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Facing Emotional Politicians: Do Emotional Displays of Politicians Evoke Mimicry and Emotional Contagion?

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Abstract

Emotional displays of politicians can be persuasive. According to prominent psychological theories, we can easily "catch" the emotional displays of others through mimicry and emotional contagion.[1][2] Do these processes work for politicians too, or is it conditional on what voters think of the politician making the display? In a pre-registered within-subjects laboratory experiment, participants observed images of neutral and manipulated emotional displays of politicians. We measured emotional mimicry (facial electromyography) and emotional contagion (self-reports). We do not find evidence for the matched motor hypothesis. Our findings are in line with the emotional mimicry in social context model. Namely, we find that the happy displays of in-party politicians elicit congruent facial activity (a positive facial index). Furthermore, the displays of the out-party politicians do not elicit mimicry, but instead our findings suggest a reactive response: participants smiled in response to angry out-party politicians. The self-reported emotions indicated a small effect of emotional contagion. Taken together, our study provides insights in how voters are emotionally affected by politicians' emotional displays and highlights that our polarized prior beliefs color our emotional responses to politics.

Keywords: politicians' emotional displays, emotional mimicry, emotional contagion, facial electromyography, self-reports.

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[2] Pre-analysis plan, code and data can be found on OSF: https://osf.io/z38gd/. The study been approved by the Ethics Review Board of the University of Amsterdam (#2019-AISSR-11160). Maaike Homan and Gijs Schumacher acknowledge funding from the European Research Council (ERC) under the European Union's Horizon 2020 research and innovation programme under grant agreement No 759079.

Facing Emotional Politicians: Do Emotional Displays of Politicians Evoke Mimicry and Emotional Contagion?

A radiant smile or a fierce frown are powerful weapons in the arsenal of a successful politician. Emotional displays such as smiling or frowning can inform and motivate the audience (Lakin, Jefferis, Cheng, & Chartrand, 2003; Van Kleef, 2017; Van Kleef, van den Berg, & Heerdink, 2014; Visser, van Knippenberg, van Kleef, & Wisse, 2013). Politicians who frequently use such emotional displays leave a much stronger impression on voters than those that only use neutral displays (Boussalis, Coan, Holman, & Müller, 2021; Stewart, Salter, & Mehu, 2009; Stewart, Waller, & Schubert, 2009). How these emotional displays influence voters is not clear yet. Academic work demonstrates that by mimicking emotional displays of non-politicians, emotions transfer from speaker to listener (Chartrand & Bargh, 1999; Hatfield, Cacioppo, & Rapson, 1993). On the one hand, this mimicking process might operate in politics as well. On the other hand, social context influences emotional mimicry and may overrule the process of affect transfer (Hess & Fischer, 2013). Existing work in political science does not yet provide conclusive evidence regarding how contextual differences between politicians and voters' identification with politicians matter. These differences can influence whether the emotional displays of politicians transfer, are blocked or even backfire. This leads us to the question: how do these contextual differences affect the success of politicians' emotional displays?

Psychologists have long examined the phenomena of emotional "mimicry", i.e., the mimicking of the emotional expressions of others. Mimicry is known to lead to increased liking, social bonding, perspective-taking, and empathy (Chartrand & Bargh, 1999; Lakin et al., 2003). However, according to the "emotional mimicry in context

model", people only mimic the emotions of people from their in-group, and not from their out-group members (Hess & Fischer, 2013). Instead, these displays of out-group members can lead to a reactive response, opposite of the emotion observed (e.g., anger in response to a happy politician). The emotional mimicry in context model suggests there needs to be a minimal form of affiliation between the observer and the expresser to elicit emotional mimicry. This leads to our second research question: do people only mimic the emotional displays of in-party politicians? Or are politicians in general too far away from voters to elicit mimicry?

Pioneering research has previously examined how voters respond to the emotional displays of politicians (McHugo, Lanzetta, & Bush, 1991; McHugo, Lanzetta, Sullivan, Masters, & Englis, 1985; Sullivan, 1996). This so-called "Dartmouth group" demonstrated that the process of emotional mimicry and emotional contagion depends on the context. However, their argument - proposed in the 1980s - has had little resonance in broader political science research so far (for exceptions see Stewart, Salter, & Mehu, 2009; Stewart, Waller, & Schubert, 2009), despite the recent renewed interest in emotions in politics. One explanation for the limited impact is that research design issues prevented the Dartmouth group from pinning down how context exactly matters. We revive the argument that politicians' nonverbal communication and context matters using recent advances in technology, research design, and psychological theories of emotional mimicry.

In a well-powered preregistered laboratory experiment, we use images of a range of different politicians (e.g., 13 Dutch party leaders), with manipulated levels of the emotional intensity of their emotional displays. We measured both (1) whether people mimic the emotional expressions of politicians using facial electromyography and (2)

whether this mimicking leads to actual affect transfer (i.e., emotional contagion) by measuring the self-reported emotional responses of participants to the emotional displays of politicians. We test two competing hypotheses based on two prominent theories in psychology. On the one hand, we expect - following the "matched motor hypothesis" (Chartrand & Bargh, 1999) - that people mimic the emotions displayed by politicians regardless of the political party. On the other hand, we expect - following the "emotional mimicry in context model" (Hess & Fischer, 2013) - that the political context could play a role. More specifically, we expect stronger mimicking responses to the emotional displays of in-party politicians (i.e., the party the participant would vote for) compared to the displays of out-party politicians (i.e., the party the participant would never vote for). Finally, we expect attachment with the politicians to strengthen the latter effect. To summarize, our findings will provide more insight into how the political context affects the transfer of emotions from politicians to voters.

Matched Motor Hypothesis: does affect directly transfer from politicians to voters?

The question of why people tend to "catch" the other persons' emotions during social interactions – i.e., displaying and experiencing the same emotions as they observe in their interaction partner – is a central question for psychologists. Nowadays, there are two prominent - but competing - perspectives in psychology that try to explain this phenomenon, on which we build our competing hypotheses. First, the "matched motor hypothesis" (Hess & Fischer, 2013), suggests that people have a biological predisposition to automatically mimic the facial expressions, postures, vocalizations, and movements observed in others. When people perceive an emotion in others, they automatically mimic this emotional display. This mimicking evokes a physiological

response in the body, which in turn induces the same emotional experience (i.e., feeling) in the observer, reaching the full circle of emotional contagion (Hatfield et al., 1993).

According to the matched motor hypothesis emotional mimicry is based on the perception-behavior link (Chartrand & Bargh, 1999). Chartrand and Bargh (1999) theorize that perception and action share common representational systems. Along these lines, the matched motor hypothesis (Hess & Fischer, 2013) puts forward that the perception of another person's behavior (e.g., a facial expression, body posture, mannerism) increases the likelihood for the perceiver to behave similarly. Neuroscience research supports this notion by showing that the same neurons (mirror neurons) are activated when an action is observed as when the same action is performed (Hess & Fischer, 2013). The primary function of this mirroring is to enhance affiliation and promote social bonding. Lakin et al. (2003) argue that the function of emotional mimicry has evolved from a form of communication to a mechanism of signaling affiliation to enhance social coordination between interaction partners and thereby improve survival chances. Mimicry is therefore also referred to as "social glue", binding individuals together (Lakin et al., 2003). According to the matched motor hypothesis, mimicry is an automatic process that does not depend on the observers' or expressers' interpersonal goals (Chartrand & Bargh, 1999) and is difficult if not impossible to suppress (Dimberg, Thunberg, & Grunedal, 2002).

Following the matched motor hypothesis, mimicry would occur when observing a politician's emotional display regardless of your feelings towards that politician. Based on this line of research, we therefore preregistered the hypothesis *that people mimic the emotional displays of politicians* (**Hypothesis 1**).

Several studies provide empirical evidence for the matched motor hypothesis:

people consistently mimic the emotional expressions of others (e.g. Dimberg et al., 2002; Sato & Yoshikawa, 2007). However, these studies mainly presented random faces displaying an emotional expression to participants, lacking any form of social context. When including more social context (e.g. inter-group dynamics), mimicry only seems to occur under certain social circumstances (Hess & Fischer, 2013; Kastendieck, Mauersberger, Blaison, Ghalib, & Hess, 2021; Rauchbauer, Majdandžić, Stieger, & Lamm, 2016; Seibt, Mühlberger, Likowski, & Weyers, 2015). This leads us to the second competing theoretical perspective prominent in this literature: the emotional mimicry in social context model (Hess, 2021; Hess & Fischer, 2013).

Emotional Mimicry in Social Context Model

To explain how social context affects mimicry in response to emotional expressions, Hess and Fischer (2013) propose the "emotional mimicry in social context model" (Hess et al., 2017; Hess & Fischer, 2013). In this model, emotional mimicry is not seen as a motor response to specific emotional displays. Instead, emotional mimicry is a response to the pre-conscious interpretation of that emotional signal. Emotional mimicry, therefore, happens as a reaction to understanding the other person's emotional state, even without the expresser visibly displaying that particular emotional expression in the face. Mimicking this emotional state is then a social signal of understanding and affiliation. Furthermore, according to the model, mimicking is independent of emotional contagion, i.e., mimicking an emotional display does not necessarily lead you to also feel that emotion (Hess, 2021). Hence, mimicry serves as a tool to improve social interactions and strengthen social bonds (Hess, 2021).

Following the model, social context plays a prominent role in the occurrence of

mimicry (Hess, 2021; Hess & Fischer, 2013). For example, people are more likely to mimic the emotions of someone else if there is a form of affiliation between the expresser and observer. Or as Hess and Fischer (2013, p.148) explain: "Mimicry generally occurs when the relationship is at least neutral, and preferably positive, and does not occur [...] if the relationship is negative or when people appraise the emotional signal as having a negative consequence for themselves" . In contrast with the matched motor hypothesis (which assumes mimicry happens automatically), people are more likely to mimic a person from their in-group than out-group members. Moreover, our a priori evaluations of the expresser can predict subsequent levels of mimicking (Van Baaren, Janssen, Chartrand, & Dijksterhuis, 2009). Besides our prior beliefs, the type of emotion expressed can also influence the likelihood of mimicry. Hess and Fischer (2013) suggest that happiness is an emotion signaling affiliative intentions, whereas anger signals the opposite. They argue that mimicking happiness displays has low "social costs", since it only signals friendly intentions. Anger, in contrast, is an antagonistic emotion that can be perceived as a signal of a threat. Mimicking anger could turn out more costly when targeted at the wrong person (Tiedens & Fragale, 2003). To summarize, mimicry happens mostly in affiliative contexts, i.e., when the emotion signal shows signs of affiliation or when the person expressing the emotion is someone we would like to affiliate with (Hess, 2021).

In politics, voters can have strong preferences for which politicians or political parties they would vote (i.e., their in-party), and politicians or parties they would never vote for (i.e., their out-party). Voters can form an affective bond with their in-party, which leads to feelings of belonging, commitment, and attachment to the political party (Huddy, Bankert, & Davies, 2018). Furthermore, voters can also experience strong

negative emotions regarding certain political elites of one's out-party (Iyengar, Sood, & Lelkes, 2012; Medeiros & Noël, 2014). This negative partisanship is an indicator of affective polarization (Iyengar et al., 2012) and a positive predictor of vote choice for the in-party (Medeiros & Noël, 2014).

Following the emotional mimicry in context model, we preregistered three hypotheses that contradict hypothesis 1 (which is based upon the matched motor hypothesis). Namely, we expect that *people mimic the emotional displays of in-party politicians more than the emotional displays of out-party politicians* (**Hypothesis 2**). Furthermore, we hypothesize that *the stronger the positive attachment to the in-party, the stronger the mimicry response to the emotional displays of the in-party* (**Hypothesis 3**). At the same time, we hypothesize that *the stronger the negative partisanship, the weaker the mimicry response to the emotional displays of the out-party* (**Hypothesis 4**).

Beyond our preregistered hypotheses, existing theory suggests additional expectations, which we explore in our paper[3]. First of all, the level of mimicry might vary between the different emotions. For instance, the antagonistic emotion anger is less likely to be mimicked compared to the more affiliative emotion happiness (Hess, 2021; Hess & Fischer, 2013). Furthermore, a negative relationship between the politician and the observer may elicit divergent emotional responses. For example, instead of mimicking a politicians' anger, one might smile and find it ridiculous or inappropriate. Following Hess and Fischer (2013), we call this a reactive response. In such instances, the emotional response is a reaction *to* the expressed emotion, whereas mimicry can be seen as an emphatic response *with* the observed emotional expression. A reactive

[3] We thank an anonymous reviewer for the suggestions discussed here.

response can be counter-mimicry, e.g., showing a different emotion than the one expressed, or may resemble mimicry by showing the same emotion but with a different motive, e.g., "I am angry that you are angry". We did not preregister these additional expectations, and they should be considered exploratory.

Mimicry of Politicians' Emotional Displays: moving beyond the state-of-the-art

The Dartmouth group has previously tested H1-H4 with emotional displays from politicians and found conflicting evidence for these hypotheses (McHugo et al., 1991, 1985; Sullivan, 1996; Sullivan & Masters, 1988). In McHugo et al. (1985), for instance, participants watched video excerpts (30-70 seconds) of television coverage of a prominent politician – U.S. President Ronald Reagan. They measured physiological responses and self-reported emotions to politicians' emotional displays. Physiological responses were measured with facial electromyography, recording the activity of the zygomaticus ("smiling") muscle and corrugator ("frowning") muscle (McHugo et al., 1991, 1985). McHugo et al. (1985) demonstrate that politicians' emotional expressions elicit corresponding emotional responses in voters. Participants showed increased zygomaticus activation and reported more positive emotions in response to the happiness displays, and increased corrugator activity and self-reported negative emotions in response to the anger and fear displays.

However, the Dartmouth group report inconsistent findings regarding the extent to which attitudes towards the candidates condition emotional mimicry. McHugo et al. (1985) find that people with favorable attitudes towards Reagan report stronger congruent self-reported responses, while Reagan's opponents report more reactivity (e.g.

negative responses to positive displays). The physiological responses were not affected by participants' prior attitudes. Using a similar design, McHugo et al. (1991) show that prior attitudes towards President Reagan and his opponent, Senator Gary Hart, affect *both* participants' physiological and self-reported emotional responses. Compared to people with unfavorable attitudes, favorable attitudes towards the politicians led to more zygomaticus activity in response to the politicians' happiness displays. Yet, Bourgeois and Hess (2008) report again a different pattern: political attitudes do not affect facial activity in response to happiness displays but influence their response to angry displays (supporters of the politician showed more corrugator activity compared to opponents).

Shortcomings in the research designs may explain these contradicting findings of past research. First, a number of these studies use relatively small sample sizes (N=40 to N=100) as well as various between-subjects conditions (e.g., prior attitude, display modality), leading to low statistical power (e.g. McHugo et al., 1991, 1985). Underpowered studies are less likely to replicate (Asendorpf et al., 2013), which could explain the inconsistent results across the studies. Second, individuals vary in the way they express an emotion in their face (Hess, Jr, & Kleck, 2009). Including only one or two politicians limits studies' generalizability and could bias the results. For example, Ronald Reagan is known as one of the most charismatic and expressive politicians, making him less comparable with other politicians such as Gary Hart (Bourgeois & Hess, 2008). Moreover, in the study of Bourgeois and Hess (2008) also only two politicians were presented (Quebecan leaders Bouchard and Charest of the 1998 election). Participants smiled in response to both the politicians' happiness display, despite their political preferences. The authors suggest this might be due to the juvenile

looks of one of the politicians (which elicits more smiling). Third, past studies did not have complete experimental control over the expressions of politicians since the displays in these studies consist of video clips selected from televised debates and speeches. As such, the intensity, onset, and offset of the emotional expressions in these clips might vary (Sullivan, 1996), making the within-person responses to a supporting and an opposing politician less comparable.

The present research aims to overcome the issues discussed here by using a sample with sufficient statistical power, including a range of different politicians, and controlling the emotional intensity of the displays by using software to manipulate facial expressions. We specifically focus on the physiological facial response (emotional mimicry) and the more cognitive experiential emotional response (emotional contagion) to test our hypotheses.

Method

Transparency and Openness

The study design, hypotheses, and analysis plan was preregistered at July 7th 2020, during data collection (March 7 until August 5, 2020), before data analysis at Open Science Framework (see https://osf.io/z38gd/ for the Preregistration, 2020). Stimulus materials are available upon request. The study has furthermore been approved by the Ethics Review Board of the University of Amsterdam (#2019-AISSR-11160).

Design & Sample

We conducted an experimental laboratory study with a 3 (type of display: neutral, happy, and angry) by 2 (source: in-party politician versus out-party politician) within-subject design in the Netherlands. Participants were recruited through an online lab portal and were rewarded 1 hour of research credits or 10 euro. We started data collection in March 2020, but had to stop due to the corona virus outbreak. We resumed data collection in June 2020. Due to the extra corona measures we included in the experiment (such as a health check before participants come to the lab), we increased the monetary reward to 17,50 euro. We control for the time of data collection with a pre- and post-lockdown dummy variable. See Table 1 for an overview of these and other deviations from our pre-analysis plan.

Table 1
Deviations from the Pre-analysis Plan

Deviation	Explanation	Action
Higher monetary reward (17,50 euro instead of 10,00)	Corona related health checks and hygiene measures increased duration of experiment	Post-lockdown dummy variable in our analyses
Experimental protocol	Due to the corona outbreak, more hygiene measures were taken: face masks and gloves for lab assistants, more frequent disinfection of lab, participants washing their hands upon arrival	Post-lockdown dummy variable in our analyses
Control variables	To control for different kind of noise during the experiment, we included a dummy variable for facial hair and for deviations based on visual inspection of the data	Two extra control variables
Baseline selection	Instead of the last two seconds of the baseline, we selected the last two 'artefact-free' seconds based on visual inspection (following 't Hart et al., 2019)	Took last two 'artefact-free' seconds of the baseline
Analytical strategy	Our pre-registered models had a poor fit on the physiological data. We therefore followed Olszanowski et al. (2020) and use a multilevel model instead	Preregistered results reported in Supplementary Material, multilevel model results in the main text

We conducted an a-priori power analysis (Blair, Cooper, Coppock, & Humphreys, 2019) to determine the sample size (see pre-analysis plan for details). In

total, we collected data for 110 participants[4], of which 3 were excluded because of technical failures. Of the remaining 107 participants, the mean age is 25.42 (SD = 9.30), of which 75 participants are female and 82% student (see more sample details in Table S3 and S4 in the Supplementary Material). Based on visual inspection of the physiological responses and the notes made in the logbook, we excluded the corrugator responses of 7 participants (N = 100) and the zygomaticus responses of 11 participants (N = 96).

Procedure

After signing the informed consent, participants completed a pre-test including demographic and political knowledge questions (see Supplementary Material, section B) and several questions unrelated to the study. After the pre-test, a lab assistant (1) cleaned the participants' face (left cheek, eyebrow, and middle of forehead) with an alcohol swap with 70% Isopropyl Alcohol (Brand: Romed), (2) attached the facial electromyography (EMG) electrodes to the participants' face, (3) started the recording of the physiological measurement (see pre-analysis plan for details) and, after checking the quality of the measurement, started the experiment.

The experiment consisted of several blocks (see Supplementary Material, Table S2). The order of the stimuli within each block was randomized. First, the participant filled in two questions for the in- and out-party assignment and two feeling thermometers (see Survey Measures). Second, we randomly presented 4 pictures from the International Affective Picture System (IAPS; see Validation Measures). Next participants were presented with a block consisting of three trials: (1) three randomly

[4] We had more than the 100 preregistered participants scheduled to participate, just in case of drop outs, therefore we ended up with a total of 10 participants more than preregistered. However, due to measurement disruptions, we ended up with around 100 participants suitable for the fEMG analysis

presented images of emotional displays from their in- and out-party politician, (2) a filler task with words (unrelated to the experiment), and (3) three randomly presented pictures from the Amsterdam Dynamic Facial Expression Set (ADFES; see Validation Measures). After this block, participants were given a short break with a video of a calming ocean. Next, participants were presented with another block consisting of three trials with the remaining emotional displays of their in- and out-party politician, a trial of the unrelated word task, and finally the remaining ADFES pictures in random order. All stimuli (i.e., IAPS, ADFES, and emotional displays) were presented for 8 seconds, preceded by a fixation screen of 8 seconds[5]. A debriefing by the lab assistant completed the study.

Stimuli

We created stimuli for all party leaders of the 13 parties in Dutch parliament in January-February 2020 using pictures from the website of parliament (`www.tweedekamer.nl`) that all have the same format, background and angle.[6]. We used various software packages (i.e., FaceGen Modeller and PsychoMorph by Roesch et al., 2011; Tiddeman, Stirrat, & Perrett, 2005) to manipulate the politicians to have a neutral, angry and happy display (see section A in Supplementary Material for details). Pilot testing (N = 260 on MTurk) showed that all manipulated pictures were perceived as authentic. The happy pictures were highly recognized as happy, while there was some

[5] When designing the experiment, we relied on papers from political science for the stimulus duration who use 10-12 seconds (Bakker, Schumacher, Gothreau, & Arceneaux, 2020; Gruszczynski, Balzer, Jacobs, Smith, & Hibbing, 2013), and the the IAPS literature in which 6 seconds is more common (e.g., Bradley, Codispoti, Cuthbert, & Lang, 2001). Combining these, we decided to show the stimuli and fixation screens for 8 seconds

[6] Politicians: Mark Rutte (VVD), Geert Wilders (PVV), Sybrand Buma (CDA), Rob Jetten (D66), Jesse Klaver (GroenLinks), Lillian Marijnissen (SP), Lodewijk Asscher (PvdA), Gert-Jan Segers (CU), Marianne Thieme (PvvD), Henk Krol (50Plus), Kees van der Staaij (SGP) , Tunahan Kuzu (Denk) and Thierry Baudet (FvD). During the data collection, leaders of two parties changed, however, we chose to include the former more familiar party leaders as stimuli (i.e. Sybrand Buma and Marianne Thieme)

variation between politicians' perceived anger. Of the 13 politicians, 4 politicians were perceived as angry by less than 50% of the participants (see pre-test results in Supplementary Material, Table S1).

Survey Measures

Partisanship. At the start of the experiment, we asked participants to indicate their in-party with the following question: *"which of the following parties has the highest probability of receiving your vote during the next national elections?"* (with a list of all 13 parties in parliament as answer options in random order). For the out-party, participants were asked: *"which party will certainly NOT receive your vote during the next national elections?"* (with again the 13 parties in random order) – for a similar approach, see Bakker, Schumacher, and Homan (2020).

To measure party attachment we asked: *"how negative - positive do you feel about the following political party?"*, then showing the name of the assigned in-party and a slider scale from 0 (very negative) to 100 (very positive), with the slider set at midpoint (Rosema & Mayer, 2020). To measure the negative attachment (i.e., negative partisanship) with the out-party, participants were asked the same question but with the out-party assigned next to the slider.

Self-reported Emotions. After the presentation of each of the politicians' emotional displays, participants' experiences of anger, happiness and fear were measured using a slider that ranges on a scale from 0 (not at all [emotion]) to 100 (very [emotion]) (Marcus, Neuman, & MacKuen, 2015). Happiness was measured using the items 'happy', 'enthusiastic', and 'proud' (Cronbach's $\alpha = .91$); for anger we included the words 'angry', 'bitter', and 'hateful' (Cronbach's $\alpha = .85$), and 'afraid', 'worried',

and 'scared' for fear (Cronbach's $\alpha = .84$). The order of the emotion items was randomized between participants.

Physiological Measurement

Participants' mimicry response was measured with facial electromyography. We measured activity of the zygomaticus major ("smiling" response) and corrugator supercilii muscle ("frowning" response) according to the guidelines of (Fridlund & Cacioppo, 1986), using a sampling rate of 1000 Hz (van Boxtel, 2010). The electrodes were placed on the left side of the face (the side closest to the EMG amplifier). The physiological data was recorded with Versatile Stimulus Response Registration Program 1998 (Vsrrp98) software on a Windows 7 computer. The raw fEMG signal was band-pass filtered between 20 and 400 Hz, with an additional 50-Hz notch filter (van Boxtel, 2010). For both corrugator and zygomaticus, we preregistered to use the muscle activity of the average muscle activity during the 8 seconds treatment for each emotion (neutral, happy, angry) minus the baseline (the fixation screen) in the analysis (according to Fridlund & Cacioppo, 1986). Regarding the baselines, we made a small deviation from our pre-analysis plan. Following the work of 't Hart, Struiksma, van Boxtel, and van Berkum (2019), we visually inspected the data and selected the last two seconds that were "artifact-free", instead of the last two seconds from the baseline (what we preregistered). Moreover, we can be certain that a high peak in muscle activity during the baseline represents an artefact and not a treatment effect.

Besides analyzing corrugator and zygomaticus muscle activity separately, we also processed the physiological data according to Hess et al. (2017) and Olszanowski, Wróbel, and Hess (2020), by creating a facial activity index. Instead of analyzing

individual muscles, this index looks at the joint movement of the muscles in the face involved during emotional mimicry. The index is based on the assumption that emotional mimicry consist of a *pattern* of facial activity in response to the emotional displays of others. Anger mimicry implies both the increase in corrugator activity and a decrease in zygomaticus activity. Mimicry of happiness displays involves the opposite, an increase in zygomaticus activity and a decrease in corrugator activity. Emotional mimicry is therefore calculated by the contrast between the standardized (within-person z-standardization) activity of the two muscles. A positive value of the facial activity index indicates mimicry in response to happiness displays, and a negative value indicates mimicry in response to anger displays.

Validation Measures

To validate our measure of corrugator activity, we included two pictures that have been known to elicit corrugator activity (Bradley et al., 2001), namely picture 3170 (baby tumor) and 6550 (knife) from the International Affective Picture System (IAPS). To validate our measure of zygomaticus activity, we include two pictures that have been shown to elicit zygomaticus activity (Bradley et al., 2001), namely IAPS picture 2050 (baby) and 2340 (grandpa). The four pictures were presented in random order in the beginning of the experiment (see Supplementary Material, Table S2).

To replicate a general emotional mimicry effect, we used pictures from the Amsterdam Dynamic Facial Set (ADFES; van der Schalk, Hawk, Fischer, & Doosje, 2011) which have been shown to elicit both emotional mimicry and contagion (Van Der Schalk et al., 2011; van der Schalk et al., 2011). In our study, we included pictures with a neutral, anger and happiness display of a male and female subject.

Exclusion criteria & Control variables

Before analyzing the results, we visually inspected the data. First, to identify responses that were clearly abnormal throughout the experiment, e.g. because of electrodes that have fallen off, the measurement being disrupted or the electrodes not picking up any signal. These responses were excluded from the data. Secondly, for the remaining responses, we visually inspected the data for artefacts. Based on this, we created a dummy variable to account for any possible noise in the data (0 = no abnormalities, 1 = abnormality visible).

Furthermore, we included a dummy to control for any small disruptions during the experiment, e.g., participants not sitting still, sneezing or coughing (0 = no event, 1 = event). These events were noted down by the lab assistant in a logbook. Finally, we include a dummy for facial hair (0 = no facial hair, 1 = facial hair), since this can influence the measurement of the zygomaticus muscle. We preregistered to only include one dummy variable to control for any events occurring during the experiment. However, post-hoc we found that this dummy variable was encompassing too much and did not account for the different sources of possible measurement distortion and therefore opted to divide this into three separate dummy variables (see Table 1 for an overview of deviations from the pre-analysis plan).

As preregistered, we also control for gender (male as reference category) and political knowledge (see Supplementary Material, Table S3 for descriptive statistics). Finally, we also control for whether the data was collected before (0) or after (1) the corona virus outbreak. All control variables are at the participant level and included in all our models.

Results

Validation of our Physiological Measures

For all analyses in this study we use the p-value of 0.05 (two-sided) as the value for statistical significance, with no correction for multiple comparisons. We first performed our preregistered regressions models on the validation checks. Both for the IAPS and ADFES images we do not replicate the previous findings using the preregistered regression models. The models turned out to poorly fit our physiological data (the R-square model fit measure was between 0.01 and 0.06), something that can happen in complex experimental designs (Banerjee et al., 2020). At the time of our preregistration, models using the mean activity of the treatment duration was a common approach (Fridlund & Cacioppo, 1986). More recently, the literature has shifted towards the use of a multilevel approach (Hess et al., 2017; Page-Gould, 2016; 't Hart et al., 2019). We therefore applied recent suggestions by Olszanowski et al. (2020) to estimate a multilevel model with respondent physiological response per second as unit of observation. Specifying respondents as the higher level in this multilevel setup and by modelling the time dynamic, we replicated the results of the validation measures (Bradley et al., 2001; Van Der Schalk et al., 2011).

More specifically, using this multilevel model approach for the IAPS images, we find we find a statistically significant negative effect of valence (negative [0] vs. positive [1]) of the image (β = -1.23, se = 0.10, $p < .001$) on corrugator activity. This means that the negative images elicit more corrugator activity than the positive images. Using zygomaticus as dependent variable, we find a statistically significant positive effect of valence ($\beta = 0.41$, se = 0.10, $p < .001$). The positive images elicited more zygomaticus activity than the negative images (see Table S10 in Supplementary Material).

Furthermore, we analyzed the physiological responses to the angry, happy and neutral faces of the ADFES picture set using the multilevel approach (see the left panel of Figure 1 and the model results in Supplementary Material, Table S11). The angry faces elicit both significantly more corrugator ($\beta = 0.31$, se = 0.07, $p < .001$) and zygomaticus activity ($\beta = 0.340$, se = 0.07, $p < .001$) than the neutral pictures. The happy pictures elicit less corrugator activity (β = -0.25, se = 0.07, $p < .001$) and more zygomaticus activity ($\beta = 0.20$, se = 0.07, $p = .003$) than the neutral pictures. Also, the facial index is more positive in response to the happy compared to the neutral pictures ($\beta = 0.27$, se = 0.04, $p < .001$).

Based on our validation measures, we can conclude that our multilevel models are valid. We replicated results of Bradley et al. (2001), namely, the positive IAPS pictures elicit zygomaticus activity, and negative IAPS pictures lead to increased corrugator activity. We furthermore find emotional mimicry in response to the ADFES pictures, as in line with van der Schalk et al. (2011). Participants frowned in response to the angry pictures, and smiled in response to the happy pictures. However, we find one unexpected result. The zygomaticus muscle is activated during the angry conditions, which might indicate a certain degree of measurement error. Namely, measurement of the zygomaticus muscle is susceptible to capturing activity of adjacent muscles, also called "cross-talk" (van Boxtel, 2010). However, other scholars have found similar patterns of zygomaticus activation in response to negative stimuli (Brown & Schwartz, 1980; Ekman, Friesen, & Ancoli, 1980; Sonnby-Borgström, Borgström, Onsson, & Svensson, 2003). More specifically, the zygomaticus muscle might be activated as a grimacing response, e.g. when watching an unpleasant scene (Greenwald et al., 1993) or observing angry facial displays (Sims, van Reekum, Johnstone, &

Chakrabarti, 2012). Following these previous findings, it is possible that the angry displays of out-party politicians elicit this grimacing response. We will return to this issue in the discussion. Overall, we can conclude that our previously preregistered models are sub optimal. Following the suggestion by Banerjee et al. (2020), we present all preregistered models in the Supplementary Material, section C, and present the results of the multilevel models in the main text.

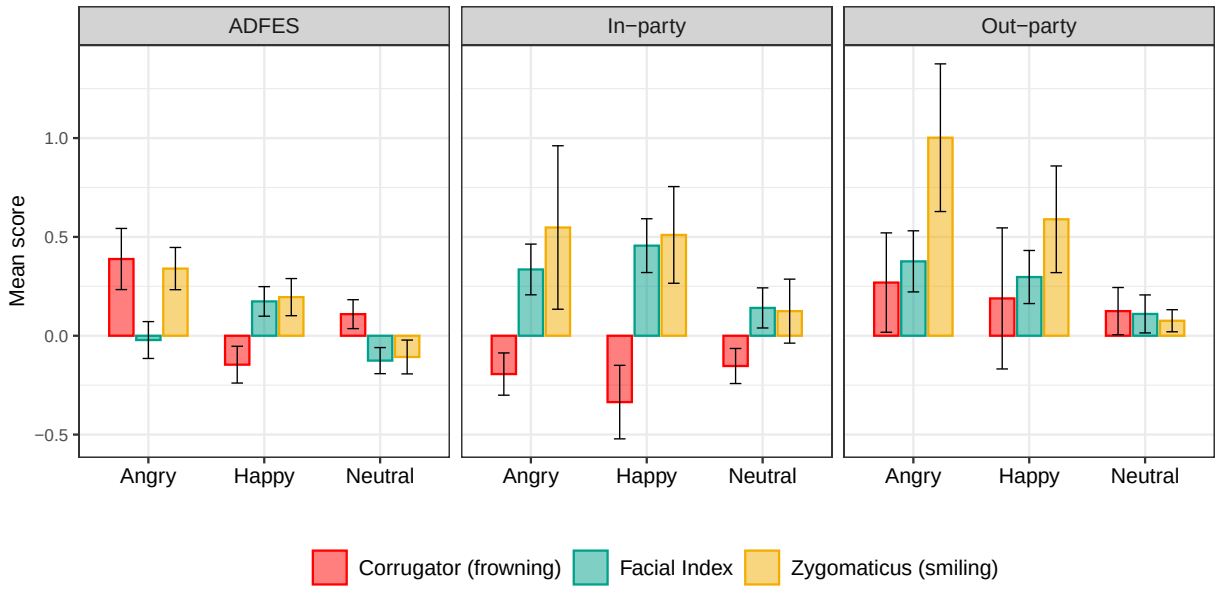

Figure 1. Mean facial EMG activity of corrugator (in red), zygomaticus (in yellow) and the facial index (in green) on the y-axis in response to the emotion conditions (x-axis) of the pictures of non-politicians from the Amsterdam Dynamic Facial Expression Set (left-hand panel), in-party politicians (middle panel), and out-party politicians (right-hand panel). Error bars represent 95% confidence intervals. The full model results can be found in Supplementary Material, Table S11, S12, S13, and S14.

Hypothesis 1 and 2: Physiological responses to emotional displays

Do emotional displays of politicians elicit mimicry (H1)? First, the angry condition does not elicit more corrugator activity than the neutral condition (see the model results in Supplementary Material, Table S12). Second, the happy condition elicits more zygomaticus activity ($\beta = 0.51$, se $= 0.14$, $p < .001$) compared to the neutral condition, but unexpectedly so does the angry condition ($\beta = 0.69$, se $= 0.14$, p

$< .001$). This is also reflected in the positive facial index in response to both the happy and angry condition. Our results do not provide strong evidence for or against H1. People seem to mimic the emotional displays of happy politicians, but not the angry displays of politicians. In contrast with our hypothesis, we find that angry politicians elicit high zygomaticus activity, which we also found in response to the ADFES angry pictures.

Are the physiological responses conditional upon partisanship (H2)? First, we examine mimicry responses per condition. Analyzing the in-party displays (see middle panel of Figure 1, and Supplementary Material, Table S13), we find no statistically significant differences in corrugator activity between the in-party neutral, in-party angry and in-party happy conditions. Furthermore, the in-party angry and in-party happy condition do not elicit more zygomaticus activity than the in-party neutral condition. However, the facial index does show more activation in the in-party happy condition compared to the in-party neutral condition ($\beta = 0.28$, se $= 0.07$, $p < .001$), indicating a mimicry response. Second, for the out-party displays, we find no statistically significant difference in corrugator activity between the out-party angry, out-party happy, and out-party neutral conditions (see results in Supplementary Material, Table S14). Both the out-party angry and out-party happy condition do elicit more zygomaticus activity compared to the out-party neutral condition (out-party angry: $\beta = 1.02$, se $= 0.20$, $p < .001$; out-party happy: $\beta = 0.64$, se $= 0.20$, $p = .002$). Finally, the facial index is higher in both the out-party angry ($\beta = 0.29$, se $= 0.08$, $p < .001$) and the out-party happy condition ($\beta = 0.17$, se $= 0.08$, $p = .037$) compared to the out-party neutral condition.

Third, we test whether people mimic in-party politicians *more* compared to out-party politicians, we used pairwise post-hoc comparisons to analyze whether

mimicry – i.e., the difference between the emotional condition and neutral condition – of the in-party is different than mimicry of the out-party (see Table S15 in the Supplementary Material). Only the comparison between in-party angry (versus neutral) and out-party angry (versus neutral) is statistically significant, namely, the in-party elicited less zygomaticus activity compared to the out-party (β = -0.63, se = 0.29, p = .028). Based on these results we find mixed evidence for H2. People do not mimic the emotional displays of in-party politicians more than the emotional displays of out-party politicians. If anything, facial activity is more prominent in response to out-party politicians, particularly when they look angry (see Figure S2 in Supplementary Material). This patterns of results could be interpreted with the emotional mimicry in social context model (Hess & Fischer, 2013). Emotional displays of out-group members may - instead of mimicry - elicit a reactive response.

Furthermore, the comparison between the in-party happy (vs neutral) and out-party happy (vs neutral) is not statistically different. We do find a mimicry response (positive facial index) to the in-party happy displays. However, the out-party happy displays elicits both high zygomaticus and corrugator activity, which suggests that this response is rather a reactive response than a mimicry response. Comparing the mimicking response of the in-party happy displays with the reactive response of the out-party happy displays is therefore less meaningful, since both have similar facial activity for different underlying reasons.

Finally, we ran an omnibus model including the emotion conditions, the political party conditions and an interaction effect of the two. Interestingly, there is a main effect of political party regardless of emotion condition (see Supplementary Material, Table S16). The out-party displays elicit more corrugator activity compared to the in-party

displays ($\beta = 0.38$, se = 0.15, $p = .009$).

Hypotheses 1 and 2: Do the emotional displays of politicians elicit emotional contagion?

First, we find statistically significant higher self-reported anger in the angry condition ($\beta = 5.27$, se = 2.55, $p < .001$) compared to the neutral condition (see Table S20 in Supplementary Material).[7] Second, participants reported less happiness in the angry condition (β = -5.10, se = 2.18, $p < .001$), and more happiness in the happy condition ($\beta = 4.69$, se = 2.48, $p < .001$, compared to the neutral condition. To conclude, our findings for the self-reported emotions are in line with H1.

Is emotional contagion dependent on partisanship (H2)? Looking at the specific emotion conditions of the in-party politicians (see Supplementary Material, Table S20), we find the in-party angry condition elicits statistically significant more self-reported anger (β= 6.40, se = 2.44, $p < .001$) and less happiness (β = -9.07, se = 3.06, $p <$ .001), than the in-party neutral condition. Furthermore, the in-party happy condition elicits more happiness ($\beta = 6.94$, se = 3.32, $p < .001$) and less anger (β = -3.06, se = 1.87, $p = .006$) than the in-party neutral condition. Turning to the out-party emotion conditions (Supplementary Material, Table S20), we find higher self-reported anger ($\beta =$ 4.16, se = 3.44, $p = .003$) for the out-party angry condition, compared to the out-party neutral condition. In the out-party happy condition we find higher self-reported happiness ($\beta = 2.45$, se = 2.01, $p = .009$) compared to the out-party neutral condition.[8]

[7] Self-reported anxiety follows the same direction, i.e., participants reported more anxiety in the angry condition ($\beta = 6.11$, se = 2.13, $p < .001$), and less anxiety in the happy condition (although not significant) compared to the neutral displays

[8] Self-reported anxiety is higher in the in-party angry (compared to in-party neutral condition; $\beta =$ 8.70, se = 0.89, $p < .001$) and in the out-party angry condition (compared to out-party neutral; $\beta =$ 3.53, se = 3.22, $p = .007$).

To test whether people experience *more* emotional contagion in response to in-party politicians compared to out-party politicians, we again performed pairwise post-hoc comparisons (Supplementary Material, Table S19). Participants felt less happy in the in-party angry condition compared to the in-party neutral condition, and this difference is bigger and statistically significant compared to the difference between out-party angry versus neutral (β = -7.95, se = 1.48, $p < .001$). Furthermore, participants felt more happiness in response to the in-party happy displays than to the in-party neutral displays, compared to the difference in self-reported happiness between the out-party happy and neutral displays (β = 4.49, se = 1.48, $p < .001$). Evidence for H2 is therefore mixed. Participants do get more emotionally engaged by the emotional displays of the in-party when looking at self-reported happiness, but this is not the case for self-reported anger.

Overall, self-reported emotions were strongly affected by political party (Supplementary Material, Table S21). After seeing the displays of the out-party politicians, participants reported higher levels of self-reported anger (β = 30.84, se = 2.75, $p < .001$) and anxiety (β = 15.64, se = 2.62, $p < .001$) and lower levels of happiness (β = -29.47, se = 2.62, $p < .001$) compared to the displays of the in-party politicians. These effects are very strong, i.e., five times as strong as the effect of the emotion conditions (see Figure 2).

Taken together, our physiological measurement shows a different pattern than the self-reported emotions. Correlations between facial activity and self-reported emotions are very low (r = -0.16 to 0.07, see Supplementary Material, Figure S3). These low correlations could be an indication that the facial activity (e.g. frowning or smiling) is cognitively adjusted when participants report how they feel. Moreover, this

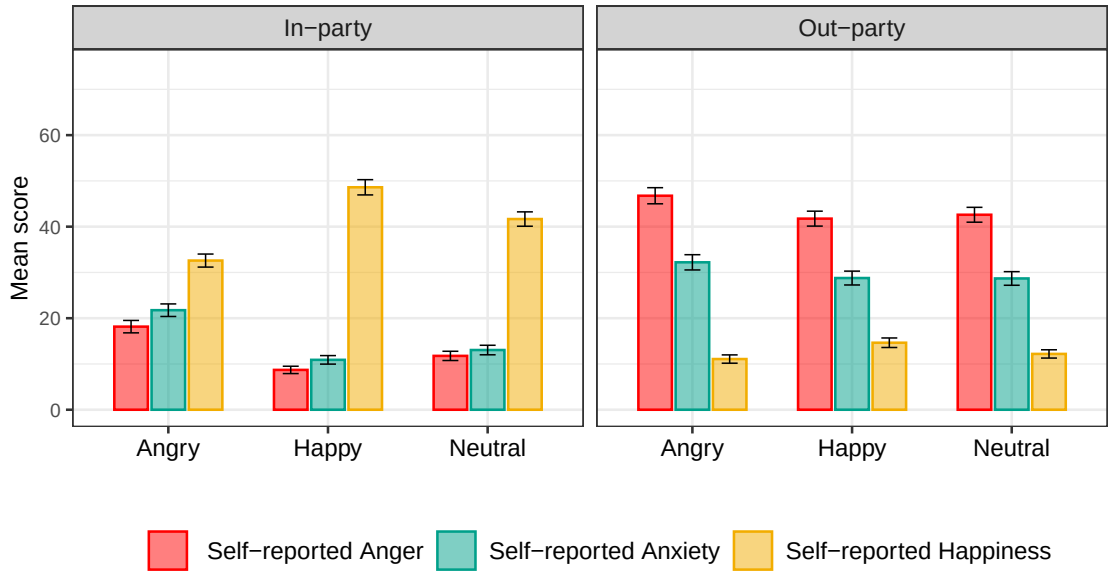

Figure 2. Mean self-reported emotions (scale from 0-100) in response to emotion conditions of the in-party politician (left) and out-party politician (right). Error bars represent 95% confidence intervals. See regression results in Table S20 in Supplementary Material

dis-alignment motivates different conclusions regarding our hypotheses for the different emotion measures (see Table 2 for an overview).

Hypotheses 3 and 4: The effect of party identification

Does identification with the in-party enhance mimicry and emotional contagion? First, based on the physiological data, we find no effect of in-party identification on mimicry of the in-party (Table S17 in Supplementary Material). Only for the in-party angry condition we find a small statistically significant positive effect on zygomaticus activity (β= 0.08, se = 0.04, p <.05), contrary to our expectations. Second, looking at the self-reported emotions, participants' identification with their in-party did not affect emotional contagion (Table S22 in Supplementary Material). We only find a negative effect of in-party identification on self-reported anger in the in-party angry condition (β= -0.384, se = 0.14, p = .007), also in contrast with our expectations. Based on these findings, we reject H3. Similarly, we find no statistically significant association effect of

Table 2
Overview of Preregistered Hypotheses and Outcome

Condition	Emotional Mimicry (fEMG)	Emotional Contagion (Self-reports)
	H1: Matched Motor Hypothesis	
Angry vs Neutral	Rejected. No mimicry	Accepted
Happy vs Neutral	Mixed. Higher zygomaticus activity in happy condition. However, this is also the case for the angry condition	Accepted
	H2: Emotional Mimicry in Social Context Model	
In-party Angry vs Neutral	No mimicry	Accepted
In-party Happy vs Neutral	Accepted. The facial index is higher (i.e., positive)	Accepted
Out-party Angry vs Neutral	Accepted. No mimicry, reactive response. Higher zygomaticus activity	Rejected, contagion
Out-party Happy vs Neutral	Accepted. No mimicry. Higher zygomaticus activity, but more likely a reactive response	Rejected, contagion
In-party Angry (vs Neutral) vs Out-party Angry (vs Neutral)	Rejected. Out-party displays more zygomaticus activity than in-party, which may be due to the reactive response	Mixed. Only lower happiness for in-party angry compared to out-party angry displays
In-party Happy (vs Neutral) vs Out-party Happy (vs Neutral)	Mixed. No differences. However, this is probably due to high zygomaticus activity in response to out-party happy displays, which is more likely a reactive response (since corrugator is also activated) than mimicry, making the comparison with the in-party less suitable	Mixed. Only more happiness for in-party happy displays than out-party happy displays

negative partisanship on both facial activity and on the self-reported emotions in response to the out-party displays (see Table S18 and S23 in Supplementary Material). We therefore also reject H4.

Discussion

How are voters affected by the emotions of politicians? In the current study, we find that social context matters and that displays are not automatically mimicked as

suggested by the matched motor hypothesis (Chartrand & Bargh, 1999; Hatfield et al., 1993). The social context matters, which is in line with recent work in psychology (Hess, 2021; Hess & Fischer, 2013; Kastendieck, Mauersberger, et al., 2021; Kastendieck, Zillmer, & Hess, 2021) and the somewhat forgotten political science work from the Dartmouth group (McHugo et al., 1991, 1985; Sullivan & Masters, 1988). Both lines of research emphasize the importance of context in understanding the causes and consequences of emotion. Yet, how much does context matter and how does it operate in politics? In the next sections, we will discuss our findings in the light of these questions and at the same time tie our paper into evolving literature that seeks to reappraise the role of emotion in politics (Bakker, Schumacher, Gothreau, & Arceneaux, 2020; Bakker, Schumacher, & Rooduijn, 2021; Tsakiris, Vehar, & Tucciarelli, 2021).

First, our study verifies that people mimic the emotional expressions of, unfamiliar, ordinary people (see also, Van Der Schalk et al., 2011). However, the mimicry responses to in-party and out-party politicians are altogether different. First of all, people do not mimic the emotional displays of out-party politicians. Instead, our findings suggest a reactive response, people smile in response to an angry out-party politician. Second, for the in-party politicians, we find that the happiness displays elicit congruent facial activity (a positive facial index). However, people do not mimic the anger displays of in-party politicians. This latter finding is in line with the work of Hess and colleagues (Hess, 2021; Hess & Fischer, 2013), who propose that positive emotions are more likely to be mimicked compared to antagonistic emotions such as anger. Building on this literature, future research could more closely examine the different social contexts in which anger is used in politics. For example, anger targeted at a political opponent versus anger displayed while discussing the country's poor state to

the public might elicit different responses. Follow-up research could manipulate these different social contexts more to better understand our findings that anger displayed by in-party politicians does not lead to mimicry, and anger displayed by out-party politicians elicits a strong reactive response.

Second, our study underlines the complexity of emotions. When we compare Figure 1 with Figure 2 the self-reports and the physiological responses to in-party politicians are both highly positive. Yet the correlation between the two measures is practically zero. The same is true for corrugator activity and self-reported anger in the out-party politician condition. These near-zero correlations are almost universally reported (Evans & Stanovich, 2013; LeDoux & Pine, 2016). These findings do not invalidate one measure in praise of the other. They rather emphasize different, conscious, and unconscious aspects of emotion, which both need to be taken into account to understand the complexity of emotions (Bakker, Schumacher, & Homan, 2020; Bakker et al., 2021; Tsakiris et al., 2021). The pattern of similar results for self-reports and physiology, but no correlation, suggests that some people report strong emotions without a physiological response. In contrast, others have strong physiological responses but do not report it. This finding supports the work of Hess (2021), who propose that emotional mimicry and emotional contagion are independent of each other. Contrary to the matched motor hypothesis, the emotional mimicry in social context model does not expect emotional mimicry to lead to emotional contagion but rather views these as two different concepts. Additional explanations are that individuals vary in how motivated they are in the experiments to adjust responses in line with partisan beliefs. They vary in thinking styles that may generate variation in the level of visceral response to political stimuli. The current study is limited in that we only analyze the

effects of partisanship, the topic to which we turn now.

Third, the strength of partisan identity does not explain additional variation in the responses. Regardless of measuring this as the strength of in-party identification (H3) or the strength of out-party dislike (H4), we find no effect. Separating politicians into in-party and out-party politicians seems sufficient to find different emotional response patterns. On the one hand, this is surprising because the strength of party identification is typically associated with stronger polarization even in multiparty systems (Huddy, Mason, & Aarøe, 2015; Iyengar & Westwood, 2015; Medeiros & Noël, 2014). On the other hand, by varying the extent to which a politician is closer or more distant to the in-party or out-party, we may uncover dynamics of partisanship that our study by design could not capture.

Fourth, in the mimicry literature facial EMG is the dominant method to measure mimicry (Hess, 2021; Hess & Fischer, 2013). Usually, these studies measure zygomaticus and corrugator responses, as we did. However, these muscles are "versatile" action units, i.e., muscles of which can be voluntarily controlled (Ekman & Friesen, 2003; Mehu, Mortillaro, Bänziger, & Scherer, 2012). Other action units, such as the orbicularis oculi, e.g., "cheek raise" associated with joy, cannot be consciously controlled. Measuring muscles that cannot be consciously controlled, could give a more complete measure of the mimicry response (Mehu et al., 2012). Furthermore, we measured fEMG on the left side of the face – the more expressive side of the face (Lindell, 2018; Sackeim, Gur, & Saucy, 1978)– which could be a reason why we might pick up some cross-talk with the zygomaticus measurement. Contempt smiles (lip corner pulls) are often unilateral (on one side of the face) and can overlap with the zygomaticus signal (Hess, 2009). Taken together, future research could consider measuring the mimicry response with different

facial muscles and consider electrode placement on the right side of the face.

Finally, given the importance of the social context as outlined above, one could change the experimental design in several ways to include more social context. For example, in our study, we show participants images of emotional politicians. Nowadays, images are omnipresent in politics (Grabe & Bucy, 2009). Politicians profile themselves with campaign posters, images on social media, and television (Dumitrescu, 2010; Grabe & Bucy, 2009; Metz, Kruikemeier, & Lecheler, 2020), making these facial displays highly salient. As such, the use of images in our study has a high degree of external validity. However, other forms of social media have also emerged, think of short video clips on TikTok or Instagram (Cervi & Marín-Lladó, 2021; Guinaudeau, Votta, & Munger, 2021). Future work could use different types of visual political communication with variant exposure times.

This paper contributes to the analysis of the role of emotions in politics. Particularly, compared to earlier studies, we find more conclusive evidence of how the social context affects our emotional responses to the emotional displays of politicians. In contrast with earlier work of the Dartmouth group (McHugo et al., 1985), and in line with their later work (McHugo et al., 1991), we show that prior attitudes affect both physiological and self-reported emotional responses. With these findings, we reappraise the importance of nonverbal communication in the form of emotional displays. These emotional displays have social influence (Lakin et al., 2003; Van Kleef et al., 2014; Visser et al., 2013). They inform and motivate the audience and have similar effects as other verbal and nonverbal expressions (Van Kleef, 2017). However, the context in which these emotional displays take place is relevant. Emotional displays become ineffective or even counterproductive when they are inappropriate (Bucy & Bradley,

2004; Cheshin, Amit, & van Kleef, 2018). Especially (angry) emotions displayed by out-party politicians backfire, whereas the emotional (happy) displays of in-party politicians result in positive responses, altogether intensifying polarization. Our paper suggests that politics is a particular social context in which political identity moderates how we respond to the emotional displays of in-party politicians and out-party politicians. This, we believe, warrants two conclusions. First, the impact of skillful politicians who are masters of appropriate, emotional displays is limited to the political context. Second, that politics creates a uniquely emotional context underlines the importance of investigating emotions specifically in politics.

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