SD_{right}=±224.83) (t(12)=1.62, p=.15).