

ARTICLE

Political orientation, trust and discriminatory beliefs during the COVID-19 pandemic: Longitudinal evidence from the United Kingdom

Michal Frackowiak^{1,2}  | Pascale Sophie Russell³ | Patrice Rusconi⁴ | Fabio Fasoli³ | Smadar Cohen-Chen⁵

¹Institute of Psychology, Faculty of Social and Political Sciences, University of Lausanne, Lausanne, Switzerland

²imec-mict-UGent, Department of Communication Sciences, Ghent University, Ghent, Belgium

³School of Psychology, Faculty of Health and Medical Sciences, University of Surrey, Guildford, UK

⁴Department of Cognitive Sciences, Psychology, Education and Cultural Studies, University of Messina, Messina, Italy

⁵Business School, University of Sussex, Brighton, UK

Correspondence

Michal Frackowiak, University of Lausanne, Lausanne 1015, Switzerland.
Email: michal.frackowiak@unil.ch

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Abstract

The COVID-19 pandemic has impacted the world in many ways; for example, evidence from the United Kingdom indicates that higher rates of discriminatory behaviours against immigrants have been recorded during this period. Prior research suggests that political orientation and trust are instrumental in discriminatory beliefs against immigrants. A longitudinal study (six waves and a follow-up) was conducted in the United Kingdom during the COVID-19 pandemic (September 2020–August 2021) using convenience sampling ($N = 383$). The hypotheses enquired about whether political orientation predicts trust in government, trust in science and discriminatory beliefs. Multilevel regression and mediation analyses were conducted, using repeated measures nested within individuals. It was found that conservative views are associated with higher discriminatory beliefs, lower trust in science and higher trust in government. Furthermore, trust in science promotes reduction of discrimination, whereas trust in government, increases discriminatory beliefs. However, a nuance revealed by an interaction effect, shows that a positive alignment between political and scientific authorities may be required to reduce prejudice against immigrants. Exploratory multilevel mediation showed that trust is a mediator between political orientation and discriminatory beliefs.

KEYWORDS

conservative, COVID-19, discriminatory beliefs, political orientation, UK government

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INTRODUCTION

Immigration and attitudes towards immigrants are decisive topics in the United Kingdom (Blinder & Richards, 2020). Discrimination refers to unfair treatment of an individual or a group of people based on a series of characteristics, which can span from an initial favouritism for one's own group to aggression and overt derogation of another group (Hewstone et al., 2002). Reports show that discriminatory behaviours against non-UK citizens remain prominent (Di Stasio & Heath, 2019) and that the UK-based immigrant population may experience discrimination on grounds such as ethnicity, foreign background, accent or non-recognized qualifications (Fernandez-Reino, 2020). Research has also reported that the experience and expectation of group discrimination for immigrants in the United Kingdom can have detrimental effects on their wellbeing (Frost, 2020; Guma & Dafydd Jones, 2019), thus, it is important to consider what factors reinforce discriminatory beliefs in the United Kingdom. The COVID-19 pandemic, being the major global health crisis in recent years, is a relevant and unique context for studying psychological mechanisms related to discriminatory beliefs, trust and political orientation. Due to the importance of public trust in science and in government (Cheung & Tse, 2008; Chuang et al., 2015; Prati et al., 2011) in times of crisis, we assume that both may contribute to the level of discriminatory beliefs against immigrants, in conjunction with political orientation. In this study, we focus predominantly on those variables.

Broadly, political orientation has been found to predict prejudicial and discriminatory beliefs towards immigrants: right-wing supporters have been *traditionally* linked to higher prejudice beliefs (for a review, see Crawford & Brandt, 2020; Hodson & Dhont, 2015), whereas support for left-wing politicians predicts support for pro-immigration policies (Macdonald, 2021). In the United Kingdom, conservatives tend to be less supportive of immigration policies and report more discriminatory beliefs (Meleady et al., 2017). Contextual factors are also likely to impact discriminatory beliefs and behaviours towards immigrants. For example, during the COVID-19 pandemic, a surge in discriminatory behaviours against immigrants has been observed in the United Kingdom (Gutierrez et al., 2022; Ransing et al., 2020). The COVID-19 pandemic, being a global health crisis, engendered uncertainty and a subjective sense of loss of control (Davies et al., 2021). A lack of individual locus of control (e.g. having influence over events and plans in one's own life; Galvin et al., 2018) has been found to be related to hostility towards immigrants (Harell et al., 2017). It is, therefore, not surprising that, during uncertain times, immigrants are often portrayed as posing a threat: They are portrayed and perceived as spreading infectious diseases, endorsing radical beliefs or coming to 'steal' others' jobs (Esses et al., 2013). Thus, a time of subjective loss of control in societies coupled with anxiety and fear for oneself and one's loved ones, such as the one brought about by the COVID-19 pandemic, could have set a facilitatory ground for people's negative attitudes towards immigrants.

In such a context, people could rely on two main sources to tackle the pandemic, namely the government and/or science, with these sources informing us on how to behave and deal with the virus (see Ayalon, 2021). Trust in government and science can depend on political views and ideologies, and in relation to COVID-19, it may influence the perception of migrants as a threat and encourage negative attitudes towards them. Accordingly, it is possible that beliefs about trust in science and trust in government in handling the novel situation of the COVID-19 pandemic, can influence the association between political orientation and discriminatory immigration beliefs. In this study, we investigated whether trust in government and trust in science impacted the association between political orientation and discriminatory beliefs towards immigrants during the COVID-19 pandemic. Although the link between political orientation, political trust and pro- versus anti-immigration beliefs is well-known (Macdonald, 2021), it has been argued that both conservatives and liberals can express prejudice towards individuals and groups holding a different worldview and dissimilar values (Brandt & Crawford, 2020; Crawford & Brandt, 2020). Furthermore, less is known about the specific explanatory mechanisms underlying the relationship between political orientation and discriminatory beliefs and whether and how it changes over time especially in a highly uncertain and threatening context (Brandt & Crawford, 2020), such as the one brought about by the COVID-19 pandemic. We thus aimed to examine these issues.

The role of political orientation within the COVID-19 context

Political orientation may allow us to understand the nature of discriminatory beliefs against immigrants. For example, according to the traditional view, conservatism has typically been associated with prejudice and discrimination (for a review, see Crawford & Brandt, 2020; Hodson & Dhont, 2015). Research has found that structural factors such as state policies and media representations, may promote prejudiced attitudes towards immigrants (Jost et al., 2008; Phalet et al., 2015). Since ‘the left’ political orientation has been linked to pro-diversity policies, which have been found to reduce prejudicial beliefs towards migrant groups (Guimond et al., 2013), it is reasonable to assume that our understanding of the association between a conservative political orientation with discriminatory beliefs against immigrants may be impacted by the COVID-19 pandemic context, visibly characterized by people’s need for control (Davies et al., 2021).

Incidents related to the anti-immigration sentiments were widely reported during the COVID-19 pandemic (Nature, 2020). Research has focused on immigrant experiences and associated increase in discrimination with political leadership in the United States during this time, which promoted allowance for direct verbal discrimination (e.g. when Donald Trump referred to COVID-19 as the ‘Chinese virus’; Devakumar et al., 2020). The UK evidence, though limited, shows similar results, that is, increased discrimination during this period (Parveen & Sherwood, 2016; Vacchini et al., 2021). For example, Yen et al. (2021) reported perceived increased intensity of discriminatory behaviours among UK-based immigrants. Similarly, Rowe et al. (2021) reported strong polarization of highly negative and positive responses against or for immigrants as an implication of the pandemic, indicating prominence of the problem in the UK context.

Findings also provide information on how the anti-immigrants sentiments can be explained by political orientation. Vacchini et al. (2021) found that nationality-based discrimination motivated by COVID-19 fear was not perceived as immoral by the participants. This kind of discrimination is linked to the perception of an infectious disease spread and protection from outgroup members, a stance facilitated by a conservative value system (Elad-Strenger et al., 2020; Pazhoohi & Kingstone, 2021). In this research, we examine two possible mechanisms, that is, political orientation and trust in government/science, which may help us understand what may promote or reduce the discriminatory beliefs against immigrants in the UK context, influenced by the COVID-19 pandemic and its management by the government.

Why is trust important during the pandemic and is it political?

The relationship between political orientation and discriminatory beliefs against immigrants may be influenced by other variables, for example trust. One category of trust which may be impactful and important, is one’s trust in government. Trust in government has been previously discussed in the context of the COVID-19 pandemic and it has been deemed relevant in exploring how to minimize the spread of the virus, in particular considering when government advice related to preventive behaviours is aligned with scientists (Algan et al., 2021). Indeed, high trust in the government was associated with an awareness of COVID-19 as a problem that increased preventive behaviours (Shanka & Menebo, 2022). Furthermore, cross-cultural research conducted at the beginning of the pandemic revealed that trust in government is a relevant indicator of prosocial behaviours (Han et al., 2023). Since prosocial behaviour is antithetical to discrimination, it seems relevant to explore whether and how trust in government is associated with discriminatory beliefs specifically.

Trust in government during the COVID-19 pandemic has been examined in the context of discrimination against immigrants. For instance, in Italy, political mistrust and right-wing authoritarianism were associated with prejudice towards immigrants at the beginning of the pandemic, and the effect of right-wing authoritarianism on attitudes was explained by COVID-19 anxiety (Pacilli et al., 2022; see also Ahmed et al., 2021). Moreover, Pazhoohi and Kingstone (2021) found significant positive associations

between right-wing political orientation and trust in government for COVID-19, xenophobia and right-wing authoritarianism, in the USA. On the other hand, Macdonald (2021) found that low political trust can diminish immigration support, for both Democrats and Republicans. Note, however, that support for the government may not necessarily depend on political identity (Cohen-Chen et al., 2019; Fried & Harris, 2021; Friedman, 2017).

Despite the initial evidence showing an association between political orientation, trust in government and prejudice towards immigrants, these studies only looked at one point in time. These perspectives do not necessarily agree on the relationship between those variables, though (see findings by Macdonald, 2021; Pazhoohi & Kingstone, 2021). Nonetheless, COVID-19 had different phases and government handling did impact on political-related beliefs (see Roccato et al., 2021). Hence, it is important to look at the relationship between trust in government and discriminatory beliefs against immigrants across time. Trust towards the government may vary across time due to the government's response (see Groeniger et al., 2021). For instance, this may be linked to uncertainty whether the government discloses all the relevant information regarding the risk assessment (Douglas, 2001). In the COVID-19 context, uncertainty reduction measures in the form of the transparency dimensions disclosure and accuracy, as well as social influence and trust in government, foster the adoption process to the COVID-19 testing (Oldeweme et al., 2021). Such an exploration would aid in detecting *between- and within-person effects*, which would deepen our knowledge on the subject, and explain theoretical nuances (Hamaker, 2012). To our best knowledge, such associations have not been explored in the British population. Boris Johnson, the British Prime Minister at the time of the pandemic peak and a representative of the political party Conservatives, attracted a lot of criticism for his poor handling of the pandemic by both supporters and opponents (Paton, 2022). The British government was also scrutinized for not following WHO's advice regarding testing and tracing (Pollock et al., 2020). The governmental actions may, therefore, contribute not only to changes in trust (Clarke & Newman, 2017; Davies et al., 2021; Fancourt et al., 2020), but also to a shift in political orientation. Therefore, it is relevant to test the long-term association between self-reported political orientation and trust in government in the UK context.

Another variable to consider is trust in science. Research has shown that trust in science has been a deciding factor in adherence to preventive measures (Algan et al., 2021; Pagliaro et al., 2021). However, scholars have argued that it is one's political identity that determines the extent to which individuals hold trust in scientific evidence, rather than the quality of the evidence (National Academies of Sciences, Engineering, and Medicine, 2015). Findings have been inconsistent in whether political conservatism or liberalism is associated with higher trust in science (Mooney, 2007; Nisbet et al., 2015). However, McCright et al. (2013) found that trust in science is higher in liberals than conservatives when the scientific evidence regards health or the environment, while conservatives exhibited higher trust than liberals when the evidence concerned greater economic productivity. This finding is relevant in the current context, in that trust in science may be higher for liberals due to the COVID-19 pandemic being a health concern. In this regard, Agle (2020) suggested that during the COVID-19 pandemic conservative political beliefs were negatively associated with trust in science among USA-based participants. Interestingly, while liberal participants showed a decrease in trust in science over the COVID-19 pandemic, conservative participants' trust in science increased (Agle, 2020). In Germany, trust in science increased as a consequence of COVID-19, and the decline of trust at later stages was associated with factors such as conservative and populist political beliefs (see Bromme et al., 2022).

Importantly, trust in science may also be related to perceptions of immigration policies. For instance, distrust in clinicians and practitioners has been associated with support for reducing immigration in the United States (Samson, 2016). Several studies also indicated that people higher on generalized trust reported more positive attitudes towards immigration policies (Macdonald, 2021; Sipinen et al., 2020; van der Linden et al., 2017). Trust in science has increased during COVID-19 and has helped individuals cope with anxiety and uncertainty (Luna et al., 2021; Rebughini, 2021). It is, therefore, possible that trust in science may reduce the fear of threat from the immigrants and, hence, trust in science may be associated with positive attitudes towards migrants.

Indeed, people may vary in their trust towards science and government, or both, creating dynamic individual profiles that may predict beliefs and behaviours (see Ayalon, 2021). Research conducted during the pandemic shows that levels of trust in government and science do not necessarily overlap and may even take opposite directions. For instance, Ipsos MRBI's Veracity Index for 2021 revealed high levels of trust in scientists and health care providers (over 80%), and very low trust in government ministers, politicians and global leaders (40% and below; IPSOS, 2021). In fact, the British Academy (2021) identified long-term societal impacts of the pandemic. In the report, it was argued that whilst the awareness of the importance of mental health surged, trust in government was identified as 'low and unstable'. What's more, Bicchieri et al. (2021), tested the relationship between normative expectations and compliance likelihood across nine countries during the pandemic, and found diverging effects of trust in science and trust in government, those of the former being stronger. Also, previous political and psychological research found 'trust' to be a significant mediator between the predictor and the outcome (Balliet et al., 2018; Capasso et al., 2022; Erhardt et al., 2021; Seijts et al., 2021). For example, Plohl and Musil (2021) reported trust in science to be a mediator between political conservatism and compliance with COVID-19 guidelines. Thus, trust in government and science are examined separately in this research as exploratory explanations of the relationship between political orientation and discriminatory beliefs.

The present study

The present study uses the data from a larger longitudinal study conducted during the COVID-19 pandemic (September 2020–August 2021). The study involved an experimental manipulation (Russell et al., 2023) that is not central to the current hypotheses and variables of interest.¹ The timeframe of this study involved key societal events and restrictions that may have influenced British participants' perceptions and attitudes related to COVID-19, for example the introduction of the rule of six or national lockdowns (see the Institute for Government analysis/summary of events, 2021). It is also relevant to consider the longitudinal nature of the trust variables, prone to fluctuations over time in the context of COVID-19 (Bromme et al., 2022; Davies et al., 2021; Kreps & Kriner, 2020). In particular, in the United Kingdom, political trust was generally low before the COVID-19 pandemic, at the time of the General Election in December 2019, when Brexit was salient (Davies et al., 2021). In line with a 'rally-round-the-flag' effect, there was a rise in trust at the time of the first lockdown and the following month (April 2020). There was then a gradual linear decline from May to October 2020 (Davies et al., 2021, see also Fancourt et al., 2020). This could have been motivated by a constant exposure to politicians' and academics' discourses during the pandemic or dynamically changing restrictions.

In the preliminary analyses, we aim to examine (1) the associations between levels of trust in science, trust in government and discriminatory beliefs during the COVID-19 pandemic in the United Kingdom and political orientation (Pazhoohi & Kingstone, 2021). Next, based on previous findings, we test the hypothesis that (2) discriminatory beliefs against immigrants are promoted by high trust in the conservative government and low trust in scientific advisers. This model includes an interaction term between the two levels of trust given that scientists' and government's recommendations might not always be aligned (Algan et al., 2021) and trust in science and government creates different individual profiles (see Agle, 2020). Finally, to understand how those mechanisms interplay, we posit an exploratory research question to analyse (3) if trust in government versus trust in science mediates the relationship between political orientation and discriminatory beliefs.

To account for the longitudinal design of the current study, we adopt an interpretative framework of *between-person differences* and *within-person processes* (Hamaker, 2012). It assumes that for each study variable, each participant will have a *constant value* and a series of *deviations*, resulting from *repeated measures nested within a person* (Bolger & Laurenceau, 2013). The former will define the between-person differences

¹ The initial manipulation check has shown that the scores in the analysed variables did not differ across experimental conditions. See [Preliminary analyses](#) in the Results section.

across participants, whilst the latter will facilitate understanding of within-person processes. The data aggregation on the two levels will directly inform the interpretation of the analyses, and therefore, the conclusion based on the study results.

In our study, we controlled for the *political orientation* of participants at each time point. Changing political landscape in the United Kingdom, along with the increased criticism of the prime minister Boris Johnson and the Conservatives over the conduct and ‘poor management’ of the pandemic and lockdowns (Paton, 2022), may have contributed not only to a shift in trust in the government's handling of the pandemic (Davies et al., 2021), but also to a shift in political identity. In the current study, *political orientation* is operationalized as a variable that may change based on the context (Morgan et al., 2014; Rosenfeld & Tomiyama, 2021). In line with the interpretative framework of *within-person processes*, this allows for a prediction of the outcome variable based on the political orientation score reported each month, rather than a single baseline value for each participant.

METHOD

Design

This study involved 7 time points (once a month for a period of 6 months and a 6-month follow-up), from September 2020 to August 2021. The time points were meant to explore the changes across a six-month period and then conduct a six-month follow-up to see if there is sustained change in perceptions. Participants also engaged in either a Hope, Gratitude or Neutral emotion-recall task; however, this experimental manipulation (hereafter called condition) is not central to the test the hypotheses of the current article, and it is the focus of another article (Russell et al., 2023), but condition is controlled for in our analyses.²

Participants

Based on the study pre-registration on Open Science Framework (OSF, https://osf.io/upb2h/?view_only=6eb16e9373c642f784254972f42b449c), G*Power (Faul et al., 2007) a-priori power analysis indicated that an adequate sample size would be 287 (assuming an effect size of 0.20, with a power of 0.85 and α of .05, performing MANOVA analysis, repeated measures, with between-within interactions). Due to the longitudinal design and assuming attrition rates we aimed to recruit 375 participants. A total of $N=383$ participants were included in the first time point (September 2020), whilst the follow-up (August 2021) counted $N=247$ participants. We recruited participants from Prolific (<https://prolific.co/>), and they were rewarded £2 at each time point. To take part in the research, participants had to be UK residents and they had not completed similar studies (see OSF pre-registration). Most participants were female (70.0%) and White (88.7%). Participants varied in age range ($M=36.9$, $SD=12.5$, 18–88). Most participants identified as British (98.3%) and had a university degree or higher qualification (63%).

Procedure and materials

Participants who were enrolled in the first time point were subsequently invited to the following monthly time points and the follow-up via Prolific. Participants were presented with an information sheet and consent form at each time point and were fully debriefed at the end of the final time point. Ethical approval for this study was obtained from the relevant University. Participants completed the following measures in the subsequent order. A full list of measures is available via the OSF pre-registration and in Appendix A.

² Additional information on the experimental procedure can be found on Open Science Framework (see [Participants](#) subsection).

Demographics

Participants first filled in the demographic variables: Age, gender, education, nationality, ethnicity and political orientation. Political orientation was measured by a single item at each time point (i.e. *How would you describe your political orientation?*) on a 7-point scale (1 = *Extremely conservative* to 7 = *Extremely liberal*; 4 corresponding to a centrist political orientation). We used a single item as this has been shown to have high predictive validity (Pazhoohi & Kingstone, 2021).

Trust in government versus science

Participants completed several items which assessed their trust in the government and scientific advisers, on a 7-point scale ranging from 1 (*Not at all*) to 7 (*Very Much*). The items were adapted from Cheung and Tse (2008), Krewski et al. (2008), Prati et al. (2011) and Vacchini et al. (2021). Five items measured trust in government (e.g. *How much do you trust the central government?*) and two items measured trust in scientific advisers (i.e. *How much do you trust scientific advisers?*; *At present, how confident are you in the scientific advisers?*).

A Confirmatory Factor Analysis (CFA) validating the trust measures (Boomsma et al., 2012), was computed using the lavaan package in R (Rosseel, 2012). The analysis was based on the first time point of the study (383 observations). The diagonally weighted least squares (DWLS) estimator was applied to differentiate the trust in government and trust in science measures. Model-to-data fit was evaluated based on indices of fit where CFI (Comparative Fit Index) and TLI (Tucker-Lewis Index) should be higher than 0.95, and RMSEA should be below the cut-off value of 0.08 (Bentler & Bonett, 1980; Browne & Cudeck, 1993). $\chi^2 = 43.44$, $df = 13$, $p < .001$, CFI = 0.98, TLI = 0.968, RMSEA = 0.078. The obtained coefficients indicated by the CFA indicate a good fit of the model based on the scale items (Jöreskog & Sörbom, 1993; Xia & Yang, 2018). Trust in Government had a moderate to high reliability on a within-person level ($R_c = .72$) and high on a between-person level ($R_{KF} = .99$); whereas Trust in Science had a high reliability on a within- ($R_c = .81$) and between-person level ($R_{KF} = .99$; Cranford et al., 2006).

Discriminatory beliefs against immigrants

Participants completed seven items assessing their discriminatory beliefs towards immigrants (e.g. *The NHS should charge immigrants more than what British people are charged*), adapted from Lima-Nunes et al. (2013). The construct was measured on a 7-point scale (1 = *Strongly disagree*, 7 = *Strongly agree*). A CFA validating the discriminatory beliefs measure (Boomsma et al., 2012), was computed using the lavaan package in R (Rosseel, 2012), using the first time point of the study (383 observations). The diagonally weighted least squares (DWLS) estimator was applied. The obtained coefficients indicated by the CFA indicate a satisfactory fit of the model based on the scale items (Jöreskog & Sörbom, 1993; Xia & Yang, 2018), $\chi^2 = 58.48$, $df = 14$, $p < .001$, CFI = 0.98, TLI = 0.97, RMSEA = 0.038. The reliability across the discrimination items was moderate to high within-participants ($R_c = .71$) and high between-participants ($R_{KF} = .99$; Cranford et al., 2006).

Data analysis strategy

In this study, we examined the association between political orientation and trust in science, trust in government and discriminatory beliefs against immigrants, what promotes and reduces the discriminatory beliefs, and explored what mediates those relationships. Due to the hierarchical structure of the long-format data, we applied a multilevel model (MLM) analysis to (a) use participants as a nesting variable and explore within- and between-person differences (Hamaker, 2012) and (b) to account for missing variables or drop-out and return of participants to the study, which is a strength of MLM (Bolger & Laurenceau, 2013). MLM in the present study uses a time-series model at Level 1 (*within-person processes*), where Level 2 allows the exploration of *between-person differences* (Hamaker & Wichers, 2017). Further

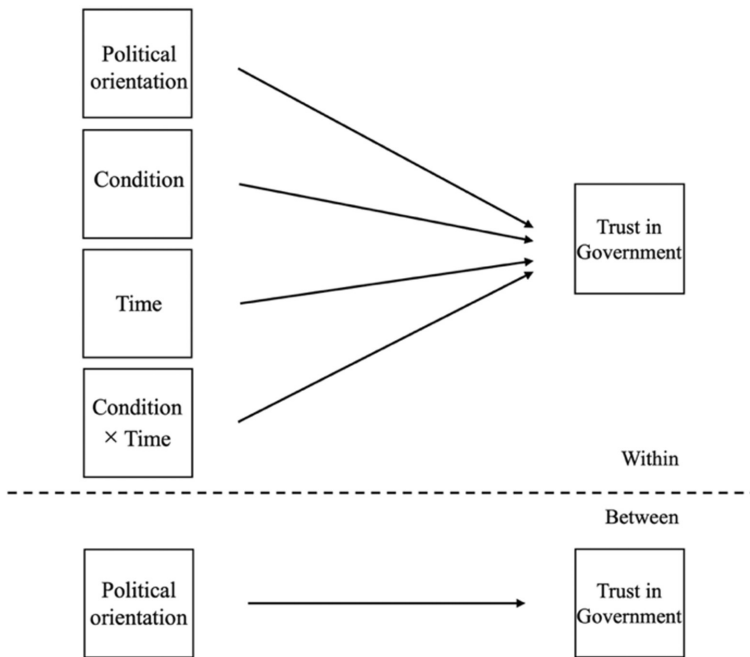


FIGURE 1 An example model testing H1.

checks have been made to assure that the sample size was sufficient to conduct MLM without the inflation of type II error (Hox & McNeish, 2020; Maas & Hox, 2005).

For preliminary analyses and our hypothesis, we used R version 3.6.3 (R Core Team, 2018), using the ‘lmer’ package (Bates et al., 2015). To control for convergence of the executed MLM, we optimized the models for the non-linear parameter estimation using box-constrained optimization ‘bobyqa’ from the ‘optimx’ package (Nash, 2014). The interaction plot was created using the ‘ggplot2’ package (Wickham, 2009). The exploratory multilevel parallel mediation analysis was executed using SPSS 27, package MLMed Macro (Hayes & Rockwood, 2020).

The predictor variables were disaggregated into between- and within-person components for the first two analyses (Hamaker & Muthén, 2020; Mundlak, 1978). The between-person component was calculated based on an overall grand mean of the person's average score of each predictor variable, for example political orientation ($\text{PoliticalOrientation}_{\text{between}}$). For the within-person component, we subtracted the between-person component (the uncentered individual score of each participant) from the monthly values of the variables (e.g. $\text{PoliticalOrientation}_{\text{within}}$). Due to the inclusion of the interaction term in our second analysis, the predictor variables on the between-person levels were centred.

For the preliminary analysis, which tests whether political orientation is linked to trust in government, trust in science and discriminatory beliefs, three models were built, all with the *political orientation* variable as a predictor on a between- and within-person level, and one of the three variables as dependent, each model being clustered by participants. Figure 1 represents how political orientation is associated with trust in government on both levels of analysis (visual models with coefficients are reported in Results). The equation below reflects this figure.

$$\begin{aligned} \text{Trust in Government}_{it} = & \gamma_{01} (\text{PoliticalOrientation}_{\text{between}}) + \\ & \gamma_{10} (\text{PoliticalOrientation}_{\text{within}}) \\ & + \text{Time} + \text{Condition} + \text{Time} \times \text{Condition} \\ & + \mu_{0i} + \mu_{1i} (\text{PoliticalOrientation}_{\text{within}}) + \varepsilon_{it} \end{aligned}$$

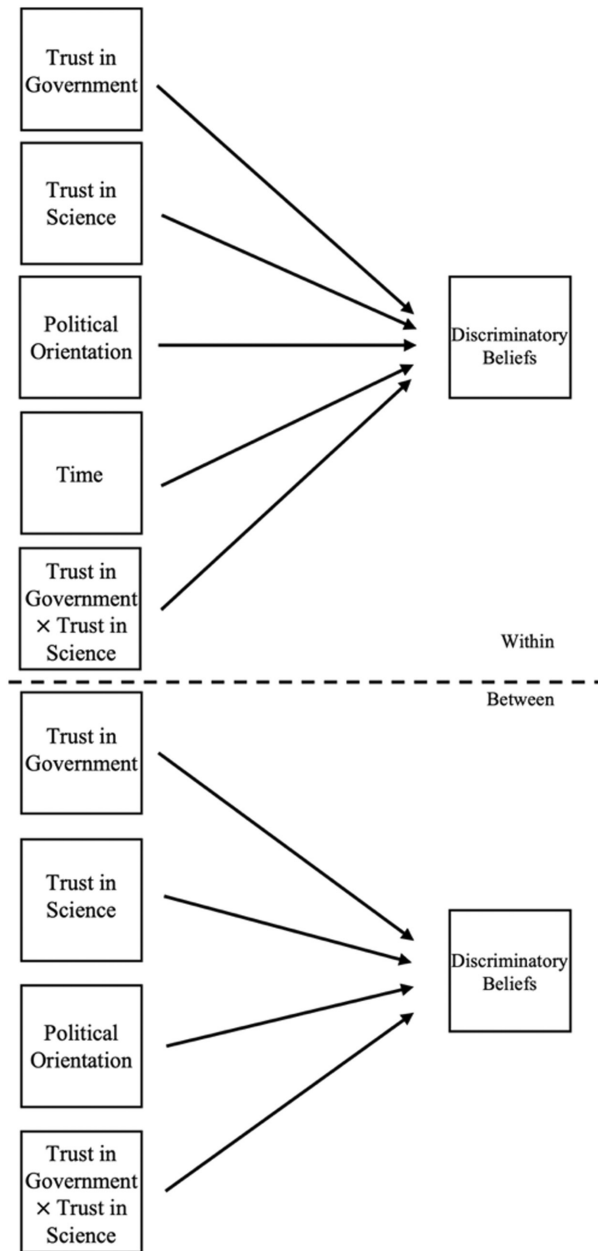


FIGURE 2 The model testing H2.

In the equation, i refers to an individual participant and t refers to a time point, whilst γ_{01} and γ_{10} index participant's political orientation on a *between-person* level and a *within-person* level, respectively. u_{0i} represents the random intercept, and u_{1i} represents the random slope for political orientation of participants. Finally, ε_{it} stands for the regression residual for participant i in the time point t .

The second model included *discriminatory beliefs* as a dependent variable, and trust in government, trust in scientific advisers and political orientation as predictors. To aid the exploration, we included an interaction between trust in government and trust in science on both levels (see equation and Figure 2; visual models with coefficients are reported in Results). The variable Condition was excluded from this

analysis, due to its non-significance in the manipulation checks (see Footnote 3). Figure 2 illustrates this model, and so does the following equation:

$$\begin{aligned} \text{Discrimination}_{it} = & \gamma_{01}(\text{Trust in Government}_{\text{between}}) + \gamma_{10}(\text{Trust in Government}_{\text{within}}) \\ & + \gamma_{02}(\text{Trust in Science}_{\text{between}}) + \gamma_{20}(\text{Trust in Science}_{\text{within}}) \\ & + \gamma_{03}(\text{Political Orientation}_{\text{between}}) + \gamma_{30}(\text{Political Orientation}_{\text{within}}) \\ & + \gamma_{04}(\text{Trust in Government}_{\text{between}} \times \text{Trust in Science}_{\text{between}}) \\ & + \gamma_{40}(\text{Trust in Government}_{\text{within}} \times \text{Trust in Science}_{\text{within}}) \\ & + \text{Time} + \mu_{0i} + \mu_{1i}(\text{Trust in Government}_{\text{within}}) \\ & + \mu_{2i}(\text{Trust in Science}_{\text{within}}) + \epsilon_{it} \end{aligned}$$

In this equation, i refers to an individual participant and t refers to a time point in the study timeline, whilst γ_{01} , γ_{02} and γ_{03} refer to the following variables on a *between-person* level: trust in government, trust in science, political orientation, respectively. γ_{10} , γ_{20} and γ_{30} , on the other hand, refer to the same variables, but on a *within-person* level. γ_{04} and γ_{40} outline the interaction terms between trust in government and trust in science on a between- and within-person level, respectively. μ_{0i} represents the random intercept, and μ_{1i} and μ_{2i} represent the random slopes for trust in government and trust in science, respectively, of participants. Finally, ϵ_{it} stands for the regression residual for participant i in the time point t . The random slope for the variable *political orientation* is not included in this model, because the differences between participants in predicting discriminatory beliefs were already specified in the random slope of the preliminary analysis.³

To test the final exploratory mediation model, a multilevel parallel mediation was run. The model includes political orientation as a predictor (X), discriminatory beliefs as a dependent variable (Y), trust in government as mediator 1 (M1), and trust in science as mediator 2 (M2), see Figure 3 which represents the model. On a between-person level, political orientation of participant i predicts trust in government and trust in science, and discriminatory beliefs of participant i in time point t . Both trust variables mediate this pathway between X and Y and predict discriminatory beliefs of participant i in time point t . This trend is reflected on the within-person level that is political orientation of participant i in time point t predicts discriminatory beliefs, trust in science and government of participant i in time point t . Trust in science and trust in government mediated this path (participant i , time point t). Time was included as a covariate on a within-person level (that is, with respect to intraindividual processes over time, see Curran & Bauer, 2011).

RESULTS

Descriptive statistics

Table 1 includes means and standard deviations of all study variables, along with correlations. In terms of political orientation, our sample oscillated minimally above the scale midpoint ($M = 4.65$, $SD = 1.40$), slightly leaning towards liberalism. Means illustrate that the rates of *discriminatory beliefs* against immigrants were low ($M = 2.53$, $SD = 1.38$). Overall *trust in government* was low to moderate ($M = 3.02$, $SD = 1.42$), whereas trust in science was moderate to high ($M = 4.87$, $SD = 1.54$). The variables *discriminatory beliefs* and *political orientation* were strongly and negatively correlated, which indicates negative association between being liberal and holding discriminatory beliefs against immigrants. Variables *trust in government* and *political orientation* followed a similar, significant trend that is reporting stronger liberal political orientation was linked to lower *trust in government*, but higher *trust in science*. The means and

³ This decision has been additionally bolstered by our attempt to avoid overfitting of the model. It has been argued that, in modelling multilevel analyses, the number of variables with random effects 'should not be so large that the model becomes unwieldy' (Snijders, 2005, p. 665). Non-inclusion of random effects does not change the coefficients of fixed effects in MLM but reduces the risk of overfitting.

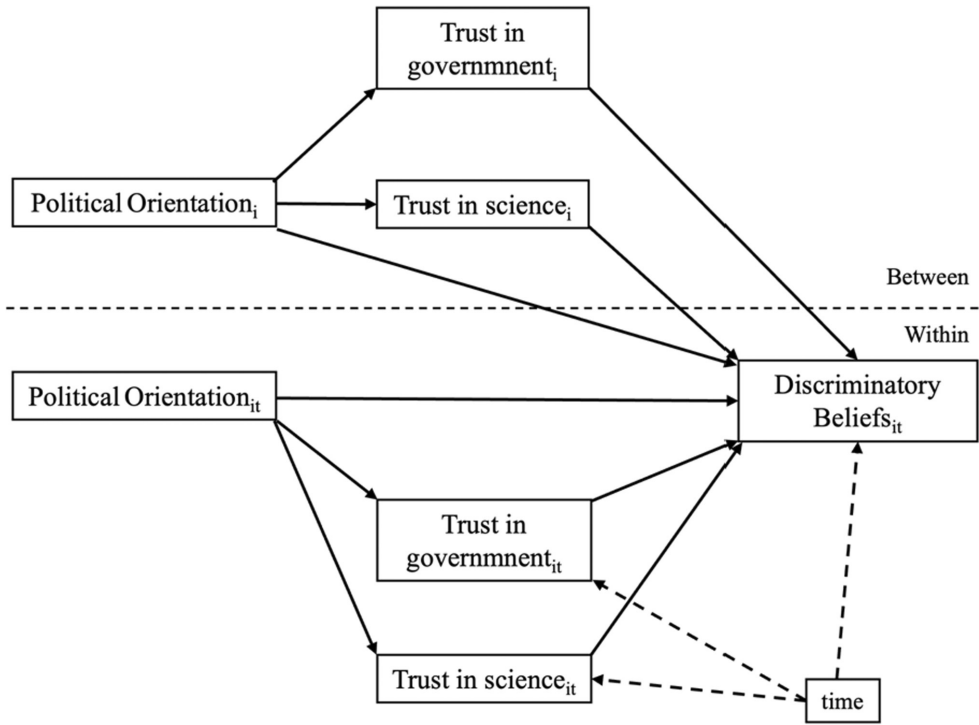


FIGURE 3 The multilevel parallel mediation model (H3).

TABLE 1 Descriptive statistics and between-person and within-person correlations of the study variables.

Variable	M	SD	Between-person (n = 383)				Within-person (n = 2575)				ICC
			1	2	3	4	1	2	3	4	
1. Discriminatory beliefs	2.53	1.38	–	–.21	.41	–.61	–	–.18	.00	–.54	0.84
2. Trust in science	4.87	1.54		–	.27	.21		–	.34	.18	0.70
3. Trust in government	3.02	1.42			–	–.59			–	–.01	0.77
4. Political orientation	4.65	1.40				–				–	0.88

Note: ICC = intraclass correlation on a between-person level. All variables' values ranged from 1 to 7. M and SD are based on averaging reports from seven time points. Significant correlations are in bold ($p < .05$, two-tailed).

standard deviations of the study variables (Table 2) show that variables *discriminatory beliefs* and *political orientation* were relatively stable during the study, whereas *trust in science* and *trust in government* tended to fluctuate at certain time points.

Preliminary analysis: Political orientation as a predictor of trust and discrimination

In the preliminary analysis, we tested associations of *trust in science*, *trust in government* and *discriminatory beliefs* with *political orientation*. Condition, time and the interaction between the two were also included in the model to control for the possible effect of the emotion-recall experimental manipulation, which is the focus of another study and is unrelated to the current hypothesis. Findings with standardized and unstandardized coefficients can be found in Table 3, and the coefficients are mapped on the theoretical models (see Figures 4–6). *Trust in government* was negatively related to *political orientation* on the

TABLE 2 Means and standard deviations of the study variables across 7 time points.

Time	Discriminatory beliefs		Trust in science		Trust in government		Political orientation	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
1	2.57	1.35	4.75	1.43	2.83	1.37	4.62	1.42
2	2.57	1.36	4.66	1.46	2.83	1.36	4.67	1.37
3	2.48	1.32	4.80	1.58	2.98	1.37	4.68	1.36
4	2.58	1.44	4.85	1.60	3.11	1.49	4.64	1.40
5	2.46	1.41	4.98	1.57	2.97	1.46	4.65	1.39
6	2.66	1.48	5.13	1.58	3.39	1.48	4.60	1.44
12	2.51	1.35	5.00	1.55	3.18	1.40	4.71	1.41

between-person level only, $t(392.7) = -13.04$, $p < .001$. This indicates that participants who in general self-identified as more conservative, tended to report higher trust in government than participants who rated their political views as more liberal. The time variable was also significant, $t(1742) = 4.14$, $p < .001$, showing that *trust in government* increased with time.⁴ Neither condition, nor the interaction between time and condition were significant predictors of trust in government.

Trust in science was associated with *political orientation* on a between-person level only, $t(381) = 4.34$, $p < .001$ that is indicating that participants who reported stronger liberal political orientation, also reported higher trust in science than participants who self-identified more strongly as conservatives overall. Time, condition and the interaction between the two were not significant predictors of *trust in science*.⁵

Finally, we found that the variable *discriminatory beliefs against immigrants* was negatively related to *political orientation* on both, between-person, $t(379.9) = -14.85$, $p < .001$ and within-person level, $t(136.3) = -2.51$, $p = .013$. The within-person effect suggests that when participants reported their political views as more liberal, they also reported less discriminatory beliefs, compared to when they reported more conservative political stance. Time, condition and the interaction term were not significant predictors in this model.

Discriminatory beliefs as a function of trust and political orientation

Next, we tested our hypothesis whether *discriminatory beliefs* against immigrants are predicted by *trust in government* and *trust in science*. *Political orientation* was included in the model as a control variable, given our assumption that it may explain the variance in or contribute to both, *discriminatory beliefs* and *trust* (Cinelli et al., 2022). The tested model included all three predictors on a between- and within-person level, and two interactions between trust in government and trust in science: On a between- (trait) and within-person (state) level. Due to the non-significance of the condition (which is the focus of another study unrelated to the current hypothesis) in predicting the study variables, this variable was excluded from further analysis. The results of the model are presented in Table 4, and the coefficients are mapped on the theoretical model (see Figure 7).

The results of this model showed that *trust in government* was a positive predictor of *discriminatory beliefs* on a between-person level only, $t(395.9) = 4.85$, $p < .001$ that is participants who displayed higher

⁴To account for the 6-month lag between time points 6 and 7, the analyses were repeated using the data set without the final time point, but when the model predicted *trust in government* and *discriminatory beliefs*, none of the results suggested different trends to the presented ones (Appendix B).

⁵The same model was run without the final time point, and the effect of time was significant, $t(1497.0) = 2.51$, $p = .012$, whereas the remaining predictors and their significance level remained unchanged (Appendix B).

TABLE 3 Parameter estimates for multilevel models of trust in government, trust in science and discriminatory beliefs as a function of political orientation.

Fixed effects (intercepts, slopes)	Predicted: Trust in government					Predicted: Trust in science					Predicted: Discriminatory beliefs											
	B	SE	t	β	p	CI LL	CI UL	B	SE	t	β	p	CI LL	CI UL	B	SE	t	β	p	CI LL	CI UL	
Intercept	5.17	0.24	21.92	2.72	<.001	4.70	5.64	3.53	0.29	12.04	4.55	<.001	3.02	4.05	5.44	0.23	23.53	2.68	<.001	5.00	5.92	
Time	0.05	0.01	4.14	0.05	<.001	0.03	0.07	0.01	0.02	0.75	0.01	.454	-0.02	0.04	0.00	0.01	0.36	0.00	.717	-0.02	0.02	
Condition	0.07	0.07	1.07	0.07	.287	-0.05	0.21	0.10	0.09	1.09	0.09	.278	-0.07	0.25	-0.06	0.07	-1.00	-0.07	.320	-0.20	0.07	
Time \times Condition	-0.01	0.01	-1.19	-0.01	.233	-0.02	0.00	0.01	0.01	1.22	0.01	.223	-0.00	0.02	-0.00	0.00	-0.89	-0.00	.374	-0.01	0.00	
Level 1 (within-person)																						
Political orientation	0.00	0.04	0.05	0.00	.959	-0.08	0.08	-0.03	0.01	-0.66	-0.01	.512	-0.11	0.06	-0.08	0.03	-2.51	-0.04	.013	-0.15	-0.03	
Level 2 (between-person)																						
Political orientation	-0.52	0.04	-13.04	-0.70	<.001	-0.61	-0.44	0.22	0.01	4.35	0.29	<.001	0.12	0.31	-0.59	0.04	-14.85	-0.79	<.001	-0.67	-0.51	
Random effects																						
Level 1 (within-person)																						
Residual	0.45	0.67	-	0.45	-	0.65	0.69	0.68	0.82	-	0.68	-	0.79	0.85	0.31	0.56	-	0.31	-	0.54	0.58	
Level 2 (between-person)																						
Intercept	1.05	1.02	-	1.05	-	0.94	1.10	1.56	1.25	-	1.56	-	1.15	1.34	1.00	1.00	-	1.00	-	0.93	1.08	
Political orientation	0.04	0.19	-	0.04	-	0.03	0.30	0.06	0.25	-	0.06	-	0.05	0.37	0.03	0.17	-	0.03	-	0.01	0.26	

Note: B = unstandardized estimates; SE = standard error for unstandardized estimates; β = standardized estimates; / = t-value; CI = 95% confidence interval; LL = lower limit; UL = upper limit; significant coefficients are in bold ($p < .05$, two-tailed).

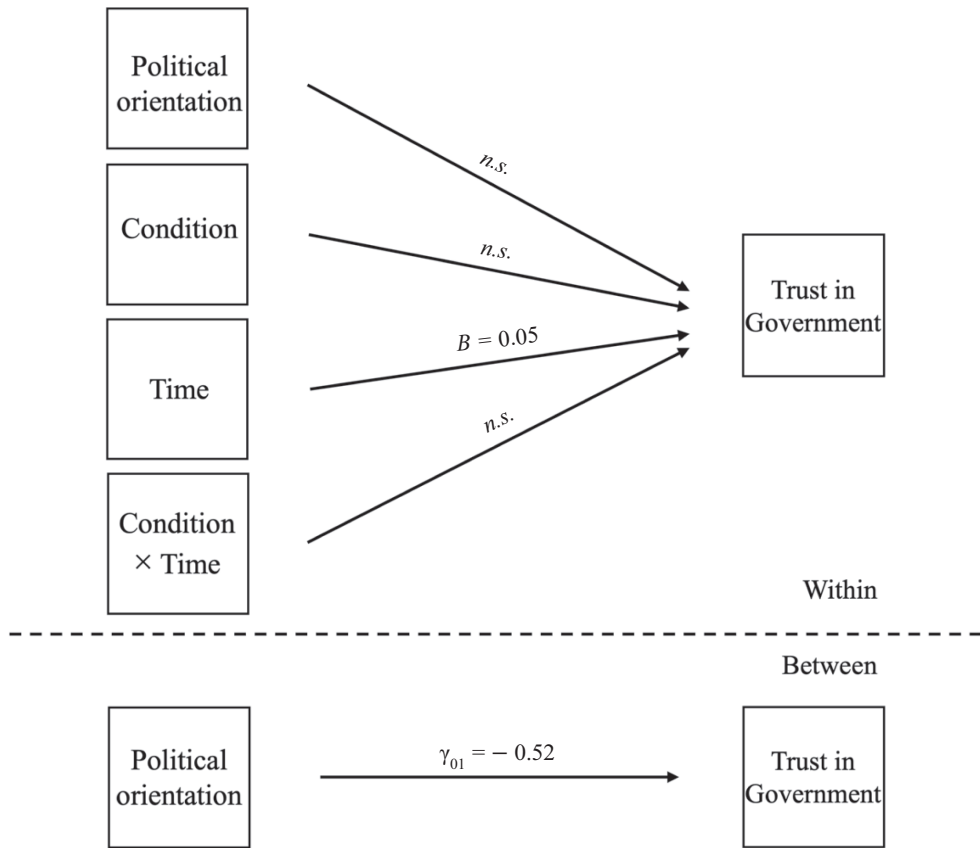


FIGURE 4 Parameter estimates for the multilevel model of trust in government (H1).

levels of trust in the government overall during the study run (i.e. reported higher mean levels), also reported higher discriminatory beliefs against immigrants. *Trust in science*, on the other hand, predicted *discriminatory beliefs* negatively on both levels. On a between-person level, $t(392.9) = -3.36$, $p < .001$, the results demonstrate that participants who held a general higher trust in science during the study run, reported lower levels of discriminatory beliefs than those who had lower trust in science. The results on a within-person level, $t(235.0) = -2.14$, $p = .033$, showed that in months when participants held higher trust in science during COVID-19 they reported lower discriminatory beliefs, compared to the months when they reported lower trust in science and they reported higher discriminatory beliefs. *Political orientation* was a significant predictor of *discriminatory beliefs* on both levels as well. On a between-person level, $t(398.0) = -8.36$, $p < .001$, the results suggest that participants who on average identified as liberal during the study run, also reported lower discriminatory beliefs against immigrants, when compared to those who identified as rather conservative. On a within-person level, $t(1688.0) = -2.68$, $p = .007$, the results indicate that when participants identified as more liberal, they also displayed lower discriminatory beliefs than when they identified their political views as more conservative.

The interaction between *trust in science* and *trust in government* was significant on the within-person level only, $t(1074.0) = -2.37$, $p = .018$. Simple slopes analysis showed significant moderation on the mean ($p < .001$) and +1 *SD* level of the variable ($p < .001$). The interaction plot (Figure 8) suggests that the effect of low trust in science was magnified when trust in government was on the mean level or on the +1 *SD* level, resulting in higher rates of discriminatory beliefs when trust in government was higher. However, the trend changes in the midpoint of trust in science scale. The rates of discriminatory beliefs

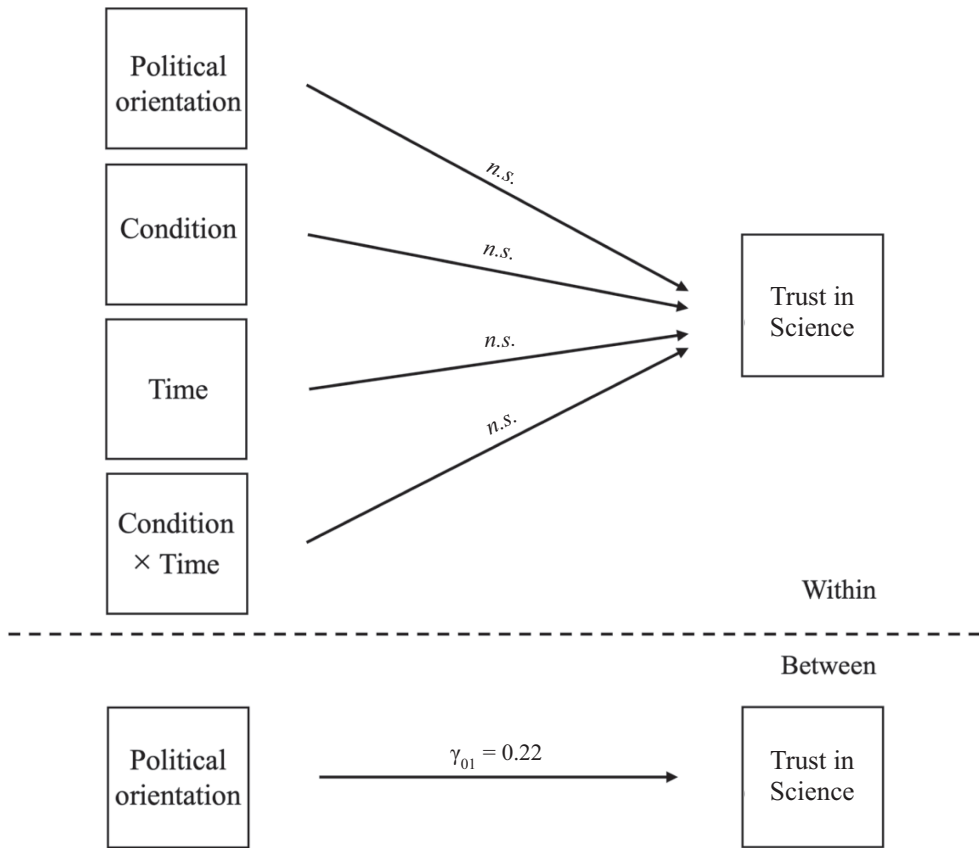


FIGURE 5 Parameter estimates for the multilevel model of trust in science (H1).

against immigrants are at their lowest when both trust in science and trust in government are at their highest (+1 *SD* above the mean). The discrimination rates increase when trust in science is high but when trust in government is lower (*mean* level of the variable).

Exploratory multilevel parallel mediation model

To explore the mechanisms between *political orientation* and *discriminatory beliefs* against immigrants, a multilevel parallel mediation model was run. The aim of this mediational analysis was to determine whether the relationship between the political orientation and discrimination is due, partially, or completely, to the mediators. Findings with Monte Carlo confidence intervals in Table 5 show that the direct effect of *political orientation* on *discriminatory beliefs* was significant on both levels: Between-person, $t(396.65) = -8.13, p < .001$ and within-person, $t(76.09) = -2.34, p < .022$. The effect of the predictor on mediator was significant in case of both parallel mediators on a between-person level only: *trust in government* negatively, $t(393.31) = -13.01, p < .001$, *trust in science* positively, $t(396.76) = 4.57, p < .001$. Time was a significant covariate in predicting both mediators: $t(1709.30) = 9.58, p < .001$ for *trust in government* and $t(1713.00) = 6.23, p < .001$ for *trust in science*, but not for the outcome variable. *Trust in science* and *trust in government* were significant mediators between *political orientation* and *discriminatory beliefs* on a between-person level only, trust in government: $t(393.74) = 4.13, p < .001$, trust in science: $t(392.05) = -3.00, p = .003$.

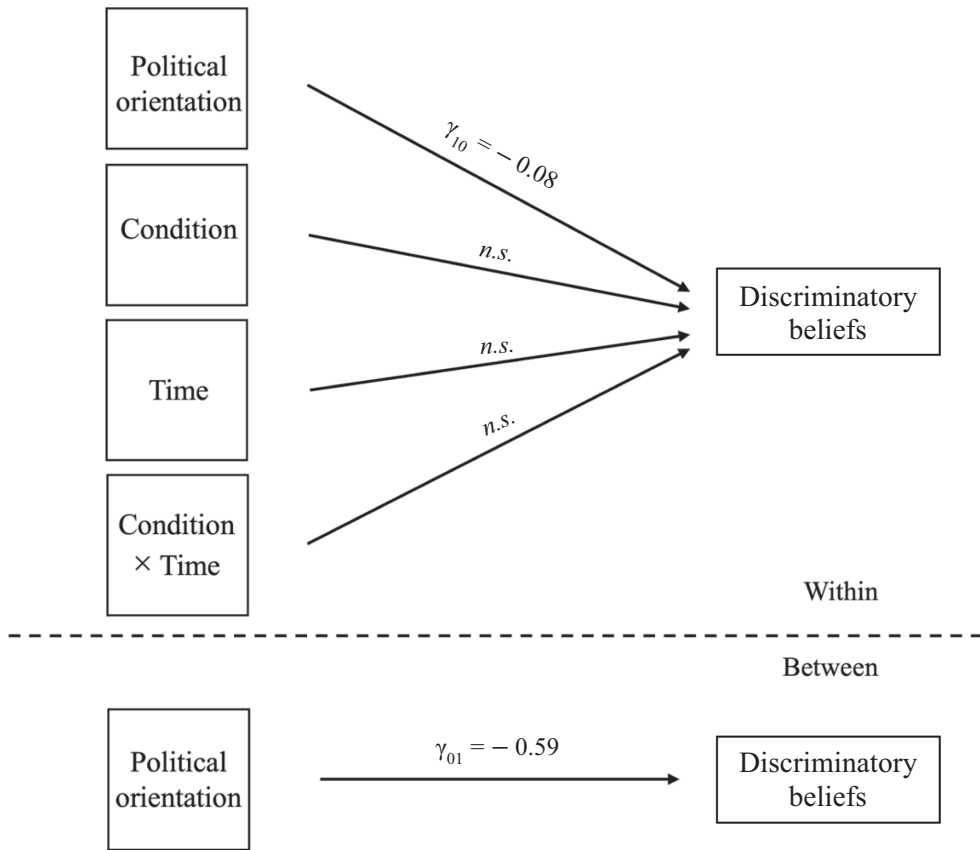


FIGURE 6 Parameter estimates for the multilevel model of discriminatory beliefs (H1).

DISCUSSION

The present study investigated longitudinally the association between political orientation, trust in government, trust in science and discriminatory beliefs against immigrants in a sample of UK residents. The study was conducted in the context of the COVID-19 pandemic, a time when levels of prejudice and discrimination increased (Frost, 2020; Ransing et al., 2020). Replicating prior research that *traditionally* links conservative beliefs to prejudice (for a review, see Crawford & Brandt, 2020; Hodson & Dhont, 2015), we found that a conservative political orientation was associated with more discriminatory beliefs against immigrants during this time in the United Kingdom. The association between right-wing political identity and higher proneness to hold discriminatory beliefs against immigrants seems to conform to the trope that believing in conservative values informs prejudicial beliefs against immigrants (Pettigrew et al., 2007) and more extreme phenomena such as dehumanization of foreign residents (Markowitz & Slovic, 2020). Our results also corroborate a recently advanced hypothesis in the literature that both conservatives and liberals can express prejudice towards individuals and groups who hold a different set of values (Brandt & Crawford, 2020) as participants in our sample did not exhibit a polarized political orientation and their political beliefs tended to slightly change over time.

Furthermore, the results suggest that trust in science and trust in government played differential roles in this relationship. We found that a conservative political orientation was associated with higher levels of trust in the government, which is reasonable given that the conservative party was in government during the time of the study. However, it additionally proved informative about the maintenance of conservative political trust regarding the conservative government's handling of the COVID-19 pandemic, and not just

TABLE 4 Parameter estimates for the multilevel model of discriminatory beliefs as a function of trust in science, trust in government and political orientation.

Fixed effects (intercepts, slopes)	<i>B</i>	<i>SE</i>	<i>t</i>	β	<i>p</i>	CI LL	CI UL
Intercept	4.67	0.25	18.51	2.62	<.001	4.15	5.12
Time	-0.00	0.00	-0.84	-0.00	.399	-0.01	0.00
Level 1 (within-person)							
Trust in science	-0.04	0.02	-2.14	-0.03	.033	-0.08	-0.00
Trust in government	0.01	0.02	0.33	0.00	.742	-0.04	0.06
Political orientation	-0.07	0.02	-2.68	-0.03	.007	-0.13	-0.01
Trust in science × Trust in government	-0.06	0.02	-2.37	-0.06	.018	-0.11	-0.01
Level 2 (between-person)							
Trust in science	-0.16	0.05	-3.36	-0.22	<.001	-0.26	-0.06
Trust in government	0.25	0.06	4.28	0.32	<.001	0.14	0.37
Political orientation	-0.44	0.05	-8.36	-0.58	<.001	-0.54	-0.33
Trust in science × Trust in government	-0.04	0.03	-1.36	-0.04	.176	-0.11	0.02
Random effects							
Level 1 (within-person)							
Residual	0.29	0.54	-	0.29	-	0.52	0.56
Level 2 (between-person)							
Intercept	1.03	1.02	-	1.03	-	0.94	1.09
Trust in science	0.02	0.13	-	0.02	-	0.05	0.19
Trust in government	0.03	0.18	-	0.03	-	0.10	0.24

Note: *B* = unstandardized estimates; *SE* = standard error for unstandardized estimates; β = standardized estimates; *t* = *t*-value; CI = 95% confidence interval; LL = lower limit; UL = upper limit; significant coefficients are in bold ($p < .05$, two-tailed).

generally, paralleling previous literature (Ahmed et al., 2021; Pacilli et al., 2022). We also found that trust in government increased over time, which suggests that people became more confident in the government's response to the COVID-19 pandemic as time passed. However, trust in science was more stable over time (see Agle, 2020 for data from the USA). This impact of time on trust in government can be attributed to societal events as the UK government implemented a vaccine scheme in 2021, which is the latter part of when the study was conducted. In terms of trust in science, results indicated that conservatives had lower levels of trust in science than liberals. The novel link between liberal political orientation and higher trust in science supports McCright et al.'s (2013) prior finding that liberals are likely to have higher trust in science when concerning matters of health and environment. Since the context of the COVID-19 pandemic is a public health concern, it is understandable that those who are more liberally oriented are likely to have more trust in scientific advisors. However, prior literature shows mixed results regarding the aspects of scientific evidence that may prompt higher trust from liberals versus conservatives.

Trust in government and trust in science had opposite relationships with discriminatory beliefs towards immigrants. Specifically, trust in science was associated with lower discriminatory beliefs while trust in the (conservative) government was associated with higher discriminatory beliefs. We also found that the two forms of trust interacted with one another, which revealed an original nuance about the dynamics between trust in government and trust in science, which constitutes novelty in the current literature. When trust in science was low, trust in government magnified the effect, resulting in the highest rate of discrimination. However, the discriminatory beliefs were lowest when both trust in science and government were above the mean, with the trend changing in the midpoint of trust in science scale. The moderation effect of trust in government suggests that a positive alignment between political and

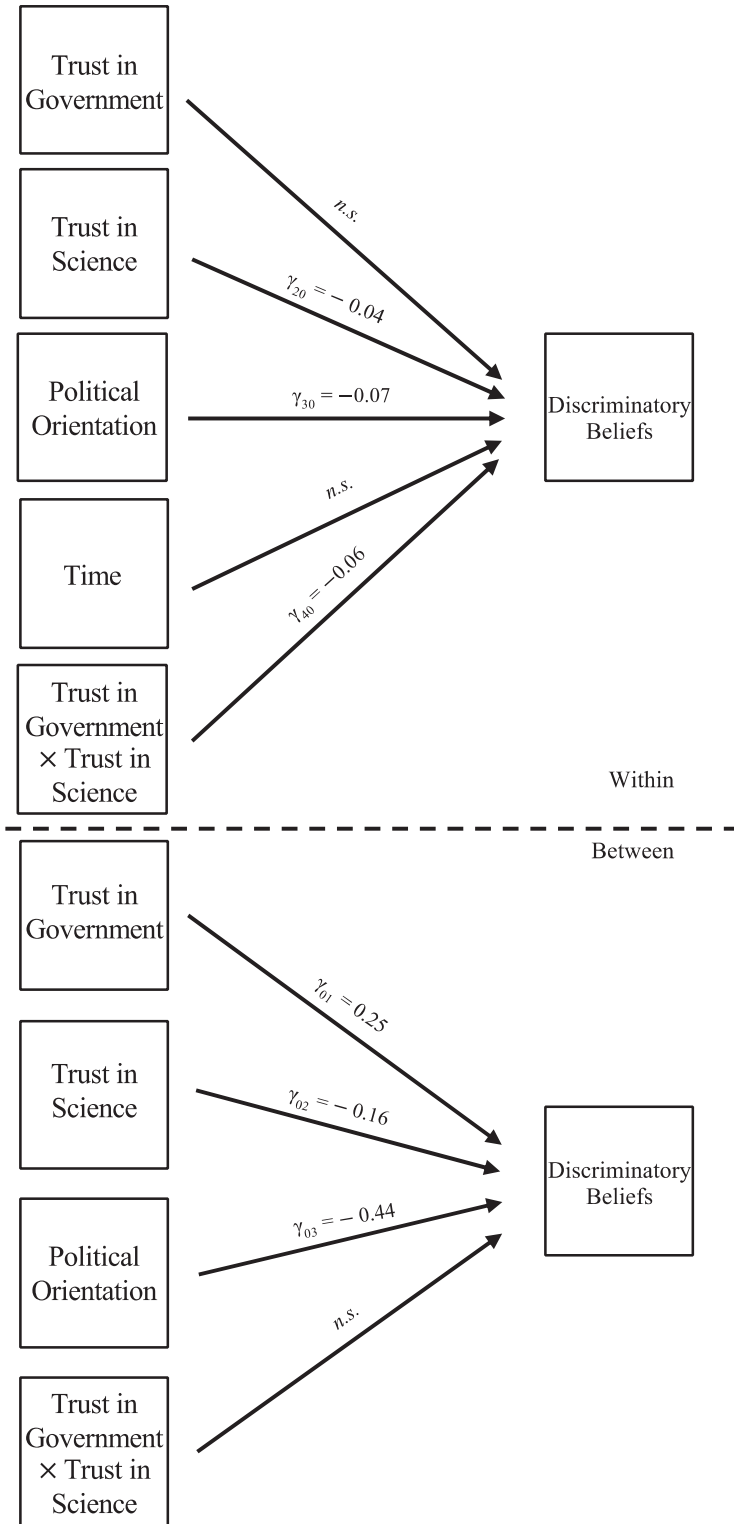


FIGURE 7 Parameter estimates for the multilevel model of discriminatory beliefs (H2).

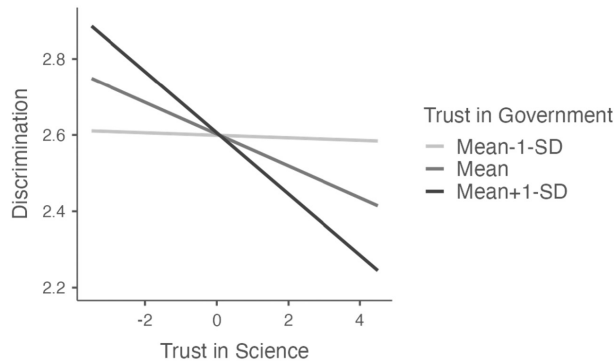


FIGURE 8 Trust in government moderates the relationship between trust in science and discriminatory beliefs on the mean and +1 *SD* level.

scientific authorities may be required to reduce prejudice against immigrants. The need for relatively high levels of trust in government, in addition to trust in science, to reach the lowest levels of discriminatory beliefs echoes the study by Macdonald (2021) in the United States, which showed that political trust is needed to sustain pro-immigration policies. Similarly, Ayalon (2021) found that people with moderate trust in government and high trust in government and science report more health preventive behaviours compared to those who have low trust overall. Specifically, if they have high trust and engage in more preventive behaviours, then they may perceive less threat associated with migrants. The interaction effect detected in our model seems to complement both these perspectives.

The present results partially dovetail with those by Pazhoohi and Kingstone (2021) in the USA, who found a positive association between political orientation, right-wing authoritarianism, xenophobia, concern about contracting COVID-19 in public and confidence in the government's ability to tackle it (see also Pacilli et al., 2022 for findings concerning Italian participants). Not only does our study provide data from the yet untested UK context, but it also adds to this literature by providing evidence for the explanatory conditions of the political orientation—discriminatory beliefs relationship within a unique context of societal changes. Indeed, exploratory mediation analyses indicated that the trust variables were significant mediators between political orientation and discriminatory beliefs, which suggests that the relationship between conservative ideology and greater discriminatory beliefs can be explained by the different forms of trust that people had across the study. Mediation analysis also indicated that trust in science had a direct relationship with discriminatory beliefs, which suggests the importance of trust in science in facilitating positive social harmony. This supports previous research that has argued in favour of applying trust as a mediator in explaining psychological processes, especially during the COVID-19 pandemic. For example, Plohl and Musil (2021) found that trust in science mediated the relationship between several predictors, such as political conservatism or conspiracy ideation, and compliance with COVID-19 guidelines (see also Capasso et al., 2022 in relation to intentions to get vaccinated against COVID-19). Trust in government, additionally, has been found to mediate the link between COVID-19 conspiracy beliefs and compliance with official guidelines (Banai et al., 2021). Interestingly, in our results, trust is predicted on a between-person level exclusively, which indicates between-person differences across more conservative versus more liberal individuals, which suggests that individual differences rather than within-person processes play a more prominent role.

Implications and theoretical contribution

The results suggest that fostering more trust in science during turbulent and uncertain times may facilitate better societal outcomes, beyond the facilitatory effects of trust in terms of promoting preventive behaviours (Algan et al., 2021; Pagliaro et al., 2021). This study provides unique data collected during

TABLE 5 Parameter estimates for the multilevel parallel mediation model.

Fixed effects (intercepts, slopes)	<i>B</i>	<i>SE</i>	<i>t</i>	<i>p</i>	CI LL	CI UL
Outcome: trust in government						
Level 1 (within-person)						
Intercept	5.46	0.20	27.83	<.001	5.08	5.85
Political orientation	-0.03	0.03	-0.96	.337	-0.10	0.03
Time	0.07	0.01	9.58	<.001	0.06	0.09
Level 2 (between-person)						
Political orientation	-0.53	0.04	-13.01	<.001	-0.61	-0.44
Outcome: trust in science						
Level 1 (within-person)						
Intercept	3.82	0.24	15.98	<.001	3.35	4.29
Political orientation	-0.03	0.04	-0.72	.471	3.35	4.29
Time	0.06	0.01	6.23	<.001	0.04	0.08
Level 2 (between-person)						
Political orientation	0.23	0.05	4.57	<.001	0.13	0.32
Outcome: discriminatory beliefs						
Level 1 (within-person)						
Intercept	4.57	0.33	13.74	<.001	3.92	5.23
Political orientation	-0.07	0.03	-2.34	.022	-0.13	-0.01
Trust in government	0.00	0.02	0.19	.848	-0.04	0.05
Trust in science	-0.04	0.02	-1.95	.052	-0.07	0.00
Time	-0.01	0.01	-1.03	.301	-0.02	0.01
Level 2 (between-person)						
Political orientation	-0.44	0.05	-8.13	<.001	-0.54	-0.33
Trust in government	0.23	0.06	4.13	<.001	0.12	0.34
Trust in science	-0.14	0.05	-3.00	.003	-0.23	-0.05
Random effects						
Level 1 residual estimates						
Trust in government	0.45	0.02	-	<.001	0.42	0.48
Trust in science	0.70	0.02	-	<.001	0.65	0.74
Discriminatory beliefs	0.29	0.01	-	<.001	0.27	0.31
Random effect estimates						
Intercept M1	1.05	0.08	-	<.001	0.90	1.22
Intercept M2	1.55	0.12	-	<.001	1.33	1.81
Intercept Y	1.05	0.08	-	<.001	0.90	1.22
Slope X → Y	0.01	0.01	-	.442	0.00	0.12
Slope M1 → Y	0.03	0.01	-	.008	0.01	0.05
Slope M2 → Y	0.01	0.01	-	.052	0.00	0.03

Note: X, political orientation, M1, trust in government, M2, trust in science, Y, discriminatory beliefs. Significant coefficients in bold. *B* = unstandardized coefficients, *SE* = standard error, *t* = *t*-value, *p* = *p*-value, CI = 95% Monte Carlo confidence intervals (LL = lower limit, UL = upper limit).

the COVID-19 pandemic in the midst of lockdowns and accompanying restrictions in the United Kingdom. It is crucial to highlight the importance of the fact that the study was carried out in the British context, where the divide between the conservatives and the liberals is highlighted and impacted by governmental actions, which further exacerbates this division (especially given the background Brexit

context). This effect may vary in the countries where there is a coalition government (e.g. not clearly either conservative or liberal; see Pacilli et al., 2022 for evidence from Italy). We argue that our results should be replicated in contexts in which participants' political orientation might be different as well as the handling of the COVID-19 pandemic might be. However, at the same time, a political ideology is a construct that has been argued to be somewhat universal (Jost et al., 2008), which would indicate that our prediction could replicate in other cultures.

Our findings suggest that for individuals holding more conservative political orientation, other interventions fostering positive immigration beliefs would be useful. At the time of the COVID-19 pandemic contact may have been less likely between groups; however, in the future facilitating positive direct contact may be a way to reduce discriminatory beliefs (Pettigrew, 1998). Furthermore, the study relied on a full and nuanced statistical model that combines multiple areas of psychological research. The present study, unlike most of the previous literature, revealed that the most effective way to counteract anti-immigration attitudes is to combine trust in science and trust in government (see the article by Macdonald, 2021, about the positive effect of political trust on support to pro-immigration policies).

Moreover, our study has attempted to explore dynamic constructs (e.g. trust) to detect potential within-person effects that would inform us of intrapersonal processes. Not only is the evidence in this domain rarely discussed in the UK context, but it also provides an intensive longitudinal perspective with repeated measures nested within a person. This is particularly novel in the context of a political orientation, which we tested at every time point of the study, though the variable is rather seen as stable and *trait-like* (de Rijke et al., 2008). In terms of the remaining study variables, the prevalence of effects on the between-person level suggests those are also *trait-like phenomena*, rather than state-processes (Hamaker, 2012; Hamaker et al., 2007). Our analyses indicate mostly between-person effects of our variables, leaning towards an explanation of interpersonal differences. Barely any of the within-person effects were significant; although when they were significant, the effect size was low. Arguably, we may deduce that the phenomena we attempted to explore, such as political orientation, trust in science or trust in government, are rather stable constructs, and even a subtle change on an individual level may not automatically indicate that there would be a shift in the level of trust or discriminatory beliefs (as *per* our first two hypotheses). Whilst the *within-person paradigm* is not a new notion in psychology, it is not yet widespread, although social scientists have been urged to 'think within-person' (see Hamaker, 2012; Nezlek & Mroczinski, 2020). The present manuscript contributes a methodological rationale to study effects in hierarchical data structures in order to profound our understanding on within- versus between-person level (the contrast which is particularly visible in our analyses).

Limitations and future research

Limitations of the study should also be acknowledged. First, we used a single item to measure political orientation, though the justification of the choice was based on the literature (Pazhoohi & Kingstone, 2021). Future research could consider the different features of political orientation and ideologies that may offer to detect nuances that a single item does not account for. Second, we used a convenience sample that marginally leaned towards being liberal. However, the scores across study time points show that the values consistently oscillated around the scale midpoint. Future studies should consider a sample with broader political views that would be balanced in terms of participants with conservative and liberal political beliefs. Moreover, had political orientation been measured in different domains (social vs. economic, for instance), we may have seen further nuances in terms of how political orientation relates to discriminatory beliefs and trust.

We focused on discriminatory beliefs towards immigrants and did not focus on specific groups that were the target of COVID-19 related microaggressions (e.g. Asian community). Future studies should consider different immigrant groups, their experiences and also pre-existing schema and prejudicial beliefs that may reinforce discrimination. It could also focus on other minority groups (e.g. sexual minorities) that were targets of antipathy by conservatives during COVID-19 (see Pacilli et al., 2022). We also used an explicit measure of discriminatory beliefs but individuals' implicit attitudes towards

immigrants and actual behaviours may have been more extreme. It is crucial to consider the tormenting pandemic period that may have exaggerated discriminatory beliefs. Now that the restrictions in the United Kingdom have been removed, the relationships between variables may differ when there is less salient threat, so it would be useful to examine differences in the current context.

CONCLUSION

The current results suggest that liberal political orientation and trust in science reduced discriminatory beliefs against immigrants, while trust in government heightened discriminatory beliefs. Thus, trust is an important link in explaining why conservatism is associated with greater discriminatory beliefs towards immigrants. In our study, trust is predicted on a between-person level exclusively, which indicates between-person differences across more conservative versus more liberal individuals. Evidence and the analyses indicate individual differences rather than within-person processes play a role. Furthermore, we provided evidence in favour of an alignment between trust in government and trust in science, which should be looked at when fostering pro-migration attitudes and policies within an uncertain and threatening context.

AUTHOR CONTRIBUTIONS

Michal Frackowiak: Conceptualization; data curation; formal analysis; project administration; methodology; visualization; writing – original draft preparation. **Pascale Sophie Russell:** Conceptualization; data curation; funding acquisition; investigation; project administration; writing – original draft preparation; supervision. **Patrice Rusconi:** Conceptualization; supervision; writing – review & editing. **Fabio Fasoli:** Conceptualization; supervision; writing – review & editing. **Smadar Cohen-Chen:** Conceptualization; supervision; writing – review & editing.

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CONFLICT OF INTEREST STATEMENT

The authors declare no conflict of interest.

OPEN RESEARCH BADGES



This article has earned Open Data and Preregistered Research Designs badges. Data and the preregistered design and analysis plan are available at <https://osf.io/upb2h/>.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are openly available on Open Science Framework at https://osf.io/upb2h/?view_only=6eb16e9373c642f784254972f42b449c.

ORCID

Michal Frackowiak  <https://orcid.org/0000-0002-0995-8827>

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SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

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APPENDIX A

Measuring instruments used in the studies

Trust in government (1 = not at all, 7 = very much)

1. At present, how confident are you in the government?
2. Do you think the government are doing a good job of dealing with the COVID-19 pandemic?
3. Do you think the government have enough resources to cope with the COVID-19 pandemic?
4. Do you think the government are prepared for any new COVID-19 outbreaks?
5. How much do you trust the central government?

Trust in science (1 = not at all, 7 = very much)

1. How much do you trust scientific advisers?
2. At present, how confident are you in the scientific advisers?

Discriminatory beliefs against immigrants (1 = strongly disagree, 7 = strongly agree)

1. The NHS should charge immigrants more than what British people are charged.
2. Immigrants should pay more for social security than British nationals.
3. The British court should give more severe sentences to immigrants than British nationals.
4. The United Kingdom should prohibit immigrants from running for political office.
5. The United Kingdom should give permission to all immigrants to vote in British elections. (RC)
6. The United Kingdom government should track immigrants' mobile phones more so than British people.
7. The United Kingdom government should track the movements of immigrants more so than British people.

Political Orientation (1 = extremely conservative, 7 = extremely liberal)

How would you describe your political orientation?

APPENDIX B

Parameter estimates for multilevel models of trust in government, trust in science and discriminatory beliefs as a function of political orientation (Final time point *not* included).

Fixed effects (intercepts, slopes)	Predicted: Trust in government						Predicted: Trust in science						Predicted: Discriminatory beliefs						
	<i>B</i>	<i>SE/SD</i>	<i>t</i>	β	<i>p</i>	CI LL/UL	<i>B</i>	<i>SE/SD</i>	<i>t</i>	β	<i>p</i>	CI LL/UL	<i>B</i>	<i>SE/SD</i>	<i>t</i>	β	<i>p</i>	CI LL/UL	
Intercept	5.01	0.24	20.53	2.54	<.001	4.54 5.53	3.38	0.30	11.15	4.37	<.001	2.79 4.04	5.42	0.24	22.73	2.66	<.001	4.94 5.89	
Time	0.11	0.02	4.68	0.11	<.001	0.06 0.16	0.08	0.03	2.51	0.08	.012	0.01 0.14	0.01	0.02	0.42	0.01	.675	-0.03 0.05	
Condition	0.10	0.07	1.29	0.10	.199	-0.05 0.25	0.12	0.09	1.26	0.12	.208	-0.07 0.31	-0.05	0.07	-0.68	-0.05	.494	-0.19 0.08	
Time \times Condition	-0.01	0.01	-1.21	-0.01	.228	-0.04 0.01	0.00	0.01	0.04	0.00	.967	-0.03 0.03	-0.01	0.01	-1.12	-0.01	.261	-0.03 0.01	
Level 1 (within-person)																			
Political orientation	0.02	0.04	0.50	0.01	.621	-0.06 0.12	-0.00	0.05	-0.10	-0.00	.924	-0.10 0.10	-0.07	0.04	-2.06	-0.03	.041	-0.14 -0.00	
Level 2 (between-person)																			
Political orientation	-0.53	0.04	-13.05	-0.70	<.001	-0.61 -0.46	0.21	0.05	4.20	0.28	<.001	0.11 0.31	-0.59	0.04	-14.68	-0.79	<.001	-0.66 -0.51	
Random effects																			
Level 1 (within-person)																			
Residual	0.42	0.64	-	0.42	-	0.62 0.67	0.67	0.82	-	0.67	-	0.79 0.85	0.31	0.55	-	0.31	-	0.53 0.57	
Level 2 (between-person)																			
Intercept	1.06	1.03	-	1.06	-	0.95 1.11	1.55	1.25	-	1.55	-	1.14 1.34	1.02	1.01	-	1.02	-	0.93 1.09	
Political orientation	0.05	0.22	-	0.05	-	0.03 0.34	0.05	0.23	-	0.05	-	0.04 0.37	0.03	0.18	-	0.03	-	0.02 0.27	

Note: *B* = unstandardized estimates; *SE* = standard error for unstandardized estimates; *SD* = standard deviation for unstandardized estimates; β = standardized estimates; *t* = *t*-value; CI = 95% confidence interval; LL = lower limit; UL = upper limit; significant coefficients are in bold (*p* < .05, two-tailed). For fixed effects, *SE* have been reported. For random effects, *SD* have been reported.