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The Role of Emotions and Identity-Protection Cognition When Processing (Mis)Information

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In this study, we investigate the role of emotions in identity-protection cognition to understand how people draw inferences from politicized (mis-)information. In doing so, we combine the identity-protection cognition theory with insights about the effects of emotions on information processing. Central to our study, we assume that the relationship between an individual's political identity and inference-conclusions of politicized information is mediated by the experienced emotions anger, anxiety, and enthusiasm. In an online study, 463 German adults were asked to interpret numerical information in two politically polarizing contexts (refugee intake and driving ban for Diesel cars) and one nonpolarizing context (treatment of skin rash). Results showed that, although emotions were mostly unrelated to political identity, they predicted performance more consistently than political identity and cognitive sophistication.

Keywords: misinformation, identity-protection cognition, emotions, mediation, cognitive sophistication

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The increased circulation of misinformation and its direct linkage to damaging consequences, such as information avoidance about the recent Coronavirus disease 2019 (COVID-19) outbreak (Kim et al., 2020), decreased trust in the media (Turcotte et al., 2015), and environmental harm (Farrell, 2019), has resulted in the proliferation of academic studies investigating misinformation. Different approaches and fields investigated, for example, the spread of misinformation (Brady et al., 2017), susceptibility for it (Druckman, 2012; Pennycook & Rand, 2019), and the difficulty to correct it (De keersmaecker & Roets, 2017; Flynn et al., 2017).

Previous studies about misinformation acceptance have placed their investigation within the broader concept of motivated reasoning to understand its underlying psychological mechanisms. Motivated reasoning, also known as biased assimilation (Lord et al., 1979), generally assumes that information processing and assimilation are sometimes biased in favor of one's prior-beliefs and attitudes.

In this article, we contribute to this growing knowledge on misinformation by investigating the role of identity protection cognition and protection-related emotions. To do so, in our theory-driven approach, we combine insights from the theory of identity-protection cognition (IPC), an identity-centered motivated reasoning conceptualization, with theories of identity threat, affirmation, and emotional reaction to identity threat. We choose IPC, which was originally developed to explain public disagreement about risk (Kahan et al., 2007) and scientific consensus (Kahan et al., 2011), as it was recently introduced to explain why individuals believe misinformation (Kahan, 2017). Moreover, although it has the individual at the center, it also incorporates cognition related to group belonging and social identity which the classical motivated reasoning literature has generally disregarded. However, especially in highly politically polarizing contexts, group belongings and social identity play a crucial role (Cohen, 2003).

By applying IPC, we asked participants to draw numerical inferences in two politically polarized contexts as well as how they experienced the inference-tasks concerning the emotions of anger, anxiety, and enthusiasm, emotions which have previously been closely related to political reasoning (Marcus et al., 2000). We

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argue that if information threatens one's status within an affinity group, as IPC suggests, the identity threat elicits anger or anxiety. In turn, if incoming information affirms one's identity, enthusiasm will be elicited. As emotions have been shown to influence downstream information processing, we hypothesize that both the experience of anger and anxiety, as well as enthusiasm, mediate the relationship of IPC and the reasoning outcome. Our overarching objective is to contribute to a better understanding of cognitive and emotional processes in combating misinformation.

Theoretical Background

An Identity Approach to (Mis)Information Processing

With the increasing emergence of misinformation, Yeo et al. (2015) found that, especially in social media, the question of why people believe misinformative content has experienced a renewal of interest. Findings from previous studies reveal that belief in misinformation is either rooted in motivational processes (Chaiken et al., 1996; Kunda, 1990), cognitive biases such as confirmation bias (Nickerson, 1998) and myside bias (Mercier, 2016), biased memory retrieval (Taber & Lodge, 2016), or cognitive sophistication (Pennycook & Rand, 2019). Contrary to this, we focus on a different approach that places information processing in an identity-driven framework of motivated reasoning.

In *identity-protection cognition* (IPC), Kahan (2017) argues that beliefs and political views become "a badge of membership with identity-defining affinity groups" (p. 2). IPC considers it *individually rational* to reject information that opposes group beliefs, not solely individuals' beliefs, engaging in information processing that is "rationally suited to the ends of the agents who display it" (Kahan, 2017, p. 1). The main goal of an individual becomes then to protect one's status within the affinity group. Empirical results of recent studies support this claim by showing that the rejection of scientists as well as anthropogenic climate change is driven by social identity threats (Nauroth et al., 2017; Postmes, 2015).

Relating IPC to misinformation, Kahan (2017) argued that IPC's contribution is twofold. On the one hand, individuals accomplish their goal of expressing group belonging in selectively dismissing factual information while on the other hand crediting misinformation that confirms affinity-group identities. This argumentation is supported by studies that experimentally modified identity salience to increase misinformation rejection and increase genuine information acceptance, respectively (Wischnewski & Krämer, 2020).

Testing IPC empirically against deliberate and reflective information processing, Kahan et al. (2017) gave participants numerical information about the effect of a gun-ban and asked them to derive from the numbers the correct conclusion of the ban: either an increase or a decrease of crime. Unlike deliberative and reflective information processing would suggest, namely, that individuals with higher numeracy scores performed better in solving the task, they found that individuals were more likely to answer correctly if the answer confirmed their political identity.

Although Kahan et al. (2017) do not directly compare the acceptance of real and fake news like others have done (e.g., Pennycook et al., 2018) but rather investigate inferential conclusions about facts, we considered their approach fruitful: The actual validity of information put aside, it explains not only why people believe misinformation but also why some real information is rejected. Moreover, in Kahan et al.'s (2017) study, the authors used numeric information and mathematical evaluations. One would expect that even strong identifications cannot change numerical inferences–after all, the numbers in their study allowed for only *one* correct interpretation. However, that was not the case. Although numbers unequivocally implied one answer, strong identifications had an impact on the answering behavior, even for individuals who were highly numerate. We argue that even supposedly undebatable arguments such as numbers can be perceived in a biased manner.

The theoretical groundwork of IPC draws on evolutionary psychology and utility maximation theory. According to the former, social groups fulfill humans' inherent need of belonging, protection, and safety, whereas the latter suggests that the benefits of conforming to group beliefs outweigh the costs of accepting group-inconsistent information. Empirical studies support IPC in the context of politics (Kahan et al., 2017) and risk perception (Kahan et al., 2007).

Attitudes or values that are transformed into a badge of group membership leading to IPC are manifold. However, in line with the original works on IPC (Kahan et al., 2017), our goal is to investigate politicized attitudes. We argue that this is appropriate given that political partisanship has previously been associated with group-belongings and social identity theory (Greene, 2004). Hence, we combine IPC with partisanship and social identity to suggest that political identity-incongruent information becomes identity threatening, whereas political identity-congruent information becomes identity-affirming.

While the resulting bias of IPC and other theories of motivated reasoning within reasoning about politics is widely accepted, the moderating variable of cognitive sophistication yielded contradicting results. Findings by Kahan et al. (2017) indicated that cognitive sophistication increased identity-protection cognition and, hence, resulted in a stronger bias. However, recent investigations of this relationship found the opposite effect. Individuals with higher cognitive abilities showed less bias (Lind et al., 2018; Pennycook & Rand, 2019; Tappin et al., 2020). We position our investigation within the latter findings. In addition to this, IPC has been a source of criticism concerning its earlier label *cultural cognition* (used in, e.g., Kahan et al., 2011). Specifically, the notion of "cultural" bias has led to conceptual criticism (van der Linden, 2016). For our study, we do not want to argue for or against a notion of culture but rather follow IPC's argumentation of an identity-based approach to understand how people reason about (mis)information. In doing so, we follow Van Bavel and Pereira (2018) who adopt the idea of IPC in their identity-based model of beliefs. Their main argumentation proposes that "accuracy goals compete with identity goals to determine the value of beliefs" (p. 215). Examples of these identity goals are belonging goals, epistemic goals, status goals, or system goals which Van Bavel and Pereira connect to partisan identities. Similar to Kahan (2017), they argue that "maintaining beliefs and judgements that are aligned with one's political identity [...] is a higher priority than achieving accuracy" (p. 217).

Concludingly, we hypothesized, based on the above-reviewed literature on identity-protection cognition:

> *Hypothesis 1:* If participants are asked to draw inferences from neutral stimuli, accurate inferences are predicted by participants' cognitive sophistication, not their political identity (see Figure 1 Hypothesis 1).

Hypothesis 2: If participants are asked to draw inferences from politicized stimuli, accurate inferences are predicted by participants' political identity, not by cognitive sophistication (see Figure 1 Hypothesis 2).

Hypothesis 3: If participants are asked to draw inferences from politicized stimuli, the relationship between participants' political identity and accurate inferences is moderated by participants' cognitive sophistication (see Figure 1 Hypothesis 3).

The Central Role of Identity-Defense

The psychological defense mechanism against threats to self-integrity, that IPC uses, has long been discussed (e.g., Sherman & Cohen, 2002). For example, Chaiken (1987) argued in the heuristic-systematic model (HSM) that individuals' primary motivation is to arrive at an accurate conclusion. Given sufficient cognitive capacities and motivation, individuals process information thoroughly (systematic), whereas they otherwise rely on mental shortcuts (heuristic). In a later version of the HSM, Chaiken et al. (1996) revised this understanding, saying that accuracy goals are not always the primary driver of cognition but instead goals that preserve beliefs and self-concept (defense motivation) or impression management goals (impression motivation). This defense motivation has later been associated not only to the protection of the self-concept but also to favor in-groups (De Dreu et al., 2008). Concludingly, the defense mechanism becomes a central part of our theoretical understanding of IPC.

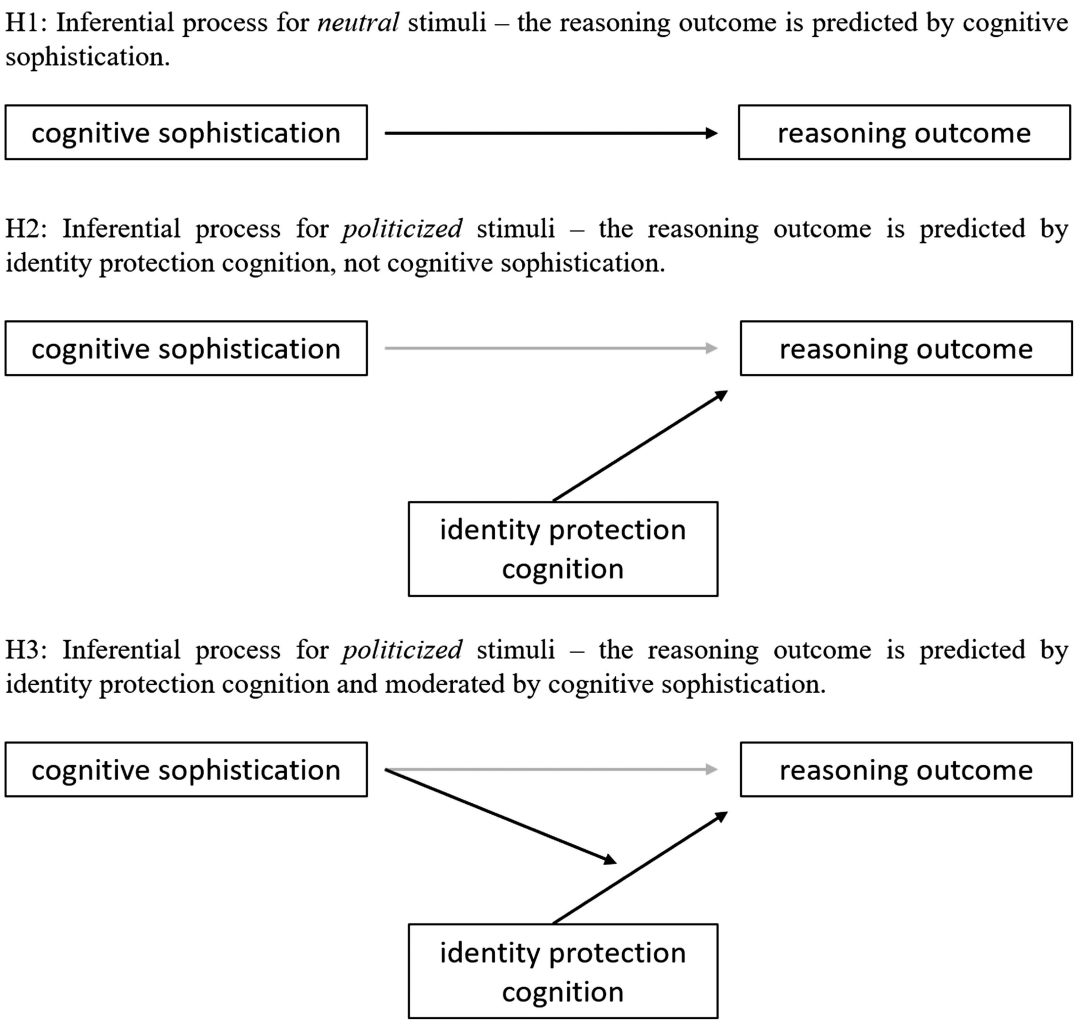
In the next section, we combine this defense motivation with emotional experiences related to identity threat.

Emotions and Identity-Protection Cognition

For the longest time, emotions have been regarded as corroding rational thought. In the last two decades, however, they found their way into many theories on human reasoning (Blanchette & Caparos, 2013; Jung et al., 2014; Ray & Huntsinger, 2017). Emotions have been introduced to political science (Brader et al., 2008;

Figure 1

Visualization of Hypotheses 1–3. Hypothesis 1 Describes the Inferential Process for Neutral Stimuli, Whereas Hypotheses 2 and 3 Describe the Inferential Process for Politicized Stimuli in Accordance to IPC



MacKuen et al., 2010; Marcus et al., 2000, 2011), as well as studies on misinformation (Bakir & McStay, 2018; Brady et al., 2017; Van Damme & Smets, 2014; Weeks, 2015) and motivated reasoning (Lodge & Taber, 2013; Lord et al., 1979; Martel et al., 2019; Suhay & Erisen, 2018; Taber & Lodge, 2016).

Earlier research on the effects of emotion on cognition differentiated primarily between positive and negative emotions. Concerning social cognition, for example, it was found that positive moods induce top–down processing strategies, whereas negative moods induce a more systematic, stimulus-driven, bottom–up processing (Fiedler, 2001). In line with this, Schwarz (2002) suggested that emotions signal the level of required vigilance and effort, where negative states signal potential threat and positive states signal a safe environment which he called *cognitive tuning*. Later findings differentiate, however, between negative emotions, such as anger and anxiety. Contrary to previous findings, it was found that anger, as well as enthusiasm, led to a general overreliance on prior beliefs and superficial reasoning strategies (Huddy et al., 2007)—a top–down processing strategy. In the same lines, Weeks (2015) found that angry people were also "more likely to be motivated to defend their attitudes or partisanship" (p. 126). In turn, it was found that the discrete emotion of anxiety facilitates attention to available information and prompts thorough information seeking and processing (Brader et al., 2008). People who felt anxious were more likely to put their prior attitudes aside and to consider evidence in a balanced manner. These findings are consistent with the argumentation of affective intelligence theory (AIT) by Marcus et al. (2000). In AIT, Marcus and colleagues introduce two affective systems, the surveillance and the dispositional systems. While the former is alerted when an individual encounters new and unknown situations or information, the latter monitors habitual behavior. As part of the surveillance system, Marcus et al. propose that anger increases reliance on heuristics as well as enthusiasm. In contrast, anxiety facilitates the use of careful considerations.

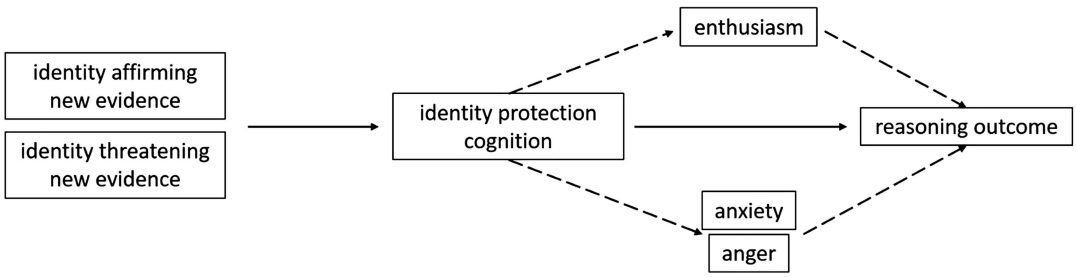
Another strand of research regards emotions as additional information for the evaluation of information. The *feelings-as-information* hypothesis suggests that feelings are used to infer conclusions in a "how-do-I-feel-about-it" manner (Schwarz & Clore, 1983). Positive emotions signal positive evaluations, whereas negative emotions signal negative evaluations, respectively. Slovic et al. (2007) have argued that this reliance on affective cues gives individuals an advantage over the more effortful and time-consuming reasoning processes of weighing pros and cons, independent of whether the affective cue is consciously perceived or not. They propose that the use of a mental shortcut, an affect heuristic, is especially likely "when the required judgement or decision is complex or mental resources are limited" (Slovic et al., 2007, p. 1336). In a complex inference task, it is, hence, more likely that feelings guide individuals' processing. If a task holds identity-threatening potential, negative emotions such as anger or anxiety amplify this threat, leading to either avoidance or rejection of the given information, as IPC suggests. Positive emotions such as enthusiasm signal safety and approval of incoming information which is, in turn, used as additional information in the decision-making process.

This research aligns with Lazarus' (1991) appraisal theory which proposes that any emotional state is preceded by a subjective evaluation of the event. Especially going beyond a dimensional understanding of emotions, discrete emotions like anger, anxiety, or enthusiasm require some degree of cognitive appraisal (Lodge & Taber, 2013). For the case of motivated reasoning which IPC relates to, Suhay and Erisen (2018) found, for example, that the discrete emotion anger successfully mediated the relationship between prior attitude and quality ratings and counter arguments of political campaigns.

Concerning IPC, as stated above, it is assumed that group-inconsistent information threatens an individual's identity. Consequently, the individual reacts to the threat with identity-protective cognition which leads to the rejection of information, independent of its veracity. Previous studies on identity threat have shown, however, that identity threat elicited feelings of either anger or anxiety (Huddy et al., 2005; Huddy et al., 2015; Wischnewski & Krämer, 2020). We can expect that anger is elicited as a result of a perceived violation of one's standards (Carver & Harmon-Jones, 2009), whereas anxiety is associated with a lack of personal control and uncertainty (Eysenck et al., 2007). Hence, if IPC is a reaction to identity threat, we can expect that this threat is accompanied by emotions integral to the situation like anger or anxiety (see dashed arrows in Figure 2). However, if incoming information is identity affirming, we can expect that enthusiasm is elicited due to identity affirmation (Marcus et al., 2000). In turn, we can expect that an individual, who identifies less with a certain issue, experiences less identity threat or identity affirmation. Hence, the individual should also be less biased in her/his reasoning.

Figure 2

Original Identity-Protection Cognition Path in Unbroken Lines. We Hypothesize That Dependent on an Individual's Attitudes, Anger, Anxiety (for Identity Threat) or Enthusiasm (for Identity Affirmation) are Elicited (dashed Lines). In Turn, the Effect of Identity-Protection Cognition on the Reasoning Outcomes is Mediated by the Respective Elicited Emotions



In accordance with the discussed literature and empirical results, we theorize that emotional reactions are an integral part of IPC. We, therefore, hypothesize a mediating role of emotions:

> *Hypothesis 4:* If participants are asked to draw inferences from politicized stimuli, the relationship of participants' political identity and accurate inferences is mediated by experienced anger, anxiety, and enthusiasm.

The Current Study

In this study, we investigated the role of emotions in identity-protection cognition to understand how people draw inferences from politicized information. Central to our study, we assume that the relationship between an individual's political identity and inference conclusions of politicized information is mediated by the experienced emotions anger, anxiety, and enthusiasm (H4). To assess this, we first hypothesize that inferring conclusions from nonpoliticized information are driven by an individual's cognitive sophistication skills (Hypothesis 1), whereas inferences about politicized information are driven by individual's political identity (Hypothesis 2). In addition, we hypothesized that the relationship between an individual's political identity and the inference conclusion for politicized information is moderated by cognitive sophistication (Hypothesis 3).

To test our hypotheses, we gave participants information about two politicized scenarios and one unpoliticized scenario and asked them to interpret the given information. Information was presented in a way to either confirm or reject one side of the selected politicized issue. Through self-report measures, we assessed participants' emotional responses as well as their cognitive sophistication.

Method

This study received ethical approval from the ethics committee of the Department of Computer Science and Applied Cognitive Science, University of Duisburg-Essen.

Sample

In an online experiment using convenience sampling, 463 (304 female) German citizens were recruited via different online platforms[1] (to arrive at our final sample size, we used the software G * Power version 3.1.9.4). The mean age of participants was 27.82 years ($SD = 8.64$), with most participants having a University degree (54%). Subjects who indicated so could participate in a raffle to win one out of overall 18 gift cards, worth between 10€ and 100€, as compensation. The data collection took place throughout late April to early June 2019.

General Procedure

After assessing individual cognitive sophistication skills, participants encountered three different fictitious scenarios in a randomized order. Within each scenario, they were confronted with a math task, asking them to draw inferential conclusions from numerical data. Immediately after each scenario, we asked participants to self-report their emotional reaction. The study closed with measures of political identity, basic demographic data, and a debriefing statement.

Pilot Study

To select potential polarized issues, we tested the threatening and affirming potential of seven controversies in a prestudy ($N = 64$). Controversies were selected through purposive sampling. A detailed report of the pilot study can be found here: https://osf.io/8wt59/. We selected the two most threat- and affirmation-inducing topics of the pretest, which were refugee intake and a driving ban for diesel cars. The former has been a highly discussed issue in multiple European countries and has induced IPC before (Lind et al., 2018). The latter relates to environmental concerns which have shown to induce biased reasoning as well (e.g., Hart & Nisbet, 2012; Kahan, 2013). Furthermore, the pretest results confirmed that issue positions (pro-refugee intake versus against, and pro-driving ban versus against) were closely related to specific political identities. However, positions for refugee intake were more pronounced and divergent than for a driving ban.

Experimental Design

In a 3 (neutral/polarized I/polarized II) × 2 (increase/decrease) mixed experimental design, participants encountered three different fictitious scenarios in a randomized order. Constituting the first factor, in each of the three scenarios participants were asked to draw inferential conclusions: (a) Use of a skin crème and the occurrence of a skin rash (neutral), (b) refugee intake and crime rates (polarized I), and (c) driving ban for Diesel cars and air quality (polarized II). Constituting the second factor, each of these three scenarios was randomly presented in a way to indicate either an increase or a decrease (between factors), resulting in overall six different scenarios. For example, in the neutral condition, the skin crème could either increase or decrease the rash. In turn, for the polarized conditions, it meant that a refugee intake either increased or decreased crime rates as well as a Diesel car driving ban resulting to better (increase) air quality or worse (decrease).

Dependent Variable

General scenario structure, instructions, and data presented in each condition (see Figure 3 for an example) were adapted from Kahan et al. (2017) and translated to German. We asked participants to read the text as well as the numbers to indicate which conclusion they thought to be accurate, according to the data presented. The correct answer could be derived through inferential reasoning about data presented in a 2 × 2 contingency table (see Figure 3). Hence, the dependent measure *task performance* was the answer given by the participants, which resulted in a binary measure (correct vs. incorrect).

Independent Variables

Political Identity

Similar to Kahan et al. (2017), we assessed participants' political identity through two different measures: a left-right scale and a progressive-conservative scale. Participants were asked to indicate on two 5-point Likert scales to self-identify as either political left or right and progressive versus conservative. High scores indicated far

[1] Different Facebook groups, Twitter, Survey Circle, eBay.

Figure 3

One of Six Experimental Conditions, Depicting the Inferential Task. Participants Were Asked to Read the Text as Well as the Numbers in the Table and Then to Indicate Which of the Statements Was Correct (Here Decrease). Statements Either Aligned With or Opposed Political Identities. to Create the Increase Condition, the Column Heads "Crime Rate Decrease" and "Crime Rate Increased" Were Swapped

Limited entry and crimes rates

Recently, a lot of controversy has risen from refugee intake and its effects on crime rates in German cities. Because opinions about this differ immensely, a large-scale study was conducted to find answers to this hypothesized correlation by the German Ministry for Migration. Refugee intake and crime rates for multiple communes within Germany have been measured. Among the communes, some have taken in a lot of refugees, whereas other have only accepted very few. The results of the study are stated in the table below. Although the two groups were not the same size, relative differences can still be detected.

	Crime rate decrease	Crime rate increase
Communes that took in many refugees	181	61
Communes that took in few refugees	87	17

Which indicate which of the following statements is correct:

- o The crime rate decreased in communes that took in many refugees.
- o The crime rate increased in communes that took in many refugees.

right and very conservative, respectively. Both measures were skewed toward the left and progressive side, which was found in German samples before (Bauer et al., 2017; $M = 2.43$, $SD = 0.75$). We joined both scales to one continuous political identity score, which proofed to show acceptable reliability (Cohen's $\alpha = .71$).

Independent and Moderator Variable: Cognitive Sophistication

To assess cognitive sophistication, we followed operationalizations of previous studies (e.g., Lind et al., 2018). We assessed individual abilities through two different measures: the Computer Adaptive Berlin Numeracy Test (BNT) developed by Cokely et al. (2012) and the cognitive reflection task (Frederick, 2005). Both measures were added to one overall cognitive sophistication measure (Cohen's $\alpha = .66$; see in Appendix Table A1 for all questions) with values ranging from zero to seven. Participants' mean cognitive sophistication was $M = 3.21$ ($SD = 1.98$).

Mediator Variables: Emotions

In addition to the independent variable *political identity*, we implemented three self-report measure of affective reactions, analog to affective intelligence theory (Marcus et al., 2000), which have previously been used (Weeks, 2015): anger (angry, outraged, disgusted; Cohen's $\alpha = .84$–$.93$), anxiety (afraid, anxious, nervous; Cohen's $\alpha = .84$–$.86$), and enthusiasm (enthusiastic, hopeful, proud; Cohen's $\alpha = .74$–$.89$). Affect judgments were given in percentages on a sliding scale from 0 (*not at all*) to 100 (*very much*), in whole integers.

Statistical Analysis

To account for the binary nature of the dependent variable, we conducted logistic regression analyses. In general, logistic regression estimates the probability of an outcome, in our case if participants answered correctly, via estimation of the log odds as a linear combination of the independent variables. Concerning levels of statistical significance, we followed the conventional alpha level of .05.

In the results section, we first entered cognitive sophistication, political identity as well as the control variables age, gender, and education into the regression model (Hypotheses 1 and 2). To account for the hypothesized moderation of cognitive sophistication, we included in a next step an interaction term of cognitive sophistication with political identity (Hypothesis 3). If the interaction coefficient is positive (negative) in the crime increase condition (crime decrease condition) and in the air quality decrease condition (air quality increase condition), Hypothesis 3 is supported

Finally, to assess the hypothesized mediating effects of anger, anxiety, and enthusiasm (H4), we used mediation analysis for binary-dependent variables according to Feingold et al. (2019) for all four politicized conditions. We used the PROCESS macro Version 3 (Hayes, 2017) for SPSS for all mediation models.

Results

An overview of the descriptive statistics of all variables can be found in Table 1 (dependent variables per scenario) and Table 2 (emotions per scenario). As described in the section *Statistical Analysis*, we performed binary logistic regressions for all six

Table 1
Descriptive Statistics of the Dependent Variable Task Performance Per Experimental Scenario

Dependent variable	*N*	*M*	*SD*
Rash increase	228	−0.05	1
Rash decrease	235	−0.03	1
Crime increase	225	−0.25	0.97
Crime decrease	238	−0.01	1
Air quality increase	242	0.52	0.85
Air quality decrease	221	0.18	0.98

scenarios (see Table 3 for numerical results and Figure A1 in the Appendix for a visual analysis).

Binary Logistic Regression for Nonpolarized Scenarios (Hypothesis 1)

As hypothesized in Hypothesis 1, cognitive sophistication was a significant predictor for the nonpolarized rash increase tasks, whereas the measure for political identity remained insignificant. However, in the second neutral tasks, the rash decrease condition, cognitive sophistication was not significant ($p = .057$). The positive regression coefficients for cognitive sophistication support the hypothesis that more numerate people were more likely to answer correctly (Hypothesis 1).

Binary Logistic Regression for Polarized Scenarios (Hypothesis 2)

When examining the politicized scenarios, the effects of cognitive sophistication were, as hypothesized (Hypothesis 2), mostly not significant. For the crime increase scenario, none of the suggested predictors reached significance. Instead, we noted that one of the control variables, gender, reached significance, indicating that men were more likely to answer correctly than women. Nonetheless, in the crime decrease scenario, political identity reached significance which was hypothesized (Hypothesis 2). The negative regression coefficient indicated that people who self-identified as left and progressive were more likely to answer correctly, supporting the identity-protection hypothesis. Interestingly, for one of the driving ban scenarios, cognitive sophistication was a significant predictor. Again, the positive regression coefficient indicates that with increased cognitive sophistication, individuals became more likely to answer correctly, as was expected for the neutral rash conditions. Nagelkerke's R^2 for all six models was between .044 and .098, which implied that the models could explain 4.5%–10% of the variance of our dependent variable, the response.

Table 2
Descriptive Statistics of All Emotion Scores Per Experimental Scenario

Scenario	Emotion	*N*	*M*	*SD*
Rash increase	Anger	226	17.71	22.41
	Anxiety	225	15.55	20.09
	Enthusiasm	223	18.16	21.48
Rash decrease	Anger	234	20.53	23.95
	Anxiety	234	16.29	20.93
	Enthusiasm	234	17.15	22.46
Crime increase	Anger	222	14.55	19.92
	Anxiety	220	16.89	20.85
	Enthusiasm	223	29.02	25.49
Crime decrease	Anger	234	20.53	23.95
	Anxiety	238	19.98	23.02
	Enthusiasm	237	20.57	22.37
Air quality increase	Anger	240	22.49	25.41
	Anxiety	242	14.85	18.99
	Enthusiasm	242	22.6	21.15
Air quality decrease	Anger	218	22.49	25.41
	Anxiety	216	20.53	22.28
	Enthusiasm	217	18.21	22.54

Moderation Analysis for Cognitive Sophistication (Hypothesis 3)

In the next step, we included an interaction term of cognitive sophistication and political identity in each model. Our results partly supported the hypothesis (Hypothesis 3). The interaction became significant only in the crime decrease condition ($b = -.24$, $p = .015$) but not in the crime increase and both Diesel ban conditions (see in Appendix Table A2 for regression coefficients). The nonsignificant results indicated that cognitive sophistication did not increase or decrease identity-protection cognition. The significant interaction of cognitive sophistication and political identity for the crime decrease condition supported Hypothesis 3, suggesting that cognitive sophistication decreases identity-protection cognition. Entering cognitive sophistication as a moderator revoked, however, the previously found effect of political identity in the crime decrease condition.

Mediation Effects of Anger, Anxiety and Enthusiasm

We hypothesized that the relationship between political identity and task performance is mediated by experienced anger, anxiety, and enthusiasm. As the results of the previous binary logistic regression analyses conveyed, we already knew that political identity and task performance are only associated in the case of crime decrease. We, therefore, focused on possible indirect effects of emotional experiences.

Results of the binary logistic regression analysis were generally confirmed. Political identity was only associated with the task performance in the crime decrease condition: participants with relatively left attitudes were more likely to correctly respond which supports the identity protection hypothesis. The respective relevant path coefficients per condition are displayed in Figure 4, while the respective results by emotion are reported in the next sections.

Anger

For the conditions of crime increase and air quality increase, political identity was a significant predictor for anger, whereas political identity and anger were not associated with the crime decrease condition and air quality decrease. Anger was a significant predictor for task performance only in the crime increase condition (see Figure 4a). We tested the significance of this effect using bootstrapping procedures, computing 5,000 bootstrapped samples with a confidence interval of 95%. The unstandardized indirect

Table 3
Regression Coefficients of the Logistic Regressions (Controlled for Age, Gender, and Education)

	Rash condition		Refugee intake		Diesel ban	
Predictor Variables	Increase	Decrease	Increase	Decrease	Increase	Decrease
Cognitive sophistication	0.21**	0.13+	0.05	−0.02	0.17*	0.12
Political identity	0.07	−0.08	0.21	−0.57**	−0.07	−0.26
Gender	0.65*	−0.19	0.9**	0.1	−0.06	−0.07
Nagelkerke's R^2	0.1	0.05	0.08	0.06	0.05	0.04

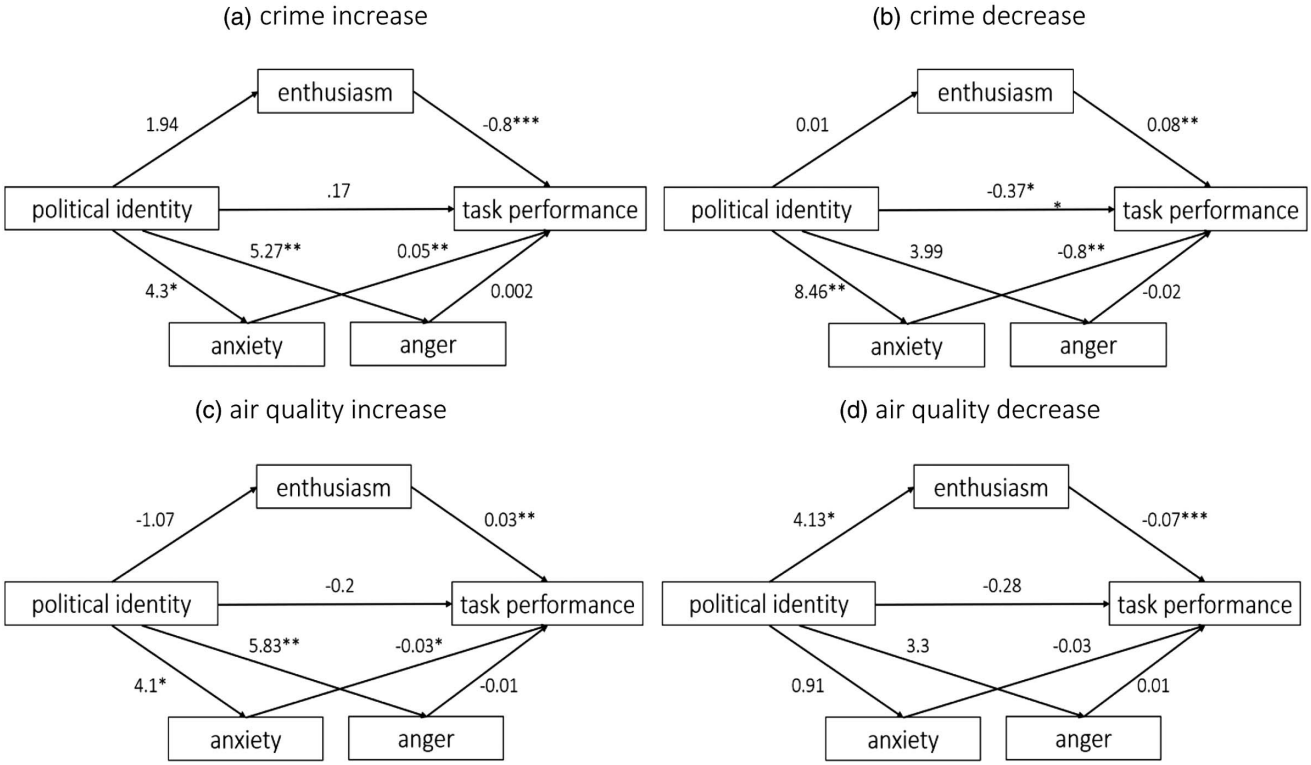
+ $p = .057$. * $p < .05$. ** $p < .01$. *** $p < .001$.

effect coefficient of anger was .19 with a 95% confidence interval ranging from −.01 to .52 (note, since the dependent variable response is binary, the metric of all effects is log-odds). Thus, the indirect effect of anger on the response was not significant, and the mediation hypothesis for anger was in no condition confirmed.

Anxiety

The picture for the experienced emotion anxiety was slightly different. Except for the air quality decrease condition, political identity was always a significant predictor for anxiety (see Figure 4d). In all conditions, anxiety was also a significant predictor for task performance, mainly indicating a negative relationship which implied that feelings of anxiety associated with political identity were detrimental to the correct responding behavior. In order to gauge the significance of the indirect effects of anxiety, we used bootstrapping procedures for the respective cases. The unstandardized indirect effect coefficient of anxiety in both the crime increase and air quality increase condition was, however, not significant (crime increase = .21, CI [−.04, .6]; air quality increase = −.13, CI [−.38, .02]). In contrast to that, we found that for the crime decrease condition, the indirect effect of anxiety was significant (−.69, CI [−2.13, −.17]; see Figure 4b). The mediation hypothesis of anxiety must broadly be declined, apart from one condition: In the crime decrease condition, we found an indirect-only mediation of anxiety. This conveys that individuals, identifying with the political right, experienced higher levels of anxiety which, in turn, deteriorated task performance.

Figure 4
Mediation Analysis With Relevant Path Coefficients for the (a) Crime Increase Condition, (b) Crime Decrease Condition, (c) Air Quality Increase Condition, and (d) Air Quality Decrease Condition



Note. Significant path coefficients are marked as followed: * $p < .05$. ** $p < .01$. *** $p < .001$.

Enthusiasm

Political identity was generally not a predictor for feelings of enthusiasm except for the condition air quality decrease (see Figure 4d), whereas enthusiasm significantly predicted task performance throughout all conditions. Considering a possible mediation, we, therefore, looked only into the condition of air quality decrease. We found that the unstandardized, indirect effect of enthusiasm was significant, −.28, CI [−.72, −.01], supporting an indirect-only mediation. Individuals from the political right experienced higher levels of enthusiasm which, in turn, deteriorated responses.

Discussion

In this study, we investigated the role of emotions in identity-protection cognition to understand how people draw inferences from politicized information. To do so, we relied on insights from motivated reasoning theories in social psychology and political science as well as advances in emotion research. Our central hypothesis assumed that the relationship between an individual's political identity and inference conclusions of politicized information is mediated by the experienced emotions anger, anxiety, and enthusiasm. To assess this, we first hypothesized that inferring conclusions from nonpoliticized information are driven by an individual's cognitive sophistication skills, whereas inferences about politicized information are driven by individual's political identity (identity-protection cognition hypothesis). In addition, we hypothesized that the relationship between an individual's political identity and the inference conclusion for politicized information is moderated by cognitive sophistication. We operationalized our hypotheses thematically in the field of refugee intake and driving bans for Diesel cars, both of which were highly politicized topics in Germany at the time of data collection.

Upon data analysis, we found only partial support for our hypotheses. Logistic regression analyses revealed that political identity did not predict task performance in three politicized conditions (Hypothesis 1), except one (crime decrease). Our data support IPC, therefore, only in the case of crime decrease. Overall, our results indicate that there is no bias related to opposing political identities. However, adding cognitive sophistication in the crime decrease condition as a moderator revoked this effect. The biasing effect of political identity was successfully moderated by individuals' cognitive ability, as we hypothesized (Hypothesis 3) and aligns with previous findings (Pennycook & Rand, 2019; Tappin et al., 2020). Concludingly, neither the political identity nor cognitive sophistication in isolation seemed to fully explain our data but rather the interaction of both.

Concerning our main research question, to investigate the role of emotions in identity-protection cognition, results were clearer, although not as predicted. Mediation analyses revealed that, whereas political identity was mostly neither associated with anger nor enthusiasm, we found a significant association of political identity and anxiety (see Figure 4b) which indirectly mediated the association of political identity and task performance. Mediation analyses also revealed that, unlike political identity and cognitive sophistication (as discussed above), emotional responses were related to task performance. In our data, we found that, other than expected, political identity did not predict identity-protection cognition but that, instead, emotional reactions determined responses. These findings are in line with previous studies. Slovic et al. (2007) argued that people use their emotional responses as heuristics when tasks are complex, as can be found, for example, in evaluative priming (Hofmann et al., 2010). Results by Lind et al. (2018) indicated that individuals with higher numeric abilities (which we refer to as cognitive sophistication) showed less identity-protection cognition, arguing, in turn, that identity-protection cognition is more likely to be driven by emotions. Recent findings on fake and genuine news differentiation further support this argumentation. It was found that participants, when encouraged to rely on their intuition and gut feelings, were less likely to differentiate real from fake news (Martel et al., 2019). Because we did not find that emotions were consistently related to political identities, we assume that elicitation was somehow the result of political identities as well as the task content. This could have only been avoided if emotions were exogenously induced, as has been done before (Weeks, 2015), to a loss of external validity.

Limitations

There are several potential limitations to our study. First, the inconsistent relation of political identity and emotional reactions could be explained by a weaker association of self-identity and political identity. Although we tested how strongly political identities related to the selected topics (refugee intake and ban of diesel cars), the mere self-reported identification on a political spectrum might have reflected actual identification less well, especially considering the facetted nature of a multiparty system such as Germany. This might also explain why we found no relationship between political identities in the Diesel Ban scenario. While people may have held strong beliefs, these were not necessarily bound to a specific political identity but were rather associated with contextual factors that influenced an individuals' attitude (e.g., living in the countryside and being dependent on a car). Future studies could incorporate an identity scale like the four-item self-report measure, developed and tested by Bankert et al. (2017) or assess actual ego-involvement (see also Carpenter, 2019), to not only assess identification through a more direct measure but also accommodate for identity intensity.

Second, we want to remind the reader that our analyses rely on convenience sampling. We found that our sample was younger, more female, and more educated than a representative German sample, making it less clear how these findings generalize. However, the theoretical considerations and implications remain valid, despite missing representativeness. From a methodological view, we also want to point out that we followed the conventional standard to not correct for multiple testing. However, we are aware that calculating six regression analyses increases the chance for alpha error cumulation.

Third, it is theoretically unclear when identity threat evokes anger and when anxiety. It was previously found that a perceived violation of an individual's standards elicited anger (Carver & Harmon-Jones, 2009), whereas the latter is generally associated with a lack of personal control and uncertainty (Eysenck et al., 2007). Empirical findings are, however, mixed. While our results indicate a stronger association between political identity and anxiety, others have found anger to be strongly associated with prior opinions (Suhay & Erisen, 2018). Future studies could investigate if these differences are

merely measurement artifacts (identity measure versus opinion measure) or represent actual underlying psychological differences.

Fourth, we suggest that future studies could accommodate a cognitive psychological perspective on processing conflicting information. If we argue that identity threat is evoked, we assume that information inconsistent with one's own believes has been processed. This cognitive conflict should result into slower reaction times for stimuli that are inconsistent with prior-opinion which has been, for example, found in the Stroop task or the Simon task (Simon & Berbaum, 1990).

Implications for Misinformation Research in Social Media

Differentiating true from fake material online, and especially on social media, has become one of the greatest challenges in today's information society. Flagging and correcting misinformation (Flynn et al., 2017) for users is one way to reach accurate beliefs but has also shown to create new challenges such as *implied truth effects* where unchecked misinformation is considered validated (Pennycook et al., 2019). The ability to draw correct inferences from presented information is, hence, central to the constitution of accurate beliefs. Previous studies on misinformation have also shown that emotions are central to the language of misinformation (Bakir & McStay, 2018), its acceptance (Zollo et al., 2015), its spread (Vosoughi, Roy, & Aral, 2018), and its likelihood to be shared (Brady et al., 2017). Our study adds to this literature that emotional reactions indeed guide inferences, showing that not only identity-threatening information per se (as has been shown before: Kahan et al., 2017) but also identity-induced emotional reactions contribute to inaccurate inferences. To include these emotional reactions has already been addressed within the media literacy literature. For example, Sivek (2018) suggests mindfulness techniques to answer the palpable influence of emotion by, first, raising awareness of news exposure and, second, raising awareness for emotional responses. This relates to some degree to research on mood misattribution where individuals erroneously incorporated unrelated, incidental emotions into their judgments (Schwarz & Clore, 1983).

Considering the role of social media platforms in the proliferation of misinformation, applied research could investigate, for example, which information processing style might be more dominant when reading news on social media. Do contextual cues of social media feeds induce heuristic-driven information processing compared to traditional online news media? This would connect to phenomena like incidental news exposure (Kaiser et al., 2018) which describes the unintentional exposure to news via a user's social media feed and is driven by heuristics decision processes concerning news selection (Marewski et al., 2009).

General Conclusion

In this study, we investigated the role of emotions in motivated reasoning to understand how people draw inferences from politicized information. With increased misinformation dissemination, the skill to draw accurate inferences about politicized information has become more and more critical. From a psychological perspective, it is critical to understand the underlying cognitive and emotional processes of misinformation acceptance to advise policy making in the best possible way. Our results align with previous findings on the role of cognitive sophistication, which can be considered a protection factor to decrease the likelihood of falling for misinformation. We did not find, however, consistent support for identity-protection cognition. More strikingly, our findings show that emotional processes, only partially related to political identity, drive the inferential processes.

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Appendix

Table A1

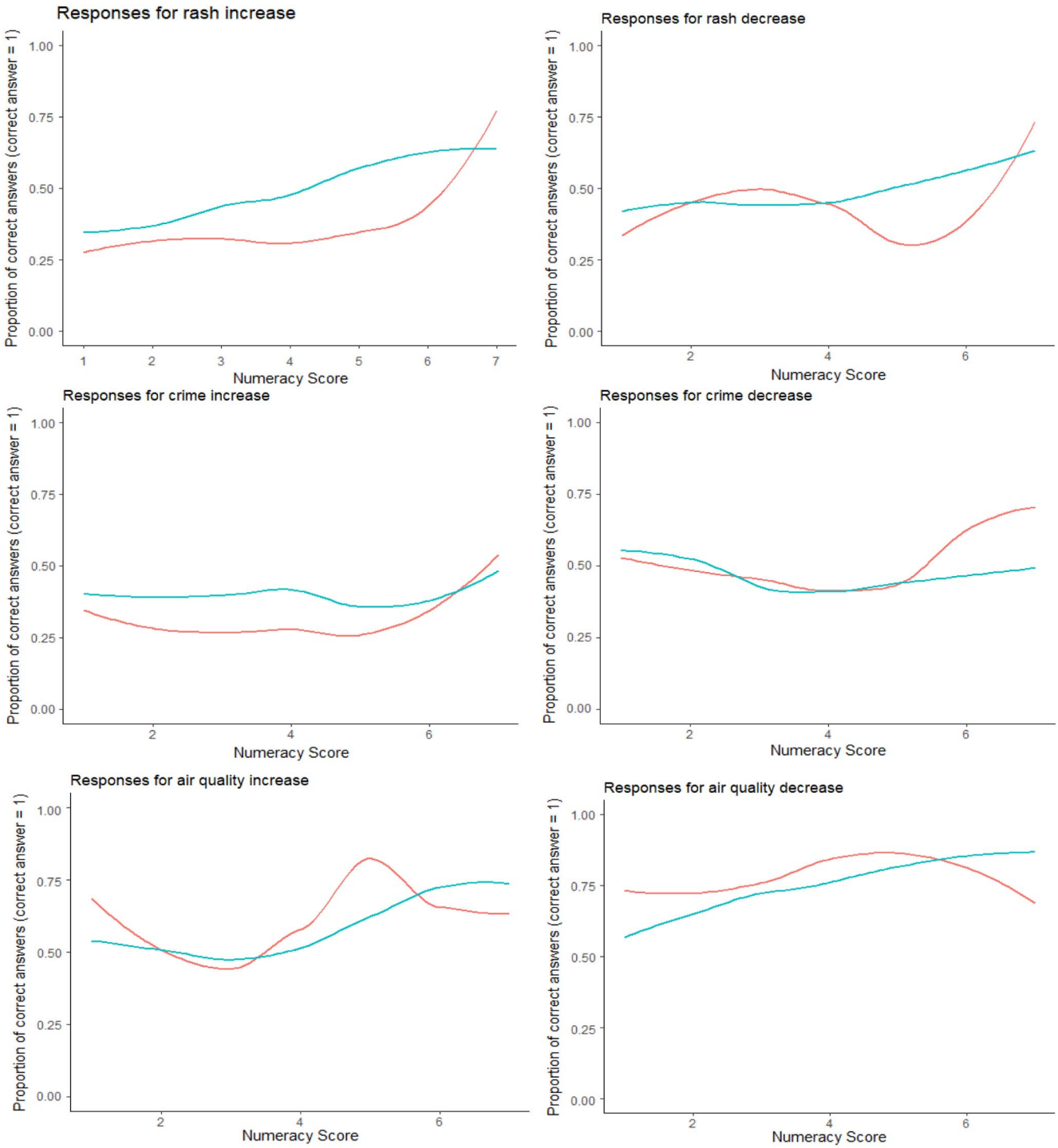
Questions of the Computer Adaptive Berlin Numeracy Test and Cognitive Reflection Test, Used to Assess an Overall Cognitive Sophistication Score

Questionnaire	Question	Correct answer
Computer adaptive berlin numeracy test	Out of 1,000 people in a small town 500 are members of a choir. Out of these 500 members in the choir 100 are men. Out of the 500 inhabitants that are not in the choir 300 are men. What is the probability that a randomly drawn man is a member of the choir? Please indicate the probability in percent.	25%
	Imagine we are throwing a five-sided die 50 times. On average, out of these 50 throws how many times would this five-sided die show an odd number (1, 3, or 5)?	30 out of 50
	Imagine we are throwing a loaded die (6 sides). The probability that the die shows a 6 is twice as high as the probability of each of the other numbers. On average, out of these 70 throws how many times would the die show the number 6?	20 out of 70 throws
	In a forest 20% of mushrooms are red, 50% brown, and 30% white. A red mushroom is poisonous with a probability of 20%. A mushroom that is not red is poisonous with a probability of 5%. What is the probability that a poisonous mushroom in the forest is red?	50%
Cognitive reflection test	A bat and a ball cost 1,10€ in total. The bat costs 1,00€ more than the ball. How much does the ball cost?	0,05 €
	If it takes 5 machines 5 min to make 5 widgets, how long would it take 100 machines to make 100 widgets?	5 min
	In a lake, there is a patch of lily pads. Every day, the patch doubles in size. If it takes 48 days for the patch to cover the entire lake, how long would it take for the patch to cover half of the lake?	47 days

(*Appendix continues*)

Figure A1

Graphic Analysis of Each Task, Illustrating Task Performance by Cognitive Sophistication (Numeracy Score)



Note. Red Lines Indicate People From the Political Left, Whereas Blue Lines Indicate People From the Political Right.

(*Appendix continues*)

Table A2

*Binary Logistic Regression Results for All Six Conditions, Including the Interaction Term Cognitive Sophistication*ideology*

Predictor Variables	Rash condition		Crime condition		Driving ban condition	
	Increase	Decrease	Increase	Decrease	Increase	Decrease
Cognitive sophistication	0.16	0.1	−0.02	−0.13	0.31**	0.13
Political identity	0.31	0.12	0.56	0.16	−0.83	−0.29
Cognitive sophistication*political identity	0.47	−0.07	−0.1	−0.24*	0.248	0.01
Gender	0.66*	0.2	0.94**	0.12	−0.01	−0.07
Nagelkerke's R^2	0.10	0.05	0.08	0.09	0.08	0.04

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