ORIGINAL ARTICLE

Do masks affect social interaction?

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Abstract

Wearing face masks to prevent the spread of COVID-19 has proved controversial in many countries; conducting new research on the use of masks would be colored by this controversy. In 2012 (pre-COVID), we conducted an experiment on the effects of masks on social interaction. College students ($N = 250$) were assigned to find a previously unknown student in a lecture hall, converse, and evaluate the interaction. Half were assigned to wear a surgical mask, sunglasses, and a hat (all provided); half wore no extra gear. Mask wearing had no effect on the ease, authenticity, friendliness of the conversation, mood, discomfort, or interestingness of the interaction. There were no discernable consequences of political ideology on the partner selection process or the evaluation of the interaction. Mask-wearing did not disable successful social interaction in this setting.

1 | INTRODUCTION

The COVID-19 pandemic and the collateral social isolation have affected social interactions in various profound ways (Duan & Zhu, 2020; Van Bavel et al., 2020). Physical distancing, quarantines, and especially the wearing of masks that obscure the face may have reduced people's ability to communicate, share emotions, and develop social relationships. We report an experiment that tests whether wearing facial masks interferes with everyday social interaction.

People can perceive substantial social information from the human face, including emotions, hostile intent, and personality (Alper et al., 2021). When information is limited to the face alone (in controlled experiments, as opposed to seeing the face in the context of the whole person), our ability to learn from the face is significantly reduced (Carbon, 2020; Todorov et al., 2015). Nevertheless, most of the time the wearing of a facial mask in vivo leaves unobscured many of the nonfacial cues that inform judgments of personality, emotion, attitudes, and intent (Bahns et al., 2016; DePaulo, 1992). Informative nonfacial cues include posture, gestures, gait and movement (Ambady & Rosenthal, 1992), verbal and paralinguistic cues (Littlepage & Pineault, 1978), apparel and shoes (Gillath et al., 2012; Howlett et al., 2013), all of which remain unobscured by accessories such as masks, glasses, or hats.

Masks have taken on symbolic, political, and tribal connotations; it is now difficult to test the effects of wearing a mask on human interaction because of their political meaning. Studies that manipulate the use of masks in social settings are transparent as to their hypotheses, and might engender demand or reactance effects (Aratani, 2020; van Kessel & Quinn, 2020).

In 2012, several years before the onset of the COVID-19 pandemic, we conducted an experiment in which we asked college students to interact with another student from the class. They were asked to find a person they had not spoken to before, and have a conversation with them in a large college lecture hall. We randomly assigned half of them to wear a mask, a hat, and sunglasses (that we provided); the other half did not. Our labs have long studied the process of finding similar others both in stranger settings and close relationships (Bahns et al., 2017). We had previously studied the effects of obscuring the view of their partner's torso (Bahns et al., 2016). The current study extended this line of research to study the effects of masking the human face in naturalistic settings on the search for others who share similar attitudes and activities. Looking for similarity is common and desirable; it happens without apparent thought or instruction and is fundamental to the earliest stages of friendship and romance (Berscheid & Walster, 1969; Byrne, 1971; McPherson et al., 2001).

Before COVID-19, facial masks in the USA were primarily associated with medical professionals, factories, and woodworkers. COVID-19 has changed this, but we collected data on the effects of obscuring the face with masks, glasses, and hats before COVID-19.

The pre-COVID data can offer a look at how the physical aspect of masks might intrude in social interaction without the surplus content of political tribalism, conspiracy ideology, or concerns about identity and freedom, which are central to the current debate in the USA and worldwide (Alberga et al., 2020; Doherty, 2021; Philipose, 2020). Masking is a political act (Boykin et al., 2021; Newman et al., 2021); research carried out now would certainly confound the direct effects of masks with their surplus social and political meanings. Having a clear idea of what masks actually *do* to interaction is fundamental to judging the effects of mask policy on students, adults, and the public at large. How disruptive is it to wear a mask during an everyday social interaction? Do masks inherently affect people according to their political ideology? These are questions that can only be asked with data collected before the COVID-19 pandemic.

The use of masks in our study mimics the current requirement/ suggestion to wear a mask in public, although it goes slightly further by obscuring the eyes and hair with sunglasses and a hat. We tested whether wearing a mask, glasses, and a hat would interfere with finding a similar partner to talk to, and whether it might disrupt the social interaction.

2 | METHOD

2.1 | Participants

Participants were 250 undergraduates ($N = 103$ women, $N = 113$ men, $N = 34$ gender not reported) in a large introductory psychology class at a public research university. Participants ranged in age from 18 to 31 years ($M = 19.4$, $SD = 1.54$). The ethnic makeup of the sample was majority White (70%), with small numbers of Black (2%), Latino (3%), Asian (4%), Native American (0.4%), and multiethnic (1.6%) participants, and 20% who did not report ethnicity. Most of the participants were US domestic students (83.6%), 2.8% were international students, and 13.6% did not report their country of origin. The study was conducted as part of an in-class activity mid-semester, and students received attendance credit for their presence in class that day.

2.2 | Materials and procedure

We randomly assigned half of the sample to wear a disposable face mask, surgical style (polypropylene bouffant) hat, and sunglasses to obstruct others' access to visual cues from the face and head. Participants were told to find a same-sex, same-mask-condition person with whom they had never before spoken, from the diagonally opposite quadrant of the lecture hall. Participants found and interacted with a partner from the same condition (*mask condition*, $N = 122$ or 61 pairs; *no mask condition*, $N = 128$ or 64 pairs), and then talked with their partner for 2 min about one of three topics of their choice (favorite vegetables, whether or not Pluto is a planet, number of credits required for the major).

2.2.1 | Evaluation of the activity and partner

After the conversation, pairs separated and participants privately rated their interaction partner using three items ($\alpha = .82$) on a paper questionnaire: "I had a good feeling about this person before we interacted (1 = *Strongly disagree*, 7 = *Strongly agree*)," "Would you be interested in becoming friends with this person? (1 = *Not at all interested*, 7 = *Very interested*)," "How much do you like this person? (1 = *Not at all*, 7 = *Very much*)." Participants also answered, "How similar do you believe this person is to you? and "How friendly and outgoing would you say this person is? (1 = *Not at all*, 7 = *Very much*). Finally, they reported their level of comfort with the activity using three items: "This activity made me feel uncomfortable," "What I was wearing made me feel uncomfortable," and "I felt like I could be myself in this activity" (1 = *Strongly disagree, 7 = Strongly agree*).

2.2.2 | How partners were chosen

The in-class, postconversation questionnaire asked, "How much did the following factors determine which person you chose to interact with?" Participants gave separate ratings (1 = *Not important*, 7 = *Very important*) for seemed friendly, seemed similar to me, seemed interesting, the look of their body and shape, the look of their face and head, their clothing seemed appealing, their clothing made them seem similar to me, and their posture and movement.

2.2.3 | Measuring similarity within partners

We measured a variety of socially relevant attitudes, personality traits, and activity preferences (39 dimensions in total) to assess the overall profile of similarity of interaction partners. Four attitudes were measured during the session: attitudes toward abortion, religion, gay people, and drinking. Thirty-five dimensions were completed online, before the day of the in-class activity. These included (1) attitudes toward gay people, exercising, birth control, the death penalty, and religion, Need for Closure (Webster & Kruglanski, 1994), Social Dominance Orientation (Pratto et al., 1994), Right Wing Authoritarianism (Altemeyer, 1988) and Protestant Work Ethic, (2) prejudice toward 11 targets of prejudice (e.g., Asian Americans, Black Americans, fat people, Native Americans) with single-item feeling thermometers, (3) seven activity preferences (0 = *Never*, 5 = *A lot*), such as frequency of going to the gym, playing a musical instrument, going to church, (4) the Big Five personality dimensions (Gosling et al., 2003) and (5) attachment anxiety and avoidance (Wei et al., 2007). Participants also completed (6) demographic information (age, gender, ethnicity, domestic or international student) and a few questions about their social networks and relationship status. The exact text of all the items appears in the Supplemental file along with links to the data set and code book (Anonymized A1 et al., 2021).

Finally, the online questionnaire included a single-item political measure (1 = *Conservative*, 4 = *Moderate*, 7 = *Liberal*).

3 | RESULTS

3.1 | Experience of the activity

Figure 1 compares the evaluation of the experience of the Mask and No Mask conditions (descending in rated agreement from left to right). Of the seven ratings of the experience of the activity, none differed except "Discomfort from wearing a mask" (M = 3.58 vs. 1.71, d = 1.1, t[245] = 8.51, p < .005, using the Holm-Bonferroni method for multiple comparisons, overall alpha = .05). This is little more than a manipulation check; it was rated the least important component of the experimental experience.

3.2 | Finding their partner

The eight reasons for choosing their partner, are displayed by mask condition in Figure 2. None differed except "The look of their face and head" (M = 2.60 vs. 3.30, d = .40, t[247] = 3.16, p < .005, using the Holm-Bonferroni method for multiple comparisons, overall alpha = .05). In a situation where masks are likely to "interfere" with social interaction, the experience of the masked participants was not discernably different, except that they recognized they and their partners were wearing a mask, hat, and glasses. Again, this is little more than a manipulation check; it was rated the least important reason for partner choice.

3.3 | Similarity among partners

We tested for similarity by calculating intraclass correlation coefficients (ICCs), which represent the fraction of the total variance that is due to variation between dyads. We first tested whether the ICCs were, on average, greater than zero, to establish whether either group was successful at finding a similar partner on these 39 social and personality dimensions; we used a one-sample t-test (null = 0). The average ICC in the No Mask condition was greater than zero (Mean ICC = .055), t[38] = 3.63, p < .001. The average ICC in the Mask condition was also greater than zero, although somewhat smaller (Mean ICC = .043), t[38] = 2.98, p = .005. The difference in similarity by condition was not significant, dependent t[38] = 0.57, p = .57, d = .09. Students with and without masks were able to find—to a modest but comparable degree—interlocutors more similar to them than chance.

There was a statistically significant degree of similarity; most of the coefficients were low. The dimensions of similarity/assortment are displayed by condition in the Supplemental file; out of 78 (39 x two conditions), 78% (61) of them were below .10. Attitudes toward LGBTQ people appeared twice for both conditions (measured once online and once in-class); no other variable provided was so reliably similar.

3.4 | The [Un]Importance of politics

Because the political dimension of masks looms so large in current discourse, we tested whether the political views of our participants
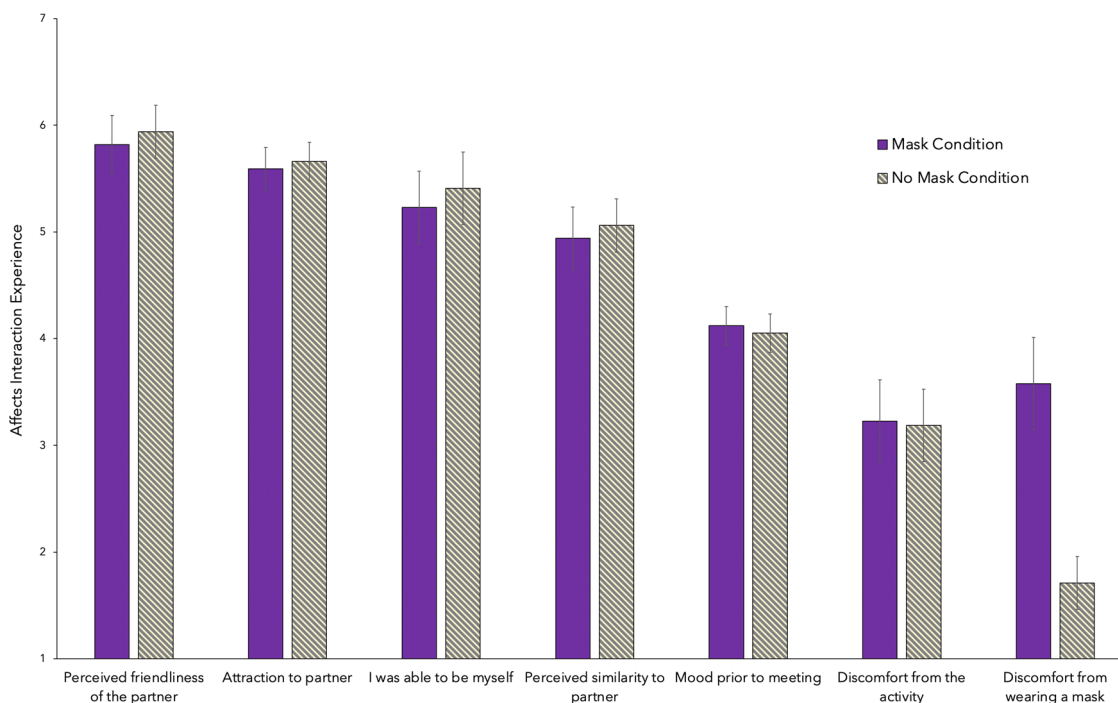

FIGURE 1 How participants experienced the interaction according to wearing the mask, glasses, and hat. Only "discomfort from wearing a mask" was affected by wearing a mask. Bars indicate 95% CI based on the Student's T distribution. [Color figure can be viewed at wileyonlinelibrary.com]
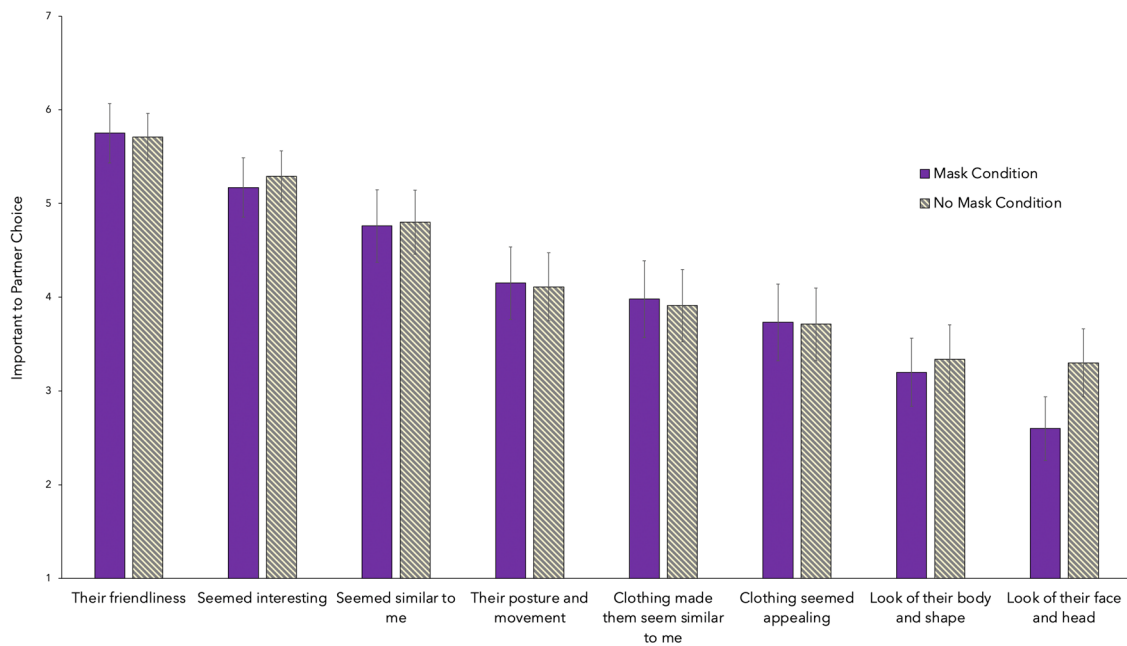
FIGURE 2 How participants choose their interaction partner by mask condition? Only "look of their face and head" was affected by wearing a mask. Bars indicate 95% CI based on the Student's *T* distribution. [Color figure can be viewed at wileyonlinelibrary.com]

TABLE 1 Correlations with political ideology

	r-all	*r*-mask	*r*-no mask	Equal slopes *p*-value
Experimental experience				
Perceived friendliness of partner	.04	.12	−.03	.22
Attraction to partner	.00	−.05	.04	.48
I was able to be myself	.03	−.04	.09	.36
Perceived similarity to partner	−.13	−.08	−.17	.64
Mood before meeting	−.03	.00	−.05	.70
Discomfort from the activity	.06	.04	.08	.83
Discomfort from wearing a mask	.07	.07	.13	.94
Reasons for choosing partner				
Their friendliness	.02	−.03	.06	.54
Seemed interesting	−.03	−.08	.02	.73
Seemed similar to me	−.20[*]	−.07	−.31[*]	.15
Their posture and movement	.07	.14	−.25[*]	.006[*]
Their clothing made them seem similar to me	−.13	.00	−.24[*]	.10
Their clothing seemed appealing	−.13	−.05	−.20[*]	.30
Look of their body and shape	−.16[*]	−.07	−.24[*]	.26
Look of their face and head	−.14[*]	−.10	−.18	.57

Note: [*]*p* < .05, uncorrected for multiple tests. *N* = 250 for all, *n* = 122 for Mask and *n* = 128 for No Mask. Higher numbers on the political scale represent political liberalism.

affected their experience of wearing masks. In Table 1, we show the correlations between political ideology (1 = *Conservative*, 7 = *Liberal*) and experience in the experiment and reasons for partner choices across conditions and separately by the presence of the mask. Some modest correlations emerge (e.g., liberals are slightly less likely to choose a partner based on similarity or appearance), but the essential test is whether any relationships were changed by the addition of the mask, glasses, and hat; this is assessed by a test of equal slopes in the

right-most column. One of the 14 tests was significant; posture and movement were indicated as a reason to choose a partner more for conservatives in the No Mask condition, and this reverses in the Mask condition, $F(1,202) = 7.45$, $p < .01$. We are not sure how to interpret this individual coefficient.

4 | DISCUSSION

Wearing a mask affected social interactions in only the smallest of ways in this situation. When participants wore masks, glasses, and a hat (compared to none), there was no loss of friendliness, appeal, authenticity, similarity, or comfort in the activity. With 250 participants, the near-complete lack of effects on how people experienced the task and no apparent effect on strategies for choosing an interaction partner suggests that the direct effects of wearing masks in a first social interaction are likely to be fairly small and only modestly disruptive. It is important to note that the social ecology of the situation was favorable to mask-wearing; the more others wear masks, the more natural people feel about wearing them themselves (Carbon, 2021). Outside of the familiar classroom environment in which the study took place, it is possible that people would respond differently to strangers wearing masks. We created an environment where masking did not reveal a person's politics, personality, or principles; in other situations, masking can be meaningful (Newman et al., 2021).

People can perceive each other and interact meaningfully even with masks, hat, and sunglasses on. The reduction in social effectiveness, in a typical social task of finding someone to interact with, was insignificant. Here, we might take a lesson from research on people with congenital facial paralysis, who are colloquially described as "wearing a mask." To communicate emotions, empathy, or interest, they are experienced at using other communication channels that are open to them, such as gestures, physical posture, or linguistic and paralinguistic cues (Bogart, 2021; Grüter & Carbon, 2010). Masks put limits on some communication pathways, but successful adaptation is possible.

The liberal-conservative dimension played almost no role in response to wearing masks and interacting with masked others in 2012. But in 2020, mask-wearing was the most common difficulty for Republicans during the COVID-19 pandemic (van Kessel & Quinn, 2020). Democrats listed it ninth, and even then, a typical complaint was that others refused to wear them. This suggests that there is nothing inherent in wearing a mask that might concern conservatives —it is more likely the political meaning of mask-wearing that is being objected to (Martinelli et al., 2020).

Our participants also wore glasses and a surgical-style hat; the obscuring of social cues was greater than if we had carried out the study with masks alone. Because wearing sunglasses and caps is commonplace among Americans—even indoors—the ecological validity of the experiment is still substantial. It is hard to argue that the (standardized) glasses and hat made the person perception or social interaction tasks easier than with a mask alone. These are sturdy

processes that can carry on fairly normally despite masks and related visual obstacles.

Without instruction or incentive, our participants found people who were (somewhat) more similar to them than would be expected by chance. The similarity is not high, in part because the variability among in-person first-year university students in the same class is reduced compared to all Americans (let alone the world); in part because the students were directed to go to the far quadrant of the large lecture hall, matching the go-getters and extraverts from the front row with the more easygoing, less-engaged, or introverted students who might populate the back; but mostly because the amount of time spent sifting and sorting the potential partners was literally seconds long, done on a visual basis only without any conversation to ascertain similarity (cf. Ambady & Rosenthal, 1992). The similarity levels found here are comparable to prior research using brief social interactions without masks (Bahns et al., 2016, 2017). It is impressive enough that they managed to assort at all; for half of them the assortment occurred with substantially degraded facial cues.

These data were collected before the onset of the COVID-19 pandemic, and before the meaning of wearing masks had become divisive and politically tinged (Taylor, 2020). Our experiment cannot examine the political or polarizing effects of the mask—these data were collected in a more innocent time. They can speak to what masks do to person perception and social interaction in the absence of the political content; that is their primary value. The obstruction of sensory information is a basic problem in communication and social interaction (e.g., online interaction, physical disability, texting and the use of emojis, etc.). These data speak to those issues, and they also help evaluate claims about the nonpolitical harm associated with the wearing of masks. We found very little evidence of social or cognitive impairment from wearing masks.

Meeting a stranger and having a short, low-stakes conversation is a common task, particularly for college students, but the task is not unusual in urban or industrial societies in general. We can tell, without directly asking, if a stranger shares our attitudes; and these shared attitudes can help form the basis of friendship, romance, allyship, and cooperation (Bahns et al., 2017). For a common task of this sort, regardless of location on the political spectrum, wearing a mask, a hat, and sunglasses does not impede this fundamental skill.

AUTHOR CONTRIBUTIONS

Conceptualization: Christian S. Crandall. *Methodology*: Christian S. Crandall, Angela J. Bahns, and Omri Gillath. *Project administration*: Christian S. Crandall and Angela J. Bahns. *Data analysis*: Angela J. Bahns and Christian S. Crandall. *Writing—original draft*: Christian S. Crandall. *Writing—review and editing*: Angela J. Bahns, Christian S. Crandall, and Omri Gillath.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

DATA AVAILABILITY STATEMENT

Data and study materials are available on the Open Science Framework online repository.

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SUPPORTING INFORMATION

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