Received: 25 May 2023 | Accepted: 8 April 2024

DOI: 10.1002/ejsp.3069

RESEARCH ARTICLE

EASP WILEY

Changing perceptions of people wearing masks: Two years of living in a pandemic

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Abstract

Despite the widespread use of face masks to combat COVID-19, little is known about their immediate and delayed social consequences. To understand short- and long-term effects of face masks on interpersonal perception, we measured the evaluation of faces with and without masks at four time points—June 2020, January 2021, September 2021 and June 2022—from the early months of the pandemic in North America to the more recent, and from the implementation of mask mandates to the end of these requirements. Surprisingly, we found that, in general, faces with masks were perceived as more competent, warm, trustworthy, considerate and attractive, but less dominant and anxious than faces without masks. Moreover, differences in attributions of dominance, trustworthiness and warmth between faces with and without masks increased in a linear trend from June 2020 to June 2022. Notably, the impact of masks on perceptions of competence, considerateness, attractiveness and anxiousness did not change over time. We discuss how mask mandates can alter people's social perceptions of others who wear masks compared to those who do not wear masks and how these mandates may influence attributions of some traits more than others through mere exposure and/or social norms.

KEYWORDS
face masks, face perception, mere exposure, pandemic, social norms

1 | INTRODUCTION

Since the acknowledgment of the 2019 Novel Coronavirus by the World Health Organization (WHO) and the Centers for Disease Control and Prevention (CDC) in January 2020, the global outbreak of this disease has caused significant morbidity and mortality (https://coronavirus.jhu.edu/map.html). Although initially many governments and health organizations endorsed wearing face masks in response to the pandemic (Betsch et al., 2020; Karaivanov et al., 2021; Scott et al., 2021), these formal recommendations changed over time as new information was brought to light, as the virus mutated into new variants that were more or less transmissible, as more people were vaccinated against COVID-19, and with fluctuations in overcrowding of health care systems.

For example, although the WHO (2020a) recommended in April 2020 that medical masks should be worn by specific groups (e.g. health care workers, people with suspected infection and respiratory symptoms and their caregivers), in June 2020, they (WHO, 2020b) revised their recommendations for masks to include the general public. Notably, guidelines related to wearing masks not only changed over time but also varied greatly between countries, provinces, states and municipalities. The primary goal of the present research was to examine the impact of changes in governmental mask recommendations and mandates in Ontario, Canada between June 2020 and June 2022 on the perception of individuals wearing masks. In particular, we aimed to investigate how traits attributed to individuals wearing masks changed over a 2-year period, spanning from the early months of the pandemic to more recent times when mask mandates were lifted. Our study

encompassed four different time points (i.e. June 2020, January 2021, September 2021, June 2022) to explore the effects of masks on four key dimensions when forming impressions of others (i.e. competence, warmth, trustworthiness and dominance) and three additional traits specifically relevant to mask-wearing (attractiveness, considerateness and anxiousness) over time.

1.1 | Mask mandates and social norms

On 7 April 2020, the Public Health Agency of Canada (PHAC) issued a recommendation for the general public to wear masks, a sentiment echoed by Dr. Tam, Canada's Chief Public Health Officer. This recommendation remained in effect until 11 June 2022, when Dr. Kieran Moore, Chief Medical Officer of Health in Ontario, lifted the provincial masking requirement.

Extensive prior research provides compelling evidence for the substantial impact of these mandates on individuals' mask-wearing behaviour (Betsch et al., 2020). Studies utilising self-reported mask use and photographic observation from digital archives indicate that mask-wearing behaviour generally increases following mandates (Karaivanov et al., 2021; Scott et al., 2021). Specifically, in the context of Ontario, research suggests rapid and widespread compliance with mask mandates (Karivanov et al., 2021). Notably, the percentage of Ontarians supporting a provincial mask mandate dropped from 78% in February 2022 (during the mandate) to 55% in July 2022 (after the mandate was lifted; Angus Reid Institute, 2022), underscoring the close link between legislation and public attitudes.

Changes in mask mandates not only influenced behaviour but was also accompanied by shifts in social norms pertaining to mask-wearing. Bourgeois (2020), for example, demonstrated that as early as September 2020, 87% of surveyed respondents reported that wearing a mask was a civic duty, illustrating the establishment of strong social norms regarding mask-wearing relatively soon after the initial mandates.

Notably, social psychologists have identified two distinct types of norms—injunctive and descriptive norms (Cialdini et al., 1990, 1991). Injunctive norms are related to beliefs about how others ought to behave and involve perceptions of behaviours that are deemed acceptable or unacceptable (i.e. 'we should wear face masks in public'). Injunctive norms motivate changes in behaviour primarily because of the social rewards or punishments associated with the behaviour. Descriptive norms, alternatively, are related to behaviours that are typically performed by others and involve perception of behaviours that are relatively frequently encountered (i.e. 'It seems like everyone around me wears face masks in public'). Descriptive norms guide behaviour based on our beliefs about how most people would act in a given situation or context. Recent research has found that both injunctive and descriptive norms strongly influence face mask-wearing, independent of an individual's perceived threat from COVID-19 (Lipsey & Losee, 2023). Although injunctive and descriptive norms are often aligned, such that typical behaviours are often deemed more appropriate and vice versa (Eriksson et al., 2015), it is possible that mask mandates may differentially impact injunctive and descriptive norms over time. Moreover, these changes in social norms may influence individuals' attributions of traits to those who wear masks.

Injunctive norms. When the use of face masks is initially mandated, injunctive norms may develop fairly quickly with a large proportion of people wearing masks (Kim & Tandoc, 2021; Silchenko & Visconti, 2021). Furthermore, behaving in accordance with this social contract compared to non-compliance is not only effective in reducing COVID-19 cases (Karivonov et al., 2021; Mitze et al., 2020) but can also reap social rewards and approval (Betsch et al., 2020). For example, people wearing masks saw themselves as more likely to be protecting themselves as well as others from viral infection (Nakayachi et al., 2020). They were also perceived as more prosocial, altruistic and socially responsible compared to those not wearing masks (Ackermann et al., 2021; Betsch et al., 2020; Nakayachi et al., 2020). Accordingly, if injunctive norms related to wearing masks developed fairly quickly after the implementation of mask mandates, their impact may be expected to remain stable over time until the mandates are removed. Specifically, if people's behaviour changed according to injunctive norms, one would expect greater attributions of positive but not negative traits after the implementation of mandates and that these attributions would not change over the duration of the mandate.

Descriptive norms. Although injunctive norms may be impacted by the initial implementation of mask mandates, descriptive norms may increase over time with greater exposure to others wearing masks. Because in North America wearing face masks in public before COVID-19 was relatively rare (Ackermann et al., 2021; Goodwin et al., 2009; Silchenko & Visconti, 2021), the pandemic provided novel and progressively greater exposure to this behaviour. Just like mere exposure to information, objects and faces can increase positive ratings of that stimuli (Allport & Lepkin, 1945; Hasher et al., 1977; Pennycook et al., 2018), theorising related to descriptive norms suggests that greater exposure to certain behaviours by others can increase evaluations of that behaviour and the person enacting that behaviour (Borsari & Carey, 2003; Kwan et al., 2015). For example, a large literature on the mere exposure effect has demonstrated a linear increase in positivity ratings when unknown faces are presented repeatedly (e.g. 0, 1, 2, 5, 10, or 25 times, Zajonc et al., 1974; see also Bornstein & D'Agostino, 1992; Faerber et al., 2016; Zebrowitz et al., 2008). Because of a growing exposure to people wearing masks during periods in which masks are mandated, we expect that attributions of positive, but not negative, traits would increase over time for people wearing masks. Specifically, if descriptive norms related to perceiving others wearing masks increased over time after the implementation of mask mandates, their impact may be expected to amplify in a linear way with more exposure until mandates are removed and fewer people wear masks.

1.2 | Impact of masks on trait attributions

Since the WHO (2020b) initially recommended the use of masks among the general public, researchers have conducted investigations into the impact of masks on various face perception processes. Numerous studies have revealed that masks hinder the recognition of facial

identities and emotions (for review, see Pavlova & Sokolov, 2022). Individuals consistently performed worse in recognising faces with masks compared to those without masks (Bennetts et al., 2022; Carragher & Hancock, 2020; Freud et al., 2022), and their overall accuracy in identifying emotions on masked faces was consistently lower (Carbon, 2020; Grundmann et al., 2021; Gulbetekin et al., 2021; Ramachandra & Longacre, 2021).

Interestingly, findings concerning social judgement and trait attributions associated with masked faces during the COVID-19 pandemic were more nuanced, with mixed results regarding the impact of masks on certain characteristics such as trustworthiness, dominance and competence. For instance, some researchers found that masked faces were perceived as more trustworthy, warm and prosocial than unmasked faces (Cartaud et al., 2020; Guo et al., 2022; Ko et al., 2023; Oldmeadow & Koch, 2021; Olivera-La Rosa et al., 2020; Stosic et al., 2022). However, other studies discovered no difference in the perceived trustworthiness of masked and unmasked faces (Twele et al., 2022). There is even evidence suggesting that participants felt less close to faces with masks compared to those without masks, despite the typically strong correlation between closeness and trustworthiness/warmth (Kastendieck et al., 2022; Glaeser et al., 2000). Similarly, whereas some researchers found no difference in the perceived dominance/competence of masked and unmasked faces (Guo et al., 2022; Oldmeadow & Koch, 2021), others found that masked faces were perceived as more competent than unmasked faces (Stosic et al., 2022). Furthermore, studies have provided evidence that face perception related to mask-wearing (perceived trustworthiness, dominance, competence, etc.) is moderated by several variables, including emotional expressions (Grundmann et al., 2021), morphological features of the face (Marini et al., 2021) and characteristics of the perceivers (Kamatani et al., 2021; Malik et al., 2021). These findings highlight the complex nature of face perception and the multifaceted impact of mask-wearing on social judgements.

Importantly, one potential reason for these mixed findings related to trait attributions is that the impact of masks on person perception may change over time and be influenced by mask mandates. For example, wearing a face mask may be perceived differently if it is measured before or soon after a mask mandate, or at the beginning of the pandemic compared to 2 years into the pandemic. Notably, most previous studies have examined perceptions of masked faces at a single point since the COVID-19 outbreak and therefore there is limited knowledge about how perceptions of masked faces have evolved over 2 years of the pandemic. Examining the evolution of these perceptions is crucial, as social norms undergo changes over time. For example, in a study by Barrick et al. (2021), participants were asked to smake similarity judgements about pairs of emotional faces without masks in both April 2020 and September 2020—before and after widespread mask adoption in the United States. Interestingly, participants who reported frequent social contact with individuals wearing masks were more likely to use cues from the eyes, suggesting changes in face processing strategies due to social interactions with mask-wearers. In another study, Kamatani et al. (2021) examined participants' ratings of the healthiness of faces with and without masks in 2016 (before the COVID-19 pandemic) and in 2021 (during the COVID-19 pandemic). The results indicated that masked faces were judged as healthier during the COVID-19 pandemic relative to the pre-COVID-19 period. These findings provide preliminary evidence that people's judgements about individuals wearing masks have changed during the pandemic.

Another potential reason for the mixed findings related to the impact of masks on trait attributions may be related to the specific traits included in each study. In the present research, we extended the findings of earlier studies by examining a range of personality trait attributions during four distinct periods in the pandemic. In particular, we examined two types of traits—core traits that are considered to be the key dimensions of person perception and traits that may be particularly relevant to perceptions of people wearing masks during the pandemic. A secondary goal of the present study was to explore if masks impact the perception of certain traits differentially over time.

Core traits. The basic characteristics of person perception are widely believed to revolve around two overarching dimensional structures (Fiske et al., 2002, 2007; Oosterhof & Todorov, 2008). In this research, we examined two prominent models within the domain of person perception and draw upon each of these models to extract core traits.

The first model, proposed by Fiske et al. (2002, 2007), suggests that person perception is primarily driven by inferences of competence and warmth. According to this account, when people meet others, they aim to determine the others' intentions (related to warmth) and their ability to act on those intentions (related to competence). A second model, primarily based on the study of face perception (Oosterhof & Todorov, 2008; Todorov et al., 2008), considers trustworthiness and dominance as central to person perception. By having participants select the most frequently used trait dimensions from unconstrained descriptions of neutral faces and by collecting judgements from an independent sample of the faces on these dimensions, Todorov et al. (2008), revealed the two principal components of face evaluations to be trustworthiness and dominance.

Extensive research has demonstrated that observers can consistently infer these core traits (i.e. competence, warmth, dominance and trustworthiness) from faces (Chen et al., 2014; Dotsch et al., 2016; Na et al., 2015; Stirrat & Perrett, 2010; Tiedens, 2001). Moreover, the inference of these traits is often rapid (Todorov et al., 2009; Willis & Todorov, 2006), and they have been associated with a variety of significant consequences from affiliative behaviour to higher pay to judicial sentencing decisions (Fruhen et al., 2015; Porter et al., 2010; Stirrat & Perrett, 2010; Sutherland et al., 2020; Todorov et al., 2015; Wilson & Rule, 2015), to name just a few.

Other potentially relevant traits. In addition to these core traits, we included three other traits that are potentially associated with perceptions of others who wear masks—attractiveness, considerateness and anxiousness.

In particular, research has demonstrated that masked faces are rated as more attractive than unmasked faces (Hies & Lewis, 2022; Oldmeadow & Koch, 2021; Patel et al., 2020). Given the recognised role of attractiveness in face perception (Xie et al., 2019), we explored the impact of masks over time on this characteristic as well. Moreover,

TABLE 1 Mask mandates in Ontario and demographic information of participants at four time points.

Time	Months after the implementation of the mask mandate	N	Mean Age (*SD*)	Gender distribution	Ethnicity distribution	Years live in Canada
T1 15 June 2020 24 June 2020	2	97	21.81 (5.26)	24 M, 73 F	36 White, 7 East Asian, 10 South East Asian, 23 South Asian, 11 Black, 5 Middle Eastern, 5 other ethnicities	21.6 (7–50)
T2 17 January 2021 16 February 2021	9	89	19.61 (3.00)	22 M, 67 F	33 White, 2 East Asian, 7 South East Asian, 18 South Asian, 7 Black, 6 Middle Eastern, 16 other ethnicities	19.5 (10–35)
T3 12 September 2021 25 September 2021	16	90	19.34 (3.70)	15 M, 75 F	25 White, 12 East Asian, 6 South East Asian, 25 South Asian, 9 Black, 9 Middle Eastern, 4 other ethnicities	18.8 (7–31)
T4 24 June 2022 8 July 2022	25	82	23.98 (2.85)	23 M, 59 F	10 White, 8 East Asian, 3 South East Asian, 28 South Asian, 15 Black, 12 Middle Eastern, 6 other ethnicities	15 (3–50)

Note: The mask mandate was lifted on 11 June 2022. Although we originally recruited a total of 96 students at T4, the data from14 students were excluded because they had not lived in Canada for more than 3 years. Given the importance of the timing of implementation and lifting of the mask mandate to our primary theorising and large variations worldwide related to mandates, we limited our participants to people residing in Canada shortly before and after that period.

the use of masks has strongly been linked to the protection of others (Ackermann et al., 2020). Specifically, because wearing masks has been associated with concern for others and prosocial behaviour (Ackermann et al., 2020; Betsch et al., 2020; Nakayachi et al., 2020), we examined ratings of considerateness as an additional trait of interest. Additionally, wearing masks during a pandemic is also associated with a concern for one's own health (Ackerman et al., 2020; Goodwin et al., 2009). According to a review by Howard et al. (2021), face masks not only prevent the transmission of the COVID-19 virus to others but also reduce the inhalation of infectious respiratory particles. Given that anxiety and fear of catching the virus are commonly associated with wearing masks, we included ratings of anxiousness in our investigation.

2 | THE PRESENT STUDY

The primary goal of the present study was to investigate how face masks impact person perception over time as their use increased during the COVID-19 pandemic. Specifically, we examined the attribution of traits to a series of faces with and without masks at four separate time points of people living in Ontario, Canada. The four time points were June 2020 (2 months after the Canadian government announced the mandatory wearing of masks in public), February 2021 (9 months after the mask mandate), September 2021 (16 months after the mask mandate) and June 2022 (immediately after the lifting of the mask mandate and 25 months after its implementation). All faces were rated on traits related to competence, warmth, trustworthiness, dominance, attractiveness, considerateness and anxiousness at each time point. Our primary goal was to examine how the ratings of masked versus non-masked faces on four core traits (dominance, trustworthiness, competence and warmth) changed over time. Our secondary goal was to explore whether the ratings of masked versus non-masked faces on traits specifically relevant to mask-wearing (considerateness, anxiousness and attractiveness) also changed over time.

3 | METHODS

3.1 | Participants

A total of 358 participants were recruited at four different time points from a university in Ontario, Canada, who received course credits for their participation. Detailed information about the participants can be found in Table 1. To examine the effect of wearing masks on trait attribution, a sensitivity analysis using G*Power (Faul et al., 2007) with a multiple regression (Fixed model, R^2 increase) showed that our final sample could detect an effect size f^2 ranging from 0.082 to 0.098 for the linear trend of the effect of Masks over time (power = 0.80, $\alpha = .05$).

3.2 | Stimuli and procedure

Using a Qualtrics survey platform (www.qualtrics.com), participants were informed that they would be presented with a series of faces to rate on several dimensions. These stimuli consisted of 12 White Caucasian actors (six women and six men) from the Radboud Faces Database (Langner et al., 2010) wearing a mask and not wearing a mask, for a total of 24 faces, see Figure 1 (the stimuli are available at https://osf.io/5ycpk/?view_only = 9349bd896c29441d9cdd615374aad1e0).

To create four stimulus sets, three male actors and three female actors wearing and not wearing a mask were randomly assigned to each set for a total of 12 images per set. Importantly, each actor was only depicted in each set once and each participant only evaluated one set to reduce the potential influence of prior exposure to the actors with or without masks.

Participants were presented with the same set in three blocks of trials. Within each block, the twelve actors were presented in a random order and participants were instructed to evaluate the face on five traits. These traits included one trait from the four constructs of dominance (dominant, assertive and forceful, $\alpha = .70$; Chen et al., 2014; Fiske

FIGURE 1 Examples of faces without and with masks.

et al., 2002), trustworthiness (trustworthy, dependable and honest, $\alpha = .77$), warmth (warm, friendly and good-natured, $\alpha = .81$), competence (competent, confident and capable, $\alpha = .73$) and one additional characteristic (attractive, considerate, or anxious). Each block included a different trait from each construct (e.g. block 1—dominant, trustworthy, competent, warm and attractive; block 2—assertive, dependable, confident, friendly and considerate; block 3—forceful, honest, capable, good-natured and anxious). Participants made their judgements using 100-point slider scales ranging from 1 = *not at all* to 100 = *extremely*. All manipulations and measures in the study were reported.

4 | RESULTS

All anonymised raw data and analyses are available at https://osf.io/5ycpk/?view_only = 9349bd896c29441d9cdd615374aad1e0. We used R (version 4.1.0; R Core Team, 2020) with the lme4 (version 1.1-27.1; Bates et al., 2015) to perform a linear mixed-effects model analysis for each of the seven trait constructs (dominance, trustworthiness, competence, warmth, considerateness, anxiousness and attractiveness ratings). As fixed effects, we entered Mask (0 = without masks, 1 = with masks; non-ordered factor), Time (T1, T2, T3 and T4; ordered factor) and their interactions into the model. As random effects, we had intercepts for participants and actors. The lmerTest package (version 3.0.1; Kuznetsova et al., 2017) was used for testing significance and the emmeans package (version 1.6.3; Lenth, 2021) was used for post-hoc comparisons. For detailed information regarding the models and all results, please refer to Table S1 in the Supporting Information. All mean ratings and standard deviations are presented in Table 2. Our first analyses were related to the four primary traits of dominance, trustworthiness, competence and warmth. Our secondary analyses explored ratings of considerateness, anxiousness and attractiveness.

4.1 | Perceived dominance, trustworthiness, competence and warmth

The main effect of Mask was significant for perceived dominance, $b = -2.28$, $SE = 0.47$, $t(3927) = -4.88$, $p < .001$, trustworthiness,

TABLE 2 Mean trait ratings (with standard deviations in brackets) for faces with and without masks at four time points.

Measure	Time	Masked face	Unmasked face
Dominance	June 2020 (T1)	45.70 (19.75)	45.10 (21.21)
	Jan. 2021 (T2)	40.48 (20.46)	42.97 (23.00)
	Sept. 2021 (T3)	41.00 (20.72)	43.78 (23.49)
	June 2022 (T4)	40.99 (19.05)	45.43 (21.24)
Trustworthiness	June 2020 (T1)	44.68 (20.64)	44.17 (19.84)
	Jan. 2021 (T2)	43.42 (21.97)	41.06 (21.91)
	Sept. 2021 (T3)	47.21 (20.79)	44.01 (20.95)
	June 2022 (T4)	46.36 (19.88)	42.92 (19.58)
Competence	June 2020 (T1)	50.96 (20.05)	50.11 (19.01)
	Jan. 2021 (T2)	50.18 (21.72)	48.73 (22.44)
	Sept. 2021 (T3)	53.90 (19.41)	52.87 (20.44)
	June 2022 (T4)	51.31 (18.81)	50.70 (18.59)
Warmth	June 2020 (T1)	43.66 (20.97)	42.66 (20.02)
	Jan. 2021 (T2)	42.61 (22.63)	38.43 (22.32)
	Sept. 2021 (T3)	46.11 (21.23)	42.62 (21.84)
	June 2022 (T4)	45.32 (21.48)	40.39 (20.77)
Attractiveness	June 2020 (T1)	49.81 (29.02)	44.46 (28.22)
	Jan. 2021 (T2)	45.18 (28.35)	39.82 (26.81)
	Sept. 2021 (T3)	44.71 (28.19)	37.50 (27.19)
	June 2022 (T4)	45.66 (26.83)	40.72 (25.17)
Considerateness	June 2020 (T1)	47.15 (25.22)	44.37 (23.45)
	Jan. 2021 (T2)	45.32 (26.56)	40.00 (25.02)
	Sept. 2021 (T3)	47.30 (24.38)	44.38 (25.30)
	June 2022 (T4)	49.8 (24.78)	43.81 (24.81)
Anxiousness	June 2020 (T1)	33.82 (24.80)	37.25 (26.42)
	Jan. 2021 (T2)	28.12 (25.25)	31.91 (28.00)
	Sept. 2021 (T3)	31.61 (26.78)	33.63 (28.69)
	June 2022 (T4)	33.71 (26.63)	34.60 (26.35)

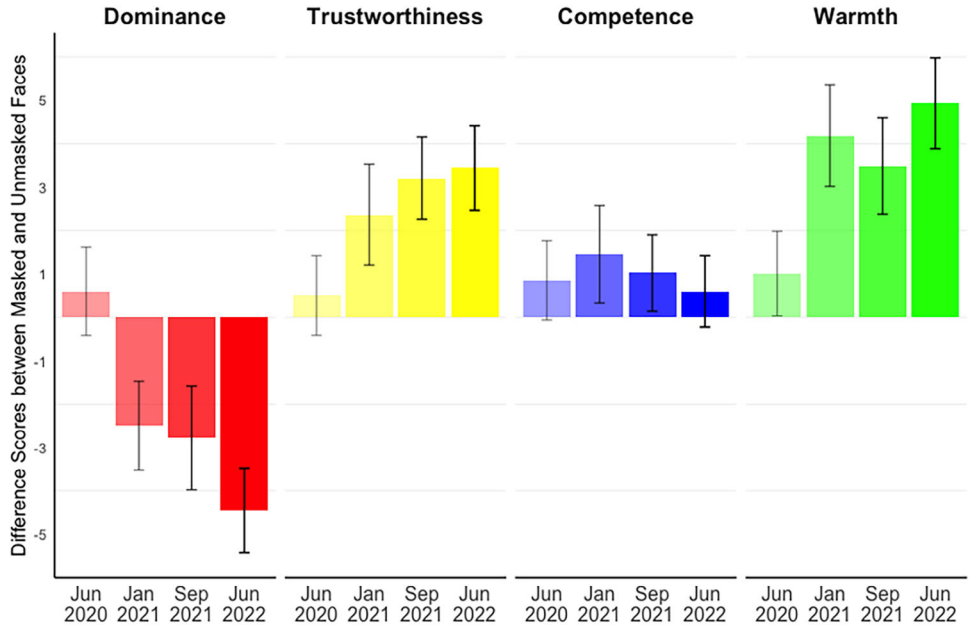

FIGURE 2 Difference scores between faces with and without masks in dominance, trustworthiness, competence and warmth at four time points.

$b = 2.35$, $SE = 0.40$, $t(3927) = 5.83$, $p < .001$, competence, $b = 0.96$, $SE = 0.36$, $t(3927) = 2.62$, $p = .009$ and warmth, $b = 3.36$, $SE = 0.43$, $t(3927) = 7.74$, $p < .001$. In general, faces with masks compared to without masks were judged as less dominant, but more trustworthy, competent and warmer.

Importantly, the effect of Mask increased linearly across the four time points for perceived dominance, $b = -3.52$, $SE = 0.94$, $t(3927) = -3.76$, $p < .001$, trustworthiness, $b = 2.19$, $SE = 0.81$, $t(3927) = 2.71$, $p = .007$ and warmth, $b = 2.54$, $SE = 0.87$, $t(3927) = 2.92$, $p = .004$, but not for perceived competence, $b = -0.28$, $SE = 0.73$, $t(3927) = -0.39$, $p = .697$ (see Figure 2 for the difference scores between faces with and without masks). Furthermore, we also examined the effect of Mask at each time point. No difference was observed between dominance ratings of masked and unmasked faces at T1 ($z = 0.69$, $p = .492$). At T2, T3 and T4, however, unmasked faces were judged as more dominant than masked faces (T2: $z = 2.59$, $p = .010$; T3: $z = 3.02$, $p = .003$; T4: $z = 4.62$, $p < .001$). Likewise, there was no difference between trustworthiness ratings of masked and unmasked faces at T1 ($z = 0.58$, $p = .565$). At T2, T3 and T4, however, masked faces were judged as more trustworthy than unmasked faces (T2: $z = 2.88$, $p = .004$; T3: $z = 4.02$, $p < .001$; T4: $z = 4.04$, $p < .001$). Finally, for warmth, we also found no difference between ratings of masked and unmasked faces at T1 ($z = 1.08$, $p = .280$). At T2, T3 and T4, however, masked faces were judged as warmer than unmasked faces (T2: $z = 4.73$, $p < .001$; T3: $z = 4.10$, $p < .001$; T4: $z = 5.39$, $p < .001$). Notably, the quadratic trend of the effect of Mask across the four time points was not significant for any traits: dominance, $b = 0.67$, $SE = 0.94$, $t(3927) = 0.72$, $p = .471$, trustworthiness, $b = -0.85$, $SE = 0.81$, $t(3927) = -1.06$, $p = .292$, warmth, $b = -0.94$, $SE = 0.87$, $t(3927) = -1.08$, $p = .280$ and competence, $b = -0.59$, $SE = 0.73$, $t(3927) = -0.80$, $p = .422$.

Although masked faces, in general, were judged as less dominant, more trustworthy and warmer than unmasked faces, these differences changed over time—with faces with compared to without masks rated a progressively less dominant but more trustworthy and warmer. Although masked faces were also perceived as more competent than unmasked faces overall, this difference remained stable over time.

4.2 | Perceived attractiveness, considerateness and anxiousness

The main effect of Mask was significant for perceived attractiveness, $b = 5.65$, $SE = 0.57$, $t(3927) = 9.87$, $p < .001$, considerateness, $b = 4.23$, $SE = 0.55$, $t(3927) = 7.68$, $p < .001$ and anxiousness, $b = -2.47$, $SE = 0.62$, $t(3927) = -3.96$, $p < .001$. In general, faces with masks compared to without masks were judged as more attractive, more considerate, but surprisingly less anxious. In contrast to the pattern of results related to the core traits, these mask effects did not change over time. Specifically, the linear trend of the effect of Mask over time was not significant for perceived attractiveness, $b = 0.11$, $SE = 1.15$, $t(3927) = 0.09$, $p = .925$, considerateness, $b = 1.69$, $SE = 1.10$, $t(3927) = 1.54$, $p = .125$, or anxiousness, $b = 2.23$, $SE = 1.25$, $t(3927) = 1.79$, $p = .074$ (see Figure 3 for the difference scores between faces with and without masks). The quadratic trend of the effect of Mask across the four time points was not found to be significant for attractiveness, $b = -1.30$, $SE = 1.15$, $t(3927) = -1.14$, $p = .256$, considerateness, $b = 0.24$, $SE = 1.10$, $t(3927) = 0.22$, $p = .825$, or anxiousness, $b = 0.95$, $SE = 1.25$, $t(3927) = 0.76$, $p = .448$.

In summary, the results related to the three secondary traits suggest that while in general faces with compared to without masks were perceived as more attractive, considerate and less anxious, these

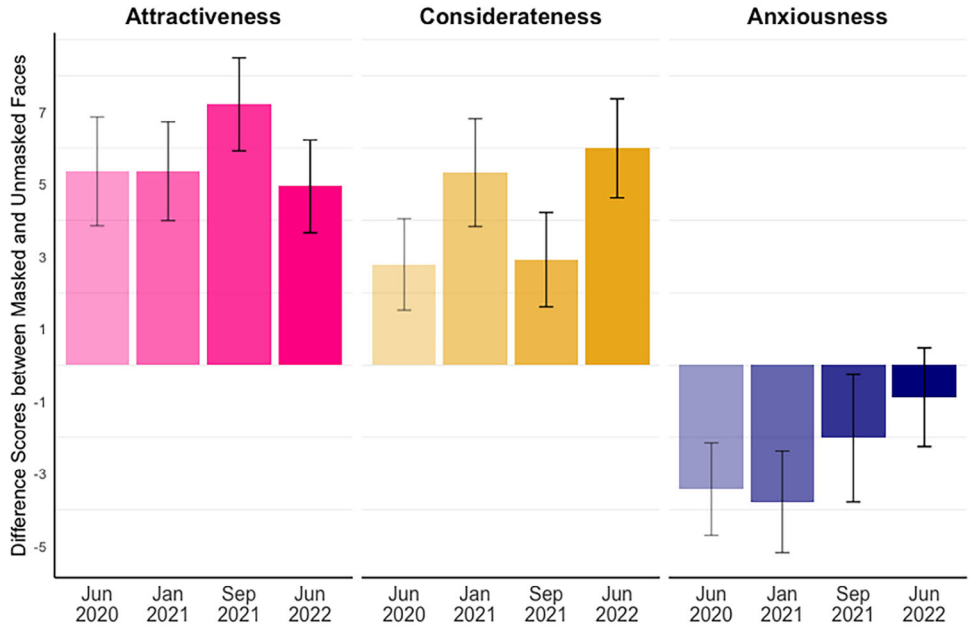

FIGURE 3 Difference scores between faces with and without masks in attractiveness, considerateness and anxiousness at four time points.

differences occurred early and remained stable over time. Although these trait attributions were also measured at four distinct and important time periods in the pandemic, from the initial governmental recommendations to wear masks to the lifting of mask requirements, differences in ratings of masked and unmasked faces with regard to attractiveness, considerateness and anxiousness were initially significant and did not change.

5 | DISCUSSION

The present research examined the impact of masks on person perception across four timepoints over a 2-year period during the COVID-19 pandemic. Notably, we found that in general, masks had a favourable impact—increasing perceptions of positive traits and decreasing perceptions of negative traits. In contrast to evidence that suggests that masks may hinder facial recognition and emotion identification (Carbon, 2020; Carragher & Hancock, 2020), masks have a beneficial effect on trait attributions. While previous research has focused on a limited number of traits with mixed results (for review, see Ramdani et al., 2022), our research included a number of traits related to both core dimensions of person perception and traits specifically relevant to wearing masks during the pandemic.

Importantly, our research explored the effects of masks over time, in contrast to previous studies that examined their impact during specific periods of the pandemic. One possible reason for the mixed effects observed in past research is the lack of clarity regarding when mask mandates were implemented in the countries involved. In contrast, our findings indicate that the time of measurement is crucial and significantly influences perceptions of masked and unmasked faces. Specifically, while there were no differences in ratings of masked and unmasked faces on core personality traits in June 2020 (just 2 months after the mask mandate), over time, faces with masks were perceived as increasingly trustworthy, warm and less dominant compared to unmasked faces.

One potential reason for this linear increase over time is that with the implementation of mask mandates, people became more exposed to masked faces and grew increasingly familiar with them. As mask mandates were in effect for longer periods of time, descriptive norms associated with mask-wearing behaviour developed and strengthened (Cialdini et al, 1990, 1991). These norms, along with the effects of mere exposure (Bornstein & D'Agnostino, 1992; Zajonc et al., 1974; Zebrowitz et al., 2008), likely contributed to the growing positive evaluations of individuals wearing masks compared to those without masks. Notably, even after the mask mandate was lifted (approximately half a month before T4), the positive effects of masks on core traits continued to increase. This suggests that although the injunctive social norm of wearing masks may have diminished, the descriptive social norm of mask-wearing might have remained intact, with many individuals continuing to wear masks and an abundance of exposure to people wearing masks. Consequently, the positive effects of masks continued. To further investigate whether the lifting of mask mandates leads to reduced exposure to masked faces and a decrease in positive attributions, we recommend conducting follow-up studies in the coming months and years.

While previous research has demonstrated that masked faces are generally rated as more attractive compared to unmasked faces (Kamatani et al., 2021; Oldmeadow & Koch, 2021), and that mask usage is associated with protecting oneself and others (Ackermann et al., 2020; Betsch et al., 2020; Nakayachi et al., 2020), our study is the first to investigate how perceptions of attractiveness, considerateness and anxiousness change over time in relation to mask mandates. Notably, prior to the COVID-19 outbreak, it was uncommon to see people in Western countries wearing masks in public (Jennings, 2020; Joung,

2020). Therefore, for Canadians, the act of wearing masks may hold a unique and direct association with the pandemic and the effort to safeguard oneself and others from contracting the virus. This contextual factor may help explain why, in general, faces with masks were perceived as more considerate and less anxious compared to faces without masks.

Furthermore, previous research has suggested that the increase in facial attractiveness associated with mask-wearing may not solely stem from the perceptual changes induced by physical coverage, but also from the positive associations linked to mask-wearing during the COVID-19 pandemic (Hies & Lewis, 2022; Oldmeadow & Koch, 2021). If this proposition holds true, it is plausible that evaluations of facial attractiveness in the presence of masks may adapt as positive social norms regarding mask-wearing continue to strengthen over time. However, our study did not find any changes over time in the effects of masks on attractiveness, considerateness, or anxiousness. Further investigation is warranted to understand why these traits did not exhibit changes over time beyond the initial impact. It is worth noting that considerateness and the core traits of trustworthiness and warmth demonstrated a strong correlation in our research (see Table S2 in the Supporting Information). When we combined these three traits, we also observed a linear increase in the effect of mask-wearing (compared to not wearing) across the duration of the study.

We recommend that future experiments examine other factors related to masks that may contribute to attributions of core and secondary traits during pandemics. One such factor is the severity of COVID-19. Previous research has indicated that individuals may be more likely to use masks when COVID-19 is severe (Lu et al., 2021). This increased mask usage may further reinforce the descriptive norms surrounding mask-wearing, potentially leading to a stronger positivity bias towards individuals who wear masks. To gather data on the severity of COVID-19 in Canada, we obtained information on the number of new COVID-19 cases for the months corresponding to our four data collection points from the Government of Canada website (https://health-infobase.canada.ca/covid-19/current-situation.html#a2). The recorded case counts were as follows: 9901 cases in June 2020, an average of 117,213 cases in January and February 2021, 116,996 cases in September 2021 and an average of 80,605 cases in June and July 2022. Due to collinearity between the case counts and the four time points, we were unable to include case counts in our regression models. Nevertheless, from the provided case counts, we observe a sharp increase in cases from June 2020 to January 2021, followed by a stabilization period, and a subsequent decline by June 2022. This trend does not entirely align with the linear changes over time that we observed in the effects of masks (compared to without masks) on the core traits of dominance, trustworthiness and warmth, as well as the consistent impact of masks on competence and secondary traits. Therefore, the severity of COVID-19 alone may not fully explain the effects of masks on person perception.

Another relevant factor is the increasing politicization of face masks during the COVID-19 pandemic. Previous studies have found that individuals who identify as Democrats and liberals perceive higher COVID-19 risk and engage in more frequent mask usage compared to those who identify as Republicans and conservatives (Bruine de Bruin et al., 2020; Gonzalez et al., 2021; Kerr et al., 2021). It is possible that participants who supported mask mandates and used masks themselves perceived others who wore masks as ingroup members, leading to more positive evaluations. Notably, the participants in our study were undergraduate students at a relatively liberal university in Canada, which may have made them more inclined to support mask mandates compared to the general population. To examine whether the present pattern of results generalise to other groups, future research should include more diverse participants in terms of age, education, socioeconomic status and political affiliation (Kerr et al., 2021; Liu & Arledge, 2022; Papageorge et al., 2021). Researchers may also consider examining the impact of other individual differences related to the perceiver, such as beliefs in mask effectiveness, health status and COVID-19 threat perception (Quigley et al., 2022; Wang et al., 2020). Despite the potential influence of these factors, a recent study by Stosic et al. (2022) found that the positivity bias toward masked faces was not moderated by political affiliation, beliefs in mask effectiveness, or explicit racial prejudice.

Moreover, it would be valuable for future researchers to investigate the impact of variations in masks, such as different shapes, colours, or messaging. Notably, previous studies examining the impact of masks that were black or white (colours that have strong negative or positive connotations, respectively) or masks that feature an upturned line (simulating a smile) or the words 'I CARE' (Kamatani et al., 2021; Kawakami et al., 2023; Oldmeadow & Koch, 2021) indicated that these factors did not alter trait perceptions relative to plain masks. However, because such factors may be intended to disambiguate the meaning of masks for some people because of their positive or negative connotations, their effects may only occur early during a pandemic when strong associations with masks and their meaning are not yet formed. After a longer period of time, however, when people have more exposure to and discussions about masks, attitudes toward people who wear masks may be more strongly entrenched. In these latter circumstances, these factors may have less impact.

Although the present study focused on White targets and multiracial perceivers in Canada, an important avenue for future research is to examine perceptions of other racial faces with and without masks. Since the global outbreak of COVID-19, racism and discrimination against minorities in North America has increased dramatically and this is especially the case against East Asians. According to a survey by the Angus Reid Institute in May 2020, one third of Chinese Canadians said they had been physically attacked or threatened since the start of the pandemic. A report by the Chinese Canadian National Council reported 1150 incidents of anti-Asian racism in Canada between March 2020 and February 2021 (Nicholson, 2021). One important extension to the current work would be to examine how people perceive Asian, Black and other racial/ethnic faces with and without masks. Would a different pattern of results be found for faces that were non-White? For example, would masked Asian faces be evaluated more negatively, not positively, than unmasked Asian faces? Similarly, would people evaluate Black faces with and without masks differently, especially if these

social categories are associated with stereotypes related to hostility, anger and aggression (Karmali & Kawakami, 2023; Kawakami et al., 2017)? If social judgements are influenced by both facial cues and categorical information, then masks may increase the influence of categorical information by reducing the ability to individuate targets based on facial cues (Kawakami et al., 2014). Notably, a recent study by Kawakami et al. (2023) found that while White targets with compared to without masks were consistently attributed more positive traits, Black targets with masks did not receive these same benefits. Although these initial findings on intergroup biases are informative, further studies examining racial differences on the impact of masks related to a variety of groups is recommended.

In addition to examining perceptions within a single nation, it would also be informative to examine how people in different nations view faces with and without masks (Kawakami et al., 2022). Although mask wearing was rare in Western countries (e.g. Canada) prior to COVID-19, it was more common in certain East Asian countries (e.g. Japan). In the latter cultures, people wear masks for a variety of reasons, including preventing the transmission of their own illness to others, air pollution, protection from the sun, not wanting to wear makeup, or to social isolate from others in a fashion similar to wearing headphones (Jennings, 2020; Joung, 2020). As a result, East Asians are more accustomed than Westerners to wearing masks and to seeing people around them wearing masks. Notably, people from East Asian countries also accepted new social norms related to wearing masks in public more quickly after the outbreak than people from Western countries (Lu et al., 2021). If wearing masks during a pandemic is socially normative, do people from East Asian countries evaluate faces with compared to without masks more positively than Western countries and is this effect more stable over time?

5.1 | Implications

The present research offers valuable insights into how person perception is impacted by cues related to facial gear and how this process evolves over time. Notably, there is surprisingly little information on how facial gear influences the formation of impressions. However, knowing how masks increase or decrease trait ratings is critical, as attributions of these characteristics have a range of implications for how we treat others (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 the COVID-19 pandemic because lower attributions of certain traits (e.g. trustworthiness warmth, attractiveness) can impact the extent to which we feel concern for others and our willingness to engage and care for them. In addition, wearing masks may also influence individuals' own behaviour. Lu et al. (2022) discovered that masks reduce wearers' deviant behaviour by heightening their moral awareness. These findings collectively suggest that, beyond its efficacy in curbing virus transmission, mask-wearing can have substantial implications for various social psychological and behavioural outcomes.

Moreover, given the importance of mask-wearing for public health during the COVID-19 pandemic and the potential of future pandemics, understanding the short- and long-term effects of mask mandates is crucial. The present research provides new insights into how perceptions can change over time related to the implementation of government mandates. Our results indicate that such regulations not only change the behaviour of citizens but also evaluations of people who follow those regulations. These findings suggest that the enactment of such health mandates may increase in approval over time. This information is important for governments and policy makers because it suggests that even regulations that may not initially be positively received may become more acceptable and have a positive effect on people who abide by those mandates in the long run.

6 | CONCLUSION

In conclusion, through four different periods of data collection over the course of 2 years, the present research demonstrated that people generally hold more positive views of faces with masks compared to those without masks. This positive bias became stronger over time on dimensions related to core personality traits such as dominance, trustworthiness and warmth, but did not change over time on competence and more secondary traits related to attractiveness, anxiousness and considerateness. Although we propose that these evolving perceptions are related to changing injunctive and descriptive social norms, further research is necessary to test this theoretical framework.

CONFLICT OF INTEREST STATEMENT

The authors declare no conflicts of interest.

ETHICS STATEMENT

The measures and procedures were approved by the ethics committee at a university in Ontario, Canada.

DATA TRANSPARENCY STATEMENT

For all experiments, we report how we determined our sample size, all manipulations, and all measures. All data, analysis code, and research materials are available at https://osf.io/5ycpk/?view_only=9349bd896c29441d9cdd615374aad1e0. This study's designs and their analyses were not preregistered.

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SUPPORTING INFORMATION

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

How to cite this article: Fang, X., & Kawakami, K. (2024). Changing perceptions of people wearing masks: Two years of living in a pandemic. *European Journal of Social Psychology*, 1–12. https://doi.org/10.1002/ejsp.3069