Running head: PERSON AND SITUATION EFFECTS

Person and situation effects in predicting outgroup prejudice and avoidance during the COVID-19 pandemic

Word Count: 5,000

Abstract

Recent theories of intergroup relations suggest that factors relevant to disease, disgust, and contagion predict prejudice towards ethnic outgroups. The current research explored the influence of contextual pathogen threat and individual differences in threat sensitivity on outgroup prejudice and avoidance in the context of the COVID-19 pandemic. Data were collected from a sample of British adults in June 2020 (N = 524). A multi-level approach was employed to capture differences in confirmed COVID-19 cases across different regions in the UK. Results demonstrated that even in a "strong" pandemic context, individual differences in both disgust sensitivity (DS) and intergroup disgust sensitivity (ITG-DS) explained variability in outgroup distancing. Subjective perceptions of contextual pathogen prevalence, but not actual infection rates, also predicted greater outgroup avoidance. However, a significant cross-level interaction revealed that DS predicted outgroup distancing in regions with higher numbers of confirmed COVID-19 cases, but not in areas of lower infection. Thus, individual differences in pathogen avoidance may be especially influential under high situational pathogen stress. There was also some evidence that pathogen threat also predicted greater ingroup attraction. Results provide important insights into factors that promote or inhibit positive intergroup relations during pandemics.

Keywords: PREJUDICE, COVID-19, VULNERABILITY TO DISEASE, DISGUST SENSITIVITY, PATHOGEN AVOIDANCE, BEHAVIORAL IMMUNE SYSTEM, MULTILEVEL ANALYSIS

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1. Introduction

The emergence and rapid spread of COVID-19 represents the greatest public health crisis the world has faced for a century. As of December 2020, in excess of 63 million cases of COVID-19 had been confirmed worldwide and COVID-19-related deaths exceeded 1.4 million. COVID-19 presents a unique challenge for psychological science, given its scope and scale, but also offers a unique opportunity to study psychological phenomena. Several theoretical approaches in recent years have proposed that factors relevant to disease, disgust, and/or contagion can play a role in predicting prejudice toward outgroups -- the current pandemic offers a truly unique and rich context to explore the joint role of environmental contagion levels (e.g., local infection rates) and sociopsychological factors (e.g., individual differences in disgust sensitivity) in shaping outgroup attitudes and avoidance.

A number of theoretical models, often rooted in evolutionary theory, suggest that humans are sensitive to contextual cues of pathogen threat and have developed strategies to reduce the risk of infection. Because immunological defences are metabolically costly and are merely reactive, human anti-pathogen defence is thought to be bolstered by a *behavioral immune system* (BIS) characterized by proactive behavioral mechanisms to response to perceptual cues connoting the presence of pathogens in the local environment (Schaller & Park, 2011). The BIS has unique consequences for many aspects of human sociality, particularly prejudice and intergroup relations. Researchers suggests that, historically, contact with ethnically-dissimilar others increased exposure to novel pathogens to which the local population would have no acquired immunity. Outgroup members were also likely to engage in practices that violate local

cultural norms (e.g. pertaining to hygiene practice and food preparation) thought to serve as buffers against infection from local pathogens. Under conditions of high pathogen prevalence, a psychological mechanism facilitating the avoidance of ethnic outgroup members is therefore adaptive and helps insulate individuals from the risk of infectious diseases (Faulkner et al., 2004; Fincher & Thornhill, 2008, Schaller & Murray, 2010).

Relevant to this discussion, we can distinguish between actual (or "real") disease threat (i.e. the actual or objective prevalence of disease within one's environment), and the subjective threat experience (i.e. one's perception of the prevalence of disease within one's environment). The behavioral immune system is considered to be flexible and context-contingent, such that more strongly aversive responses occur under conditions in which perceivers are, or perceive themselves to be, more vulnerable to pathogen infection (Schaller et al., 2007). At the societal level, regions with historically higher prevalence of parasitic diseases are characterized by stronger family ties, increased frequency of intrastate ethnic conflict, and greater social conservatism (e.g. Fincher & Thornhill, 2012; Letendre et al., 2010). Meanwhile, exposure to perceptual cues that make the threat of pathogen transmission temporally psychologically salient (e.g. images of coughing people; bodily wastes) can also exacerbate prejudice (e.g. Faulkner et al., 2004).

In addition to general and overall patterns (i.e., universals), theorists have also argued that people differ systematically from each other in their sensitivities to pathogen threats. For instance, the construct perceived vulnerability to disease (PVD) captures individual differences in chronic concerns about personal susceptibility to infectious diseases. Ethnocentric attitudes have been shown to increase as a function of perceived vulnerability to disease (Faulkner et al., 2004; Navarette & Fessler, 2006), especially with regard to foreign groups (Hodson & Costello,

2007). Likewise, the properties of disgust make it theoretically relevant to prejudice. Disgust is characterized by repulsion and rejection, initiating withdrawal from potentially infected objects. Widely considered a universal human emotion, people nonetheless differ systematically in their disgust sensitivity (Haidt et al., 1994). There is some evidence that individuals higher in general disgust sensitivity (DS) hold more negative outgroup attitudes (Hodson & Costello, 2007; Navarette & Fessler, 2006), although findings are mixed overall, with others finding no association between basic disgust sensitivity and prejudice (e.g. Choma et al., 2012; Hodson et al., 2015) or no consistent pattern of association (e.g. Hodson et al., 2013), leaving its role open to question.

Although people can experience generalized disgust in response to a wide array of aversive stimuli, *intergroup disgust* is a specific sub-type of disgust sensitivity that is theoretically more proximal to prejudice. Hodson et al., (2013) introduced the concept of intergroup disgust sensitivity (ITG-DS) to describe "affect-laden revulsion toward social outgroups" (p.195). This construct incorporates concerns about disease prevention, as well as the viral spread of social ideas and values which threaten feelings of ingroup purity and superiority. Individuals higher in ITG-DS are more disgusted and repulsed by the practices and beliefs of outgroups, and seek to avoid physical and symbolic contamination by outgroup members. This construct has been shown to strongly predict outgroup prejudice (Choma et al., 2012), even above and beyond related variables including perceived vulnerability to disease and general disgust sensitivity (Hodson et al., 2013).

Interestingly, there is also some preliminary evidence that ITG-DS is not only associated with outgroup avoidance, but also with *ingroup attraction* (Hodson et al., 2013). Individual differences in generalized disgust sensitivity have also been shown to predict not only negativity towards outgroups, but also more positive ingroup orientations (Hodson & Costello, 2007; Naverette & Fessler, 2006 see also Tybur et al., 2020). Such findings are consistent with Naverette and Fessler's (2006) argument that ingroup attraction may be just as important as outgroup avoidance in response to disease threat due to the importance of alliances during times of illness or hardship. When the likelihood of illness increases, individuals should be motivated to garner the coalitional support of the ingroup to improve one's chances of staying safe and healthy. In two studies Naveratte and Fessler demonstrate that ingroup attraction increases as a function of disgust sensitivity, both when measured as an individual difference variable and when experimentally primed.

It is unclear, however, whether such effects would persist in actual pandemic context. Social distancing is the main available way to slow the COVID-19 pandemic and many governments took strong measures, such as imposing restrictions on freedom of movement and assembly, meaning that for most people, social life was reduced to a minimum. Against this backdrop it seems unlikely that individuals who feel heightened vulnerability to threats in the natural environment will be more drawn towards other ingroup members. Indeed, it is possible that individual differences may generally be dampened at this time considering that "strong situations" might reduce inter-individual variability in outcome measures (e.g., Mischel, 1973). Yet, recent meta-analytic evidence outside of the disgust or contagion context suggests that strong situations either have little effect on dampening between-person variability, or indeed can magnify such differences, under strong situations (Keeler et al., 2019). The COVID-19 pandemic

therefore provides a unique context to test the role of individual differences against the backdrop of a very strong context.

2. The Present Investigation

This research explored how contextual pathogen threat (objective and subjective) and individual differences in threat sensitivity predict outgroup prejudice and avoidance, as well as ingroup attraction, amid the COVID-19 crisis. Data were collected from a sample of White British people during the COVID-19 crisis in June 2020. The UK had one of the worst COVID-19 outbreaks in Europe (Office for National Statistics, 2020), but there were substantial regional variations in the number of cases and spread of the virus. A multi-level approach was used to capture differences in infection rates across regions. Based on the past literature and theorizing, several potential outcomes may play out. In a strong situation, such as a once-in a century pandemic, contextual disease prevalence may outweigh the importance of individual differences. This would be indicated if we observe greater outgroup prejudice among people in areas with higher levels of contagion (Level-2 effect, or effect at the regional-level), regardless of individuals' level of threat sensitivity (Level-1 effect, or effect at the level of the individual). Alternatively, it is possible that, because COVID-19 is a relatively invisible threat and rate of infection in one's immediate environment is difficult to know or estimate, contextual disease prevalence (especially objective contagion levels, Level-2 effect) may be less important than dispositional factors in predicting outgroup bias. This would be indicated if we observe significant between-person effects (Level-1 effect) but little variance across regions (Level-2 effect). In each of these cases above, the effects of person and situation would be considered independent and possibly additive. Finally, it is possible that contextual disease prevalence and

person-based differences may interact to predict prejudice. That is, we may expect the greatest prejudice amongst people in areas with higher (vs. lower) contagion who also personally score higher (vs. lower) in chronic disease concerns (i.e. a cross-level interaction).

3. Method

3.1 Participants

Data were collected from a total of 524 participants from an online participant panel, Prolific[1]. Given our interest in racial biases amongst ethnic majority group members we focused on White British participants. Data from 3 mixed-race and 1 non-British participants were excluded. Twelve participants failed an attention screen and another 12 indicated that they did not want their data to be used. We also excluded the data of 28 participants who believed that had already contracted COVID-19 and thus were potentially no longer at risk of infection. The final sample consisted of 468 participants, including 204 males and 263 females (1 participant did not report their gender) aged between 18 and 76 (M = 37.68, SD = 14.37). Participants were drawn from each of the 9 official regions in the UK (*Scotland*, *Northern Ireland, Wales*, *North East*, *North West*, *Yorkshire and the Humber*, *West Midlands*, *East Midlands*, *South West*, *South East*, *East of England* and *Greater London*[2]. Hypotheses were preregistered at https://aspredicted.org/blind.php?x=4ie9ei

3.2 Measures

Data were collected on the 17th June 2020. At this time UK was graded as Level 4 in the government's five tier COVID-19 alert level system meaning transmission was high or rising exponentially, but healthcare systems were not overwhelmed. Non-essential retailers had been

allowed to reopen following a national lockdown, but restaurants, pubs, hairdressers, and recreational facilitates remained closed. Employees were encouraged to work from home where possible. The order of all scales was randomized.

3.2.1 Perceived vulnerability to disease (PVD). Participants completed the 15-item PVD scale (Duncan et al., 2009) which assesses chronic concerns over infectious diseases. The measure consists of two subscales: perceived infectability, which reflects people's general perception about their susceptibility to disease (e.g. 7 items, "If an illness is going around, I will get it") and germ aversion, which reflects people's affective and behavioral responses to potential pathogens (e.g. 8 items, "I don't like to write with a pencil someone else has obviously chewed on"). Responses were measured on a 7-point scale (1 = *strongly disagree* to 7 = *strongly agree*). An average (overall) perceived vulnerability to disease score was computed, $\alpha = .80$.

3.2.2 Disgust sensitivity (DS). The 25-item Disgust Scale Revised (Olatunji et al., 2008) was administered to measure general disgust sensitivity. This scale consists of three subscales measuring core disgust (basic disgust elicitors such as vomit), animal-reminder disgust (reminders of our own mortality and inherent animalistic nature) and contamination disgust (interpersonal contagion threats). Participants indicated their agreement with 13 statements (e.g. "It bothers me to hear someone clear a throat full of mucus"), from 1 = *strongly disagree* to 4 = *strongly agree*, and rated how disgusting they would find 12 specific situations (e.g. "You are about to drink a glass of milk when you smell that it is spoiled") from 1 = *not disgusting* to 4 = *very disgusting*. Items were averaged to create an overall disgust sensitivity score ($\alpha =. 85$).

3.2.3 Intergroup disgust sensitivity (ITG-DS). The 8-item ITG-DS scale (Hodson et al., 2013) was also administered. This measure taps revulsion at intergroup contact and concerns of contamination by ethnic outgroups. Sample item includes "I feel disgusted when people from

other ethnic groups invade my personal space" and "When socializing when members of a stigmatised group, one can easily become tainted by their stigma" (1 = *strongly disagree* to 7 = *strongly agree*, α = .64).

3.2.4 Outgroup prejudice. Participants completed the 7-item Modern Racism Scale (McConahay et al., 1981), which was modified to tap attitudes towards ethnic minorities generally, (e.g. "Ethnic minorities have more influence on government policies than they ought to", "Discrimination against ethnic minorities is no longer a problem in Britain"). Responses were recorded on a 5-point scale (1 = *strongly disagree* to 5 = *strongly agree*), (α = .93). Higher scores corresponded to higher outgroup prejudice.

3.2.5 Ingroup attraction. To explore whether pathogen threat may also predict higher levels of ingroup attraction participants were asked to indicate their feelings towards other White British people, in general, on six bipolar scales (1-7; *warm-cold, negative-positive, friendly-hostile, suspicious-trusting, respect-contempt, admiration-disgust,* Wright et al., 1997). Items were coded so that higher scores corresponded to more positive ingroup evaluation (α = .92). Higher scores reflect more positive ingroup attitudes.

3.2.6 Preferred social distance. We also assessed participants' preferred interpersonal space between themselves and ingroup/outgroup members. A graphic measure was adapted from Sorokowska et al. (2017). Answers were given on a slider scale anchored by two human-like figures, labelled A and B. Participants were asked to imagine that he or she was Person A, and to indicate how close a Person B could approach so that he or she would feel comfortable in a conversation with Person B by dragging the slider towards the representation of themselves. Participants completed the measure twice – once imagining the Person B was another White

British person, and once imagining that Person B was an ethnic minority. Responses ranged from 0-200, with higher scores indicating higher preferred social distance.

3.2.7 Subjective contagion. Participants' subjective sense of the infection risk was assessed with a single item. Participants were asked "Based on your best estimate, what percentage of people in your postcode area do you think are currently infected with COVID-19?". Responses were recorded on a 0-100% slider scale.

3.2.8 Objective contagion. Objective infection rate data was obtained from data provided by Public Health England, Public Health Wales, Public Health Scotland, and the Northern Ireland Department of Health. For each of the nine regions in the UK we recorded the cumulative number of confirmed cases of COVID-19 on the same day that participants completed the survey. All 4 nations provide data based on tests carried out in NHS laboratories ('pillar 1' of the Government's mass testing programme) and testing by commercial partners ('pillar 2' of the mass testing programmes). Because the different regions vary considerably in population sizes, and areas with larger populations will tend to have more cases than those with smaller populations, infection rate data was used. The infection rate data provided by the government represent the infection count for each area divided by the total population in the region and multiplied by 100,000 to adjust for differences in population size (i.e., produce a per-capita value).

4. Results

4.1 Analytic Strategy

Descriptive statistics and bivariate correlations between variables are shown in Table 1. We used multilevel modeling with individuals (Level-1) nested within regions (Level-2) using R software v.3.5.3. In multilevel modeling, Level-1 variables are measured at the level of the

individual (e.g. PVD, DS, ITG-DS, subjective contagion), Level-2 (or contextual) variables are measured at the level of the group or aggregate (e.g. actual COVID-19 infection rates by region), and cross-level effects refer to interactions between Level-1 and Level-2 variables (e.g., the interaction between individual difference variables and regional infection rates, see Figure 1)[3]. Separate models were assessed for each outcome variable (outgroup attitudes; outgroup distancing; ingroup attitudes; ingroup distancing). PVD, DS, ITG-DS, and subjective contagion were group-mean centered. Objective regional infection rates were grand-mean centered. Each model had a random intercept and random slopes for the Level-1 variables by each region.

[insert Figure 1 here]

[insert Table 1 here]

4.2 Outgroup Prejudice

As predicted, higher ITG-DS at the individual-level was positively associated with outgroup prejudice (b = .58, p<.001 see Table 2). That is, even when controlling for disgust-relevant competitors ITG-DS was strongly associated with greater hostility towards ethnic minorities. There was no significant independent association between any other individual difference variable or subjective contagion at Level-1. There was also no effect of regional objective contagion levels at Level-2 on this outcome, and no significant cross-level interactions. The overall model R^2 calculated based on the Johnson (2014), Nakagawa and Schielzeth (2013) formula was 0.29.

4.3 Outgroup Social Distance

As expected, ITG-DS at the individual-level was a significant predictor of outgroup social distance (b = 7.84, p =.004, see Table 2). Those higher in ITG-DS preferred to maintain greater physical distance from ethnic minorities. Generalized disgust sensitivity (b = 14.67, p =.006) and subjective contagion (b = 0.54, p =.007) also had significant independent effects on outgroup social distance at the individual-level. Those higher in chronic disgust sensitivity and those who reported higher subjective infection estimates preferred to maintain greater social distance from outgroup members. There was no independent effect of regional objective contagion at Level-2, however, we did observed a significant cross-level interaction between DS and objective infection rates on this outcome. See Figure 2 for slopes of DS at low (-1 SD), average, and high (+1 SD) levels of contextual infection rates. DS was found to have a significant association with preferred social distance from ethnic outgroup members in regions with high (b = 27.23, p<.001) and mean (b = 14.67, p =.006) levels of infection, but the association became non-significant at low levels of contextual infection (b = 2.12, p =.788). In other words, individual differences in DS were most predictive of outgroup avoidance in situations of high, or average levels of infection risk, compared to low infection risk contexts. The overall model R^2 was 0.09.

[Insert Table 2 here]

[Insert Figure 2 here]

4.4 Ingroup Attraction

We then explored whether individual differences in threat sensitivity and regional contagion also predicted attraction to the ingroup. The overall model R^2 was 0.03. Only DS at the individual-level was found to predict greater ingroup attraction (b = 0.33, p =.011, see Table 3).

Individuals predisposed to heightened disgust sensitivity exhibited more positive attitudes towards White British people. There was no evidence that other individual differences variables at Level-1, or objective regional contagion levels Level-2 predicted attitudes towards ingroup members.

4.5 Ingroup Social Distance

As with outgroup social distance, individual-level DS and subjective contagion were positively associated with ingroup social distance (b = 16.01, p =.006, see Table 3). Individuals higher in chronic disgust sensitivity, and those who reported higher subjective infection estimates preferred to maintain greater social distance from ethnically-similar others (as well as ethnically-dissimilar others). There was no effect of ITG-DS on this outcome, and no effect of regional contagion levels at Level-2 or cross-level interactions. The overall model R^2 was 0.08.

[Insert Table 3 here]

5. Discussion

Recent theories of intergroup relations suggest that prejudice is partially rooted in behavioral immune system mechanisms (e.g. Faulkner et al., 2004; Fincher & Thornhill, 2008; Schaller & Murray, 2010). Even when pathogen stimuli do not explicitly implicate outgroup members, they may nevertheless trigger negative reactions to outgroup members as a heuristic form of pathogen avoidance. Although the evolved psychological mechanisms underlying the ability to respond adaptatively to disease threats may be universal, there is considerable individual variation in the extent to which people feel subjectively vulnerable to disease or

sensitive to particular kinds of disease-relevant stimuli. The implication of these individual differences in predicting intergroup processes are relatively unexplored, especially within an actual pandemic context. The present research provides a critical test of theory in response to a real threat. Using official government COVID-19 infection rate data, participants were statistically nested within their local region, allowing us to explore the joint role of contextual pathogen threat and individual differences in threat sensitivity in predicting outgroup prejudice and avoidance.

Our results suggest that, despite strong government guidelines restricting individuals' freedoms, individual differences in chronic disgust concerns predicted variance in outgroup avoidance. Individuals higher in generalized DS preferred to maintain greater physical distance from ethnic minorities amid the pandemic. Higher ITG-DS also predicted greater outgroup distancing as well as more negative attitudes toward the outgroup (i.e. their beliefs and practices). These findings are consistent with the idea that ITG-DS taps the disgust domain but is empirically distinct from generalized DS. That is, ITG-DS captures concern about an unwilling change in the entity's properties (e.g. self, ingroup) through contact – both physical and symbolic (Hodson et al., 2013). Surprisingly, PVD was not uniquely related to the criteria, something to be further explored in future research.

Higher subjective estimates of situational pathogen prevalence were also associated with greater outgroup distancing. There was, however, no effect of objective pathogen prevalence on either outgroup prejudice or outgroup distancing. Such findings suggest that there is a disconnect between the psychological *perception* of contagion and actual, objective contagion risk. Indeed, there was no significant bivariate correlation between subjective and objective contagion levels (see Table 1). We did, however, detect a significant cross-level interaction between objective

298 infection rates and individual differences in DS whereby individuals higher in DS were more
299 avoidant of outgroup members at high and mean levels of contextual contagion, but not at low
300 levels of contextual contagion. This finding represents an important extension of the existing
301 literature by demonstrating that contextual pathogen threat and trait pathogen avoidance not only
302 have important independent effects, but their effects may also be interactive. In this case,
303 situational factors moderated the impact of some person-based factors in that individual
304 differences in DS were more relevant under conditions of higher pathogen stress.

305 Some prior research suggests that pathogen threat is not only associated with an
306 "avoidant" psychology of negativity towards outgroup members but also an "approach"
307 psychology directed at ingroups (Hodson & Costello, 2007; Naverette & Fessler, 2006). In
308 keeping with these findings, we found that increased DS was associated with more positive
309 attitudes towards ingroup members. At the same time, however, higher DS and higher subjective
310 infection estimates were also associated with greater ingroup distancing. These finding are
311 perhaps not surprising in a context where the virus can be transmitted through close contact with
312 infected people. Our findings suggest that individuals higher in disgust sensitivity can
313 simultaneously hold more positive attitudes towards ingroup members, and desire to maintain
314 greater physical distance from them in order to avoid contamination. This may, however, have
315 negative psychological consequences, with findings suggesting that social distancing is
316 associated with symptoms of depression and anxiety, independent of individuals' levels of
317 perceived social support (Marroquin et al., 2020).

318 Conducted during the early stages of the COVID-19 crisis in the UK, this research offers
319 a single day's snapshot of how people reacted to an ongoing pandemic. The epidemiological
320 landscape is continually changing, making it unknown the degree to which our results generalize

beyond the moment in time and cultural context of this snapshot. Lippold et al. (2020) recently found that fear of coronavirus increased as the virus intensified in Germany, but personality remained a stable predictor of fear over time. Cross-cultural evidence meanwhile suggests that COVID-19 concern is higher in the UK compared to other countries across European, American, and Asia (Dryhurst et al., 2020). Future research should seek to make comparisons between different countries, and different timepoints, with our results suggesting that individual differences may be especially influential under high pathogen stress.

Table 1

Means, standard deviations and correlations for all variables.

	M (*SD*)	1	2	3	4	5	6	7	8	9
1) Outgroup prejudice	1.84 (0.91)	-								
2) Outgroup social distance	52.08 (48.12)	.18** [.079, .274]	-							
3) Ingroup attraction	4.80 (1.04)	.09 [-.004, .176]	.01 [-.075, .102]	-						
4) Ingroup social distance	50.54 (45.66)	.11* [.015, .201]	.90** [.847, .956]	.01 [-.80, .096]	-					
5) PVD	4.04 (0.92)	.11* [.024, .198]	.17** [.088, .254]	-.01 [-.091, .075]	.15** [.064, .240]	-				
6) DS	2.72 (0.44)	.01 [-.079, .091]	.19** [.107, .279]	.12* [.021, .212]	.21** [.123, .290]	.34** [.260, .413]	-			
7) ITG-DS	1.91 (0.83)	.55** [.471, .621]	.15* [.054, .245]	.03 [-.057, .124]	.09* [-.003, .190]	.16** [.066, .250]	.05 [-.049, .133]	-		
8) Subjective contagion	11.40 (11.78)	-.03 [-.126, .057]	.17** [.078, .255]	-.05 [-.143, .032]	.19** [.106, .274]	.11* [0.12, .207]	.16* [.069, .245]	-.01 [-.090, .088]	-	
9) Objective contagion	410.06 (99.53)	<.01 [-.090, .096]	.01 [-.088, .109]	.03 [-.063, .128]	.01 [-.090, .109]	.06 [-.033, .152]	.05 [-.043, .141]	-.05 [-.153, .043]	.13* [.048, .220]	-

Notes. Values in square brackets are 95% bias correlated and accelerated confidence intervals for each correlation based on bootstrapping of 1000 iterations. *p < .05, ** p < .001

Table 2

Fixed Effects for Predictors of Outgroup Prejudice and Outgroup Social Distance

Outgroup prejudice	*b*	*SE*	*df*	*t*	*p*	*Semi-partial* r^2
Intercept	1.83	0.04	9.72	43.42	<.001	
PVD	0.03	0.05	11.32	0.46	.653	.01
DS	-0.05	0.11	8.53	-0.46	.654	<.01
ITG-DS	**0.58**	**0.05**	**7.79**	**10.62**	**<.001**	**.27**
Subjective contagion	<.01	<.01	11.95	-1.20	.253	.01
Objective contagion	<.01	<.01	9.59	-0.18	.860	<.001
PVD X Objective contagion	<.01	<.01	13.45	-1.49	.159	.01
DS X Objective contagion	<.01	<.01	10.08	0.49	.635	.<.01
ITG-DS X Objective contagion	<.01	<.01	7.69	-0.64	.540	. <.01
Subjective contagion X Objective contagion	<.01	<.01	11.69	0.49	.631	. <.01
Outgroup social distance						
Intercept	52.24	2.34	20.67	22.33	<.001	
PVD	5.04	3.08	10.01	1.64	.132	.01
DS	**14.67**	**5.32**	**189.40**	**2.76**	**.006**	**.02**
ITG-DS	**7.84**	**2.70**	**227.36**	**2.91**	**.004**	**.02**
Subjective contagion	**0.54**	**0.20**	**118.55**	**2.75**	**.007**	**.02**
Objective contagion	<.01	0.02	19.83	0.03	.975	<.001
PVD X Objective contagion	-0.03	0.03	11.64	-0.90	.387	<.01
DS X Objective contagion	**0.13**	**0.06**	**190.16**	**2.22**	**.028**	**.01**
ITG-DS X Objective contagion	0.01	0.03	236.57	0.46	.643	<.001
Subjective contagion X Objective contagion	<.01	<.01	104.53	-0.51	.614	<.01

Note. PVD = perceived vulnerability to disease, DS = disgust sensitivity, ITG-DS = intergroup disgust sensitivity. Objective contagion is measured a Level-2 (at the regional-level). The remaining variables are measured at Level-1 (at the level of the individual).

Table 3

Fixed Effects for Predictors of Ingroup Attraction and Ingroup Social Distance

Ingroup attraction	*b*	*SE*	*df*	*t*	*p*	*Semi-partial* r^2
Intercept	4.81	0.05	8.19	87.40	<.001	
PVD	-0.06	0.06	32.09	-1.02	.314	<.01
DS	**0.33**	**0.12**	**31.00**	**2.69**	**.011**	**.02**
ITG-DS	0.03	0.06	186.02	0.57	.567	<.01
Subjective contagion	-0.01	0.01	9.47	-1.04	.325	<.01
Objective contagion	<.01	<.01	7.94	0.63	.545	<.01
PVD X Objective contagion	<.01	<.01	37.56	-0.76	.449	<.01
DS X Objective contagion	<.01	<.01	36.62	-0.23	.823	<.001
ITG-DS X Objective contagion	<.01	<.01	187.05	0.27	.786	<.001
Subjective contagion X Objective contagion	<.01	<.01	9.55	-0.27	.795	<.001
Ingroup social distance						
Intercept	50.71	2.29	13.98	22.10	<.001	
PVD	3.82	2.82	11.96	1.35	.201	.01
DS	**16.01**	**5.29**	**25.43**	**3.03**	**.006**	**.02**
ITG-DS	4.17	2.75	16.15	1.52	.149	.01
Subjective contagion	**0.61**	**0.20**	**14.20**	**3.09**	**.008**	**.02**
Objective contagion	<.01	0.02	13.49	0.11	.915	<.001
PVD X Objective contagion	-0.01	0.03	14.09	-0.48	.642	<.01
DS X Objective contagion	0.07	0.06	30.33	1.26	.219	<.01
ITG-DS X Objective contagion	0.01	0.03	16.13	0.19	.849	<.001
Subjective contagion X Objective contagion	<.01	<.01	11.69	-0.21	.836	<.001

Note. PVD = perceived vulnerability to disease, DS = disgust sensitivity, ITG-DS = intergroup disgust sensitivity. Objective contagion is measured a Level-2 (at the regional-level). The remaining variables are measured at Level-1 (at the level of the individual).

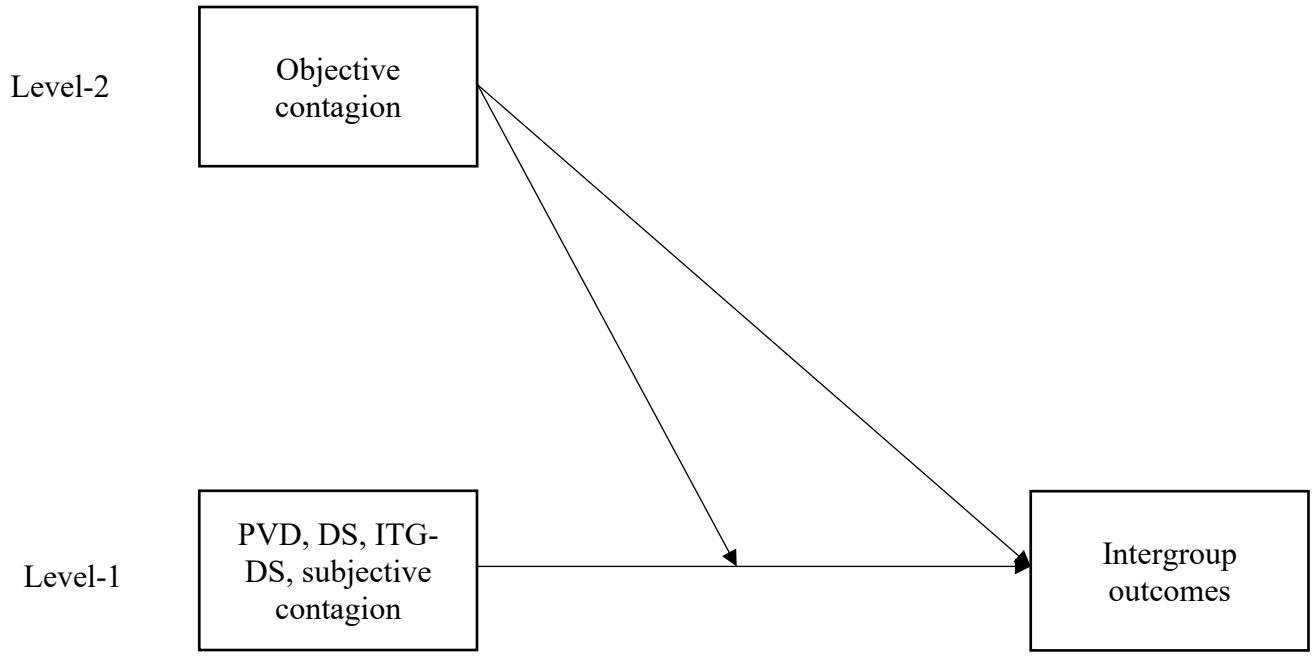

Figure 1. Conceptual representation of the model in which outcomes are predicted by individual differences and subjective contagion is measured at Level-1, and objective contagion measured at Level-2. The moderating role of Level-2 contagion on Level-1 effects was also assessed. Separate models were tested for each outcome variable (outgroup prejudice, outgroup social distance, ingroup attraction, ingroup social distance). PVD = perceived vulnerability to disease, DS = disgust sensitivity, ITG-DS = intergroup disgust sensitivity.

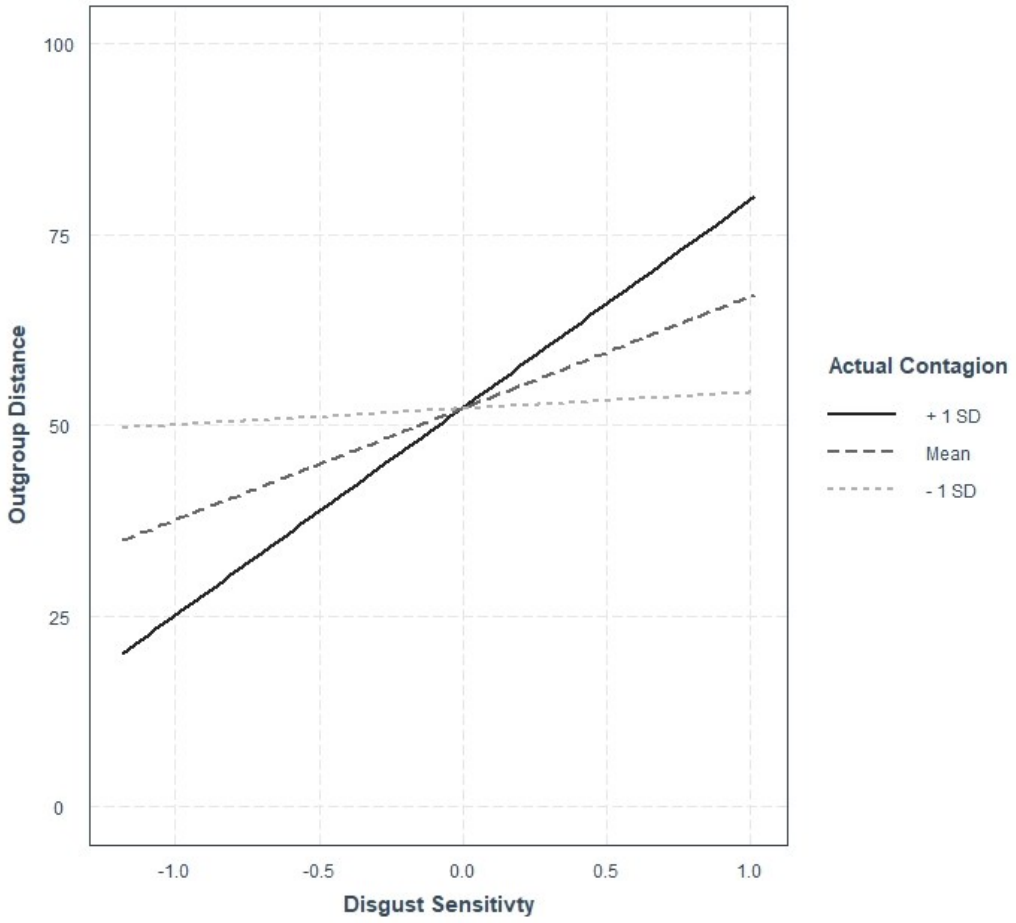

Figure 2. Simple slopes analysis exploring the association between disgust sensitivity (Level-1) and outgroup social distance at high, mean, and low levels of objective regional contagion (Level-2).

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Notes

[1] Our intended sample size was 500 but a server error when the study was live meant that more participants were able to complete the study than requested.

[2] There are 11 cases of missing data on the objective infection rate variable from participants who did not provide their postcode.

[3]Intraclass correlations (ICCs) for all analyses were small (<.01). However, it has been argued that even very small ICCs can lead to incorrect conclusions if MLM is not used (e.g. Musca et al., 2011).