

# Impact of face masks on perceptions of black and white targets during the COVID-19 pandemic

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## Abstract

Although the use of face masks was widespread during the COVID-19 pandemic, their impact on social perceptions is unclear. Notably, research that has investigated the influence of masks on personality attributions has focused on a small set of characteristics with a focus on predominantly White targets, and only few studies examining more diverse groups. Because the race of targets has been found to impact impression formation processes in significant ways, it is important to examine diverse racial targets along with a wider range of personality traits. The goal of the present research therefore was to explore how face masks impact a variety of trait attributions for both White and Black targets. Our results indicate that masking faces has positive implications (i.e., more trustworthy, warm, competent, and less threatening) for White but not Black targets. Notably, both White and Black targets with masks compared to without masks were perceived as more attractive, but the effect was smaller for Black targets. Because COVID-19 continues to be a public health emergency of international concern, with infections and deaths occurring around the world and with mask mandates still being implemented in a variety of contexts, knowing how people differentially respond to targets of different races wearing masks remains relevant and important.

## KEYWORDS

diversity, face masks, face perception, intergroup bias, pandemic

## 1 | INTRODUCTION

Since January 2020, the COVID-19 pandemic has spread globally and caused widespread morbidity and mortality (<https://coronavirus.jhu.edu/map.html>). It is important to note, however, that in North America the pandemic has impacted certain races more than others. For example, in Canada, visible minorities, including Black people, have consistently experienced greater risk of COVID-19 infection and death (Statistics Canada, 2020). Because visible minorities are often overrepresented in socio-economically disadvantaged neighbourhoods, are more likely to live in crowded housing conditions, and work in the service industry or other occupations associated with greater risk of exposure to the virus, they are disproportionately affected. For example, mortality rates due to COVID-19 during the first wave of the pandemic indicated that Canadian neighbourhoods with higher proportions of visible minorities (more than 25%) had almost twice as many deaths (Tasker, 2021).

To curtail the transmission of the virus, many governments and health organizations endorsed wearing face masks in public spaces (Betsch et al., 2020; Karaivanov et al., 2021; Scott et al., 2021; World Health Organization, 2020). Although there is strong evidence that masks significantly decrease COVID-19 cases (Howard et al., 2021; Leung et al., 2020; Prather et al., 2020), they also have important social psychological consequences on person perception. For example, a small literature has demonstrated how masks influence trait attributions. However, as with much of the research in social psychology, these results are related to predominantly White targets (Roberts et al., 2020). This is a problem because the universality of these models has been challenged (Jones et al., 2021; Oswald & Adams, 2022) and because research has indicated that the race of targets can have a significant impact when forming impressions (Hugenberg & Bodenhausen, 2003; Karmali & Kawakami, 2023; Kawakami et al., 2009, 2020). The primary goal of the present research, therefore, was to examine the impact of masks on trait attributions related to both White and Black targets.

### 1.1 | Impact of masks on trait attributions

Although past research has investigated the influence of masks on person perception, these studies have focused on only a few traits and the results have been mixed. For example, some studies related to predominantly White targets have found no evidence for the impact of masks on perceived trustworthiness (Grundmann et al., 2021; Twele et al., 2022) or competence/dominance (Oldmeadow & Koch, 2021), while other studies have demonstrated a positive impact of masks on trustworthiness (Fang & Kawakami, [under review](#); Oldmeadow & Koch, 2021; Olivera-La Rosa et al., 2020) and competence (Fang & Kawakami, [under review](#)). Yet other studies have found a negative impact on trustworthiness (Malik et al., 2021) and competence (Twele et al., 2022).

Research examining the impact of masks on nonWhite target groups, such as Asians (Kamatani et al., 2021), has found a positive effect of masks on perceived attractiveness but only for targets who were initially low in base levels of attractiveness. Notably, research that examined attractiveness ratings of *both* Asian and White targets by White participants replicated this general pattern (Dudarev et al., 2022). More importantly, however, White participants also rated White targets with masks as more attractive than without masks, but rated Asian targets with masks as less attractive than without masks; this pattern was not qualified by base levels of attractiveness.

In addition, research by Oldmeadow and Koch (2021) explored how masks influenced not only perceptions of attractiveness, but also trustworthiness, and dominance/competence for targets of different races. Their findings demonstrated that in general base levels of facial trustworthiness moderated the effect of masks on both trustworthiness and attractiveness—with masks having a larger positive impact (i.e., more trustworthy and more attractive) on faces that were low than high in base trustworthiness (also Marini et al., 2021; but see Hies & Lewis, 2022 for effects not qualified by base attractiveness). More importantly, while Oldmeadow and Koch (2021) found that masks increased perceived trustworthiness for both White and Black faces in an initial study, this effect was larger for White faces. Notably, in a second study, they found that masks increased trustworthiness for White but not Black targets.

Furthermore, race did not qualify the effects of masks on ratings of attractiveness or competence/dominance (with no effect of masks).

Given the mixed findings related to the impact of masks on trait attributions, the scarcity of research in this domain in an intergroup context, and the limited range of traits examined in these studies, our goal was to partially replicate and extend the previous literature on masks in an intergroup context. Specifically, in accordance with past research, we investigated the influence of masks on perceptions of attractiveness and trustworthiness for Black and White targets (Oldmeadow & Koch, 2021). Furthermore, we extended these findings by exploring how masks influence perceptions of warmth, competence, and threat. Although studies by Oldmeadow and Koch (2021) investigated the impact of masks on competence, their measure included ratings of dominance. Given that these two constructs are conceptually distinct (Cheng et al., 2013; Cheng & Tracy, 2014; Witkower et al., 2019) and are associated in different ways with Black and White targets (Karmali & Kawakami, 2023), our research included separate attributions of warmth, competence, and threat.

Notably, warmth and competence are two key dimensions critical to social relationships (Fiske, 2018; Fiske et al., 2007; Twele et al., 2022). Because when people meet others, they must determine their intentions (an evaluation related to warmth) and their ability to act on those intentions (an evaluation related to competence), these attributions drive person perception. Importantly, attributions of warmth and competence predict social valuation. For example, Cikara et al. (2010) demonstrated that members of groups that are perceived to be lower in warmth and/or competence are valued less and are less likely to be saved in situations related to moral dilemmas (e.g., trolley dilemma). Given that many racial minorities experience greater risk of COVID-19 morbidity and mortality (Statistics Canada, 2020), decreases in the perceived value of their lives based on lower attributions of warmth and competence may have important implications for responses to these groups and policies related to reducing their risk factors.

In addition to these key dimensions, we also examined the impact of masks on attributions of threat, a construct that is particularly relevant in an intergroup context in the United States and Canada (Eberhardt et al., 2004; Karmali & Kawakami, 2023; Kawakami et al., 2017, 2020). Given that common stereotypes of Black people are related to anger, physical threat, and dominance (Goff et al., 2014; Hugenberg & Bodenhausen, 2003; MacLin & Herrera, 2006; March et al., 2021; Wilson et al., 2017), we examined the impact of masks on negative associations of threat for Black and White targets.

A secondary goal of the present research was to investigate how messaging related to masks impacts trait attributions. While previous studies have examined the impact of masks that were black or white (colors that have strong negative or positive connotations, respectively) or masks that feature an upturned line, simulating a smile (Kamatani et al., 2021; Oldmeadow & Koch, 2021), neither of these types of masks altered trait perceptions relative to plain masks. Because masks may have positive connotations, such as the protection of others, prosocial behavior, and being responsible (Ackermann et al., 2021; Bestch et al., 2020; Nakayachi et al., 2020), as well as negative connotations, such as being unhealthy, threatening, and dangerous (Oldmeadow & Koch, 2021), their meaning may be ambiguous to some people, especially when worn by different racial groups (MacLin & Herrera, 2006). In the present research, we extended past work by reducing the ambiguity of masks by including masks with the explicit positive message "I CARE."

## 1.2 | Overview of studies

The primary goal of the present research was to examine the impact of masks on a wider range of social trait attributions in two experiments for two distinct racial target groups. In Study 1, conducted in October 2020, we investigated the effect of neutral masks compared to no masks on Black and White targets on five key dimensions— attractiveness, trustworthiness, warmth, competence, and threat. In Study 2, conducted in February 2021, our aim was to replicate and extend our initial findings by exploring the impact of positive messaging on masks.

## 2 | STUDY 1: METHOD

### 2.1 | Participants and design

To maximize power, we chose a 2 Target Race (White, Black)  $\times$  2 Mask (Masked, Unmasked)  $\times$  5 Trait (Attractiveness, Trustworthiness, Warmth, Competence, Threat) within-subjects design. We recruited 76 undergraduates (58 Females, 95% White, 4% Middle Eastern, and 1% Other Ethnicities,  $M_{\text{age}} = 19.3$ ,  $SD_{\text{age}} = 2.21$ ) from a Canadian university who received course credit. Sensitivity analysis using G\*Power (Faul et al., 2007) indicated that our sample size had 0.80 power to detect a Target Race  $\times$  Mask  $\times$  Trait within-subjects interaction on ratings with an effect size of  $\eta_p^2 = 0.02$  (observed  $\eta_p^2 = 0.34$ ).

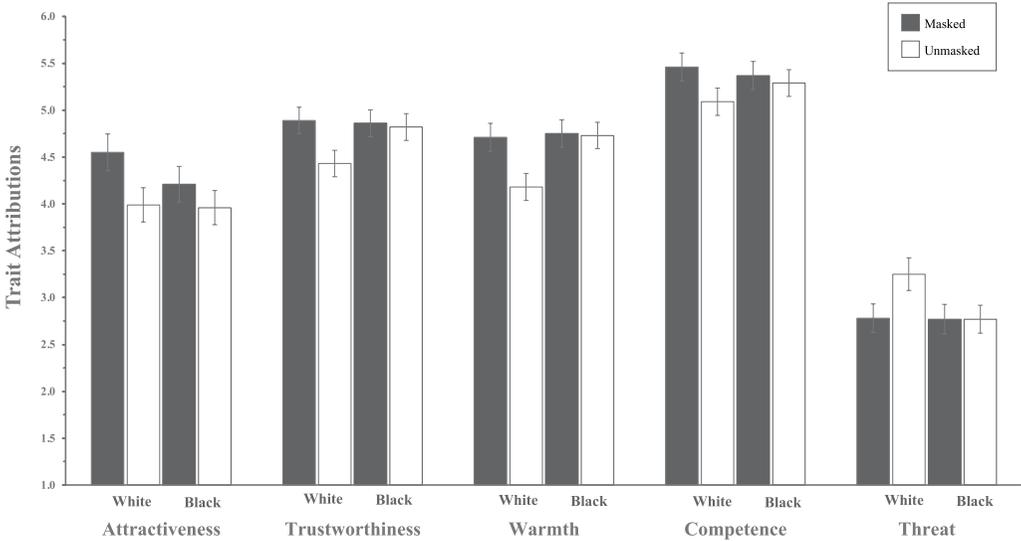
### 2.2 | Procedure

Participants were informed that they would be shown a series of faces on a computer screen. They were presented with 32 White (16 male and 16 female) targets from the Radboud Faces Database (Langner et al., 2010) and 32 Black (16 male and 16 female) targets from the York Faces Database (Vingilis-Jaremko et al., in prep), wearing a mask and not wearing a mask, see Figure 1. Participants were instructed to rate each target on traits related to attractiveness (attractive, good-looking), trustworthiness (trustworthy, dependable), warmth (warm, kind), competence (competent, capable), and threat (threatening, aggressive). Judgments were made on 9-point scales ranging from 1 (*not at all*) to 9 (*extremely*).

Specifically, participants were presented with 2 blocks of trials. In each block, 16 Black and 16 White targets (half with masks and half without masks) were presented in a random order. Each participant always saw the same group of actors wearing masks and another group of actors not wearing masks in all blocks. In Block 1, participants were presented with each face accompanied by 5 items below the face related to the 5 trait dimensions. In Block 2, they were presented with the remaining conceptually similar 5 dimensions. All manipulations and measures in Studies 1 and 2 were reported.



FIGURE 1 Examples of black and white faces with and without neutral and positive masks.



**FIGURE 2** Trait attributions in Study 1 for masked and unmasked white and black targets. Error bars represent standard errors.

### 3 | RESULTS

To examine the impact of target race and masks on traits attributions, we conducted a 2 (Target Race: Black, White)  $\times$  2 (Mask: Masked, Unmasked)  $\times$  5 (Trait: Attractiveness, Trustworthiness, Warmth, Competence, Threat) repeated-measures ANOVA.<sup>1</sup> The main effects of Mask,  $F(1, 75) = 25.75, p < 0.001, \eta_p^2 = 0.26$ , and Trait,  $F(4, 300) = 56.68, p < 0.001, \eta_p^2 = 0.43$ , as well as all two-way interactions,  $ps < 0.001$ , were significant. Importantly, these effects were qualified by the significant three-way interaction,  $F(4, 300) = 38.73, p < 0.001, \eta_p^2 = 0.34$ . To decompose this interaction, we examined the effects of Target Race and Mask on each Trait separately.

The Target Race and Mask interaction was significant for all five Traits, Attractiveness:  $F(1, 75) = 17.33, p < 0.001, \eta_p^2 = 0.19$ ; Trustworthiness:  $F(1, 75) = 42.27, p < 0.001, \eta_p^2 = 0.36$ ; Warmth:  $F(1, 75) = 47.98, p < 0.001, \eta_p^2 = 0.39$ ; Competence:  $F(1, 75) = 30.89, p < 0.001, \eta_p^2 = 0.29$ ; and Threat:  $F(1, 75) = 39.38, p < 0.001, \eta_p^2 = 0.34$ . Given our focus on the impact of masks for Black and White targets, we conducted pairwise contrasts between masked and unmasked faces for each race (see Figure 2).

For White targets, masked compared to unmasked faces were perceived as more attractive,  $F(1, 75) = 49.04, p < 0.001, \eta_p^2 = 0.40$ , trustworthy,  $F(1, 75) = 33.66, p < 0.001, \eta_p^2 = 0.31$ , warm,  $F(1, 75) = 40.28, p < 0.001, \eta_p^2 = 0.35$ , and competent,  $F(1, 75) = 25.44, p < 0.001, \eta_p^2 = 0.25$ , but less threatening,  $F(1, 75) = 44.37, p < 0.001, \eta_p^2 = 0.37$ . In contrast, for Black targets, there were no significant differences between masked and unmasked faces in perceptions of trustworthiness,  $F(1, 75) = 0.55, p = 0.462, \eta_p^2 = 0.01$ , warmth,  $F(1, 75) = 0.09, p = 0.766, \eta_p^2 < 0.01$ , competence,  $F(1, 75) = 1.67, p = 0.201, \eta_p^2 = 0.02$ , and threat,  $F(1, 75) = 0.01, p = 0.925, \eta_p^2 < 0.01$ . Although Black targets with masks compared to without masks were rated as more attractive,  $F(1, 75) = 28.74, p < 0.001, \eta_p^2 = 0.28$ , as indicated by the significant Target Race by Mask interaction, the size of this effect was smaller for Black than White targets.

### 4 | STUDY 2: METHOD

#### 4.1 | Participants and design

We used a 2 Target Race (White, Black)  $\times$  2 Mask (Masked, Unmasked)  $\times$  5 Trait (Attractiveness, Trustworthiness, Warmth, Competence, Threat)  $\times$  2 Mask Type (Neutral, Caring) mixed design, with Mask Type as a between-subjects

variable. We recruited 186 undergraduates (127 Females; 22% White, 26% Middle Eastern, 26% South Asian, 18% East Asian, and 8% Other Ethnicities,  $M_{\text{age}} = 20.7$ ,  $SD_{\text{age}} = 4.01$ ) from a Canadian university who received course credit.<sup>2</sup> Sensitivity analysis found that our sample had 0.80 power to detect a Target Race  $\times$  Mask  $\times$  Trait within-subjects interaction with an effect size of  $\eta_p^2 = 0.01$  (observed  $\eta_p^2 = 0.21$ ), and the four-way interaction (More-Power: Campbell & Thompson, 2012) with an effect size of  $\eta_p^2 = 0.02$  (observed  $\eta_p^2 = 0.01$ ).

## 4.2 | Procedure

The procedure was identical to Study 1 with one exception. Participants were randomly assigned to either a condition with unmasked faces and masked faces with no message or to a condition with unmasked faces and masked faces with the words "I CARE."

## 5 | RESULTS

To examine the impact of target race, masks, and type of masks on trait attributions, we conducted a 2 (Target Race: Black, White)  $\times$  2 (Mask: Masked, Unmasked)  $\times$  5 (Trait: Attractiveness, Trustworthiness, Warmth, Competence, Threat)  $\times$  2 (Mask Type: Neutral, Caring) mixed-design ANOVA, with only Mask Type as a between-subjects variable.

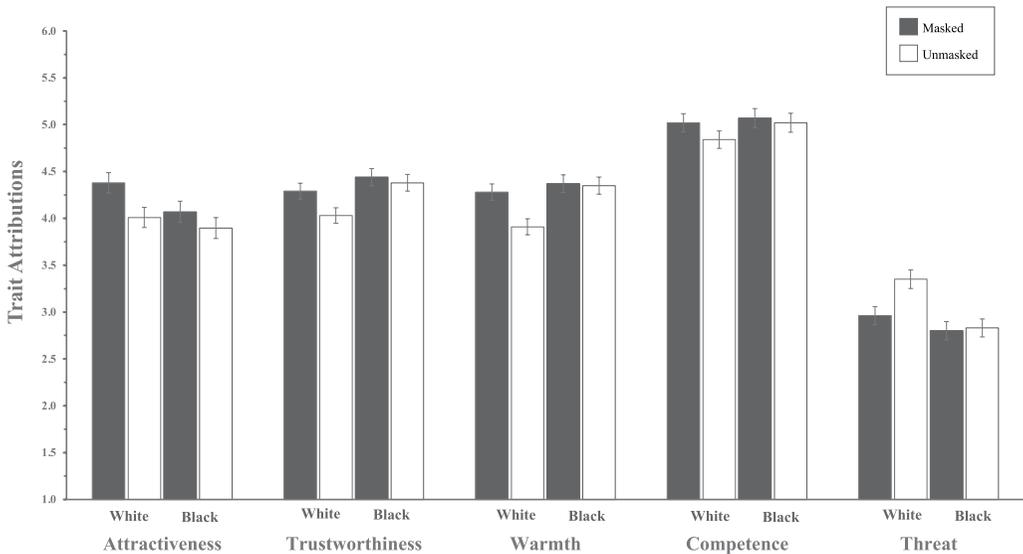
The main effects of Mask,  $F(1, 184) = 27.21$ ,  $p < 0.001$ ,  $\eta_p^2 = 0.13$ , and Trait,  $F(4, 736) = 112.18$ ,  $p < 0.001$ ,  $\eta_p^2 = 0.38$ , as well as all two-way interactions with Mask, Trait, and Target Race,  $ps < 0.001$ , were significant. These effects, however, were qualified by the Target Race, Mask, and Trait three-way interaction,  $F(4, 736) = 48.09$ ,  $p < 0.001$ ,  $\eta_p^2 = 0.21$ . Notably, the four-way interaction including Mask Type was not significant,  $F(4, 736) = 1.66$ ,  $p = 0.158$ ,  $\eta_p^2 = 0.01$ , suggesting that whether targets wore a neutral or caring mask did not moderate the main findings.

In accordance with the results in Study 1, the Target Race by Mask interaction was significant for all five Traits (see Figure 3), Attractiveness:  $F(1, 185) = 15.93$ ,  $p < 0.001$ ,  $\eta_p^2 = 0.08$ ; Trustworthiness:  $F(1, 185) = 27.67$ ,  $p < 0.001$ ,  $\eta_p^2 = 0.13$ ; Warmth:  $F(1, 185) = 69.29$ ,  $p < 0.001$ ,  $\eta_p^2 = 0.27$ ; Competence:  $F(1, 185) = 10.74$ ,  $p = 0.001$ ,  $\eta_p^2 = 0.06$ ; and Threat:  $F(1, 185) = 60.73$ ,  $p < 0.001$ ,  $\eta_p^2 = 0.25$ .

For White targets, masked compared to unmasked faces were perceived as more attractive  $F(1, 185) = 69.94$ ,  $p < 0.001$ ,  $\eta_p^2 = 0.27$ , trustworthy,  $F(1, 185) = 36.14$ ,  $p < 0.001$ ,  $\eta_p^2 = 0.16$ , warm,  $F(1, 185) = 71.20$ ,  $p < 0.001$ ,  $\eta_p^2 = 0.28$ , and competent,  $F(1, 185) = 26.42$ ,  $p < 0.001$ ,  $\eta_p^2 = 0.21$ , but as less threatening,  $F(1, 185) = 62.57$ ,  $p < 0.001$ ,  $\eta_p^2 = 0.25$ . In contrast, for Black targets, there were no significant differences between masked and unmasked faces in perceptions of trustworthiness  $F(1, 185) = 2.75$ ,  $p = 0.100$ ,  $\eta_p^2 = 0.02$ , warmth,  $F(1, 185) = 0.13$ ,  $p = 0.721$ ,  $\eta_p^2 < 0.01$ , competence,  $F(1, 185) = 3.28$ ,  $p = 0.072$ ,  $\eta_p^2 = 0.02$ , and threat,  $F(1, 185) = 1.03$ ,  $p = 0.311$ ,  $\eta_p^2 = 0.01$ . Although Black targets with masks compared to without masks were rated as more attractive,  $F(1, 185) = 21.50$ ,  $p < 0.001$ ,  $\eta_p^2 = 0.10$ , as indicated by the significant Target Race by Mask interaction, the size of this effect was smaller for Black than White targets.

## 6 | GENERAL DISCUSSION

The present research investigated the impact of masks on Black and White faces on attractiveness, trustworthiness, warmth, and competence, key dimensions when forming impressions of others, as well as perceived threat, a stereotype associated with Black people in North America. Knowing how masks increase or decrease these trait ratings is important because attribution of these characteristics have a range of implications from affiliative behavior to higher pay to judicial sentencing decisions (Fiske et al., 2007; Hugenberg & Bodenhausen, 2003; Kawakami et al., 2017; Porter et al., 2010; Todorov et al., 2015; Xie et al., 2019). This information is particularly important during



**FIGURE 3** Trait Attributions in Study 2 for masked and unmasked white and black targets. Error bars represent standard errors.

the COVID-19 pandemic because lower attributions of certain traits (e.g., trustworthiness, warmth, competence, attractiveness) can impact the extent to which we feel concern for the health of members of racialized groups such as Blacks (Cikara et al., 2010) and higher attributions of other traits (e.g., threat) can influence our willingness to interact with and care about them (Karmali & Kawakami, 2023).

Across two studies, we provided consistent evidence that masks increased positive attributions for White targets. Specifically, White targets wearing compared to not wearing masks were perceived to be more attractive and trustworthy, as previously demonstrated (Oldmeadow & Koch, 2021; Olivera-La Rosa et al., 2020). We, however, also provide novel evidence that they were rated as more competent and warmer, but less threatening. In contrast, masks had little impact on the social perception of Black targets. Specifically, wearing compared to not wearing masks did not influence the extent to which Black targets were perceived to be trustworthy, competent, warm, or threatening. Black targets with compared to without masks, however, were perceived to be more attractive, though this effect was smaller than for White targets. These findings are notable and suggest that certain nonverbal cues that work to the advantage of White targets, do not have the same effect for Black targets (Karmali & Kawakami, 2023), potentially exacerbating existing racial disparities during the pandemic.

One possible reason for why masks may have less impact on Black targets is that the meaning of masks may be more ambiguous—activating associations related to concern for others (Bestch et al., 2020; Nakayachi et al., 2020), as well as negative associations related to illness and threat stereotypes (MacLin & Herrera, 2006; Oldmeadow & Koch, 2021). In Study 2, we attempted to make masks less ambiguous by including a condition in which masks explicitly displayed a caring message. Although sufficiently powered to detect a small effect, we found, in accordance with previous research (Kamatani et al., 2021; Oldmeadow & Koch, 2021), that masks with affirmative messaging did not qualify our primary findings related to positive attributions for masked compared to unmasked White but not Black targets.

## 6.1 | Limitations and future directions

Although our results provide strong and consistent evidence that masks have a positive impact on White but not Black targets, it is important to note that the trait ratings were explicit. Because an abundance of research indicates that

White people are often less willing to respond negatively on such measures to Black targets (Apfelbaum et al., 2008; Dovidio et al., 2010; Kawakami et al., 2017), it is possible that if implicit measures are included in the future more negative consequences related to masks may be found.

A further avenue for future research is to examine how people perceive not only Black, but other racial faces with and without masks on a variety of stereotypic and nonstereotypic traits. In addition, future research should examine how characteristics related to perceivers influence perceptions of targets. Because the race of perceivers may uniquely interact with the race of targets to influence impressions (Hehman et al., 2017; Leder et al., 2022; Xie et al., 2021), it is important to examine diverse target and perceiver groups when examining the impact of masks. Beside race, we also recommend that future researchers include measures of perceiver's attitudes and behaviors during the COVID-19 pandemic. In particular, perceiver's attitudes toward masks, how often they wear masks, and their engagement with other health-conscious behaviors may moderate effects.

## 7 | CONCLUSIONS

Including targets from two racial categories, two types of masks, and five trait constructs across two studies, our results consistently indicate that wearing compared to not wearing masks has positive implications for White but not Black targets. Given that COVID-19 continues to be a public health emergency of international concern (Adams, 2023), with mask mandates still being implemented in a variety of contexts, the implications of knowing how people differentially respond to targets of different races wearing masks remains relevant and important.

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## CONFLICT OF INTEREST STATEMENT

The authors declare no conflict of interest.

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## ENDNOTES

<sup>1</sup> In both studies, we calculated trait indices by averaging participant's responses for Black and White targets, separately. For results related to the omnibus analyses for Studies 1 and 2, please refer to the Online [Supplementary Material](#) (OSM).

<sup>2</sup> Participant race did not influence the primary pattern of results, see OSM, p. 4.

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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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