

Research Article

The Effect of Attitudes Toward Masks on Group Formation

Bianca M. Sumutka^{1*}, Lily Halsted¹, Melissa S. Gamez²

¹Department of Psychology, Queens University of Charlotte, USA

²Department of Art, Design and Music, Queens University of Charlotte, USA

E-mail: sumutkab@queens.edu

Received: 19 October 2022; **Revised:** 14 January 2023; **Accepted:** 26 January 2023

Abstract: This study examined whether mask-wearing behavior predicted group formation. In this mixed-methods study, participants rated masked and unmasked faces under the guise that they were choosing potential travel companions for an upcoming study abroad trip. A total of 80 participants were recruited from psychology courses at a small liberal arts college and completed this in-person study. Participants viewed 50 unique photographic images for two seconds each. For every trial, participants rated whether they would want the pictured individual as a member of their tour group, and the reaction times for these ratings were recorded. After rating each image, participants answered questions about their mask-wearing behavior and their opinions about mask and vaccine mandates. Participants then were divided into two groups based on their self-reported mask wearing: those who regularly wore masks, and those who reported little to no mask usage. Next, within- and between-group analyses were performed to compare preferences for masked and unmasked images both within and across these groups. We found that participants who reported regular mask use rated masked images more favorably than unmasked images. This group also showed a greater preference for masked photographs in comparison to the group that reported less mask usage. No differences were found for ratings of masked and unmasked images for participants who reported little to no mask usage. In addition, all participants provided ratings for masked faces faster than unmasked faces. These findings suggest that during the pandemic, individuals who reported regular mask usage may have used mask wearing as a criterion when forming new social groups, indicating that mask wearing has become part of their social identity.

Keywords: COVID-19, masked images, attitudes about masks, mask-wearing behaviors, reaction time, social identity theory

1. Introduction

In the spring of 2020, the COVID-19 pandemic disrupted academic life, causing most institutions of higher education to shift to online learning and subsequently create policies and procedures related to a safe return to the classroom (Cameron et al., 2021). According to the National Center for Education Statistics (2022), during this time, roughly 84% of undergraduate students in the United States had at least one, if not all in-person courses shift to a strictly online format, and 9% of students reported having some to all courses canceled (Cameron et al., 2021). The pandemic also disrupted study abroad programs, altering or canceling roughly 2.7% of undergraduate international travel (Cameron et al., 2021). These disruptions continued into the fall of 2020 when approximately 73% of students had at least one

course in a virtual format, and 61% of students were fully virtual (National Center for Education Statistics, 2022).

As institutions reopened their campuses, many required the use of masks in the classroom and other public spaces, and additionally, some colleges and universities required the COVID-19 vaccine. According to a survey conducted by Trujillo and colleagues (2021), 70% of students at private institutions and 67% of students at public institutions reported having a mask mandate for in-person courses. Approximately 50% of students also reported having a vaccine mandate at their college or university (Trujillo et al., 2021). Due to these requirements, many first encounters between people on campus likely involved masks, and the presence of these masks may have affected these initial impressions and subsequently the formation of social groups.

1.1 First impressions and facial perception

First impressions can be formed rapidly, and individuals often use facial appearance to infer the personal characteristics of others (Todorov et al., 2005; Willis & Todorov, 2006). Willis and Todorov (2006) found that these first impressions can be formed from viewing a face for as little as 100 ms and that the personality traits inferred from this brief exposure were related to trait inferences made without a time constraint. During this brief exposure, participants judged novel faces on traits such as attractiveness, competence, trustworthiness, likeability, and aggressiveness (Willis & Todorov, 2006). Although participants expressed increased confidence in their judgments when provided with more time, in general, the judgments themselves did not significantly change (Willis & Todorov, 2006). In this study, participants made these decisions using unobscured faces. This raises the question of whether masks disrupt the way that we form these impressions, and whether an individual's beliefs and attitudes about wearing a mask affect the valence of these impressions.

Several recent studies have addressed how face masks affect facial perception (Carbon, 2020; Guo et al., 2022; Langbehn et al., 2022; McCrackin et al., 2022). One way that masks affect perception is that they tend to make it more difficult to identify emotions in both static images, and dynamic video displays (Carbon, 2020; Langbehn et al., 2022; McCrackin et al., 2022). Individuals tend to be less accurate at identifying emotions such as happiness, sadness, anger, and disgust for masked faces, and emotions that tend to be expressed more in the lower part of the face were most affected (Carbon, 2020; McCrackin et al., 2022). For example, the identification of the emotion of disgust was impacted more by mask wearing than fear (McCrackin et al., 2022). In addition, participants were less confident about their ability to identify these facial expressions as well as fearful and neutral expressions (Carbon, 2020). Similarly, Langbehn and colleagues (2022) found that even with dynamic video displays, emotional information was less salient in masked faces. When compared with unmasked faces, participants' ratings of the expressed emotion were lower (e.g., happy expressions were rated less happy), and they were more likely to indicate that the face expressed a non-target emotion (e.g., disgust or anger; Langbehn et al., 2022).

Although masks may diminish the level of emotion that we can detect in others, Guo and colleagues (2022) found that mask wearing can positively increase the initial perception of certain traits. They found that participants rated masked faces as more approachable and trustworthy when compared with unmasked faces while finding no overall difference in ratings for attractiveness and dominance (Guo et al., 2022). In this study, participants used a nine-point scale to rate each of these traits, and while ratings for masked faces were somewhat higher, in general, the averaged ratings trended towards the center of the scale (Guo et al., 2022). Due to the average nature of these ratings, it is possible that an additional factor, such as the participant's views about masks, could account for how participants rate masked faces.

1.2 Face masks and social identity

Wearing a mask may also signal information about an individual's group membership. Mask and vaccine mandates have been polarizing topics throughout the pandemic and there is evidence that people's perceptions about the severity of the pandemic, and their political views have influenced both mask-wearing behavior and attitudes about mask mandates (Courtice et al., 2023; Kahane, 2021; Wegemer & von Keyserlingk, 2022). Courtice and colleagues (2023) found that prior to the first public statements from the Canadian government regarding masking, beliefs about the severity of the pandemic were positively related to both mask wearing and attitudes about mask mandates. In addition, those who faced an increased risk of severe COVID-19 due to pre-existing health conditions reported more

frequent mask wearing (Courtice et al., 2023). Women also initially reported higher mask wearing than men, however, subsequent studies have failed to find a link between gender and mask-wearing behavior, suggesting that gender is not a consistent predictor of mask-wearing behavior (Courtice et al., 2023; Howard, 2021).

Courtice and colleagues (2023) found that following a public statement from the government recommending masks, political affiliation predicted attitudes regarding mask mandates, with those who rated themselves as more politically liberal tending to have more favorable attitudes. Political affiliation also seems to predict mask-wearing behavior in the U.S. (Kahane, 2021; Wegemer & von Keyserlingk, 2022). In a study linking the results of a nationally distributed survey on mask wearing to county-level demographic data, Kahane (2021) found that self-reported mask wearing was negatively related to the percentage of individuals in a county who voted for Donald Trump in the 2016 election. However, a limitation of this study is that participants did not self-report their own political affiliation, only their mask-wearing tendencies. In a smaller, collegiate sample, Wegemer and von Keyserlingk (2022) found that mask-wearing behavior was negatively related to self-reported conservatism. Therefore, mask usage may be related to an individual's social identity and a visual symbol of that person's group identity.

1.2.1 Social identity theory

Social identity theory (Tajfel & Turner, 1986) suggests that groups are sets of individuals who see themselves as belonging to the same social category. Group members then try to maintain a positive social identity by making social comparisons with those who are considered members of an out-group (Tajfel & Turner, 1986). In-groups make these comparisons in order to distinguish themselves from out-groups and maintain a positive social identity (Tajfel & Turner, 1986).

1.2.2 Social identity and mask-wearing behavior

Social identity theory is one explanation for the phenomenon of in-group favoritism, and this favoritism is evident in laboratory settings when competing groups play economic games (for a review, see Everett et al., 2015). The Prisoner's Dilemma is a commonly used economic game. A study by Powdthavee and colleagues (2021) utilized this task and found that mask wearing is likely linked to an individual's social identity. They found that while playing the Prisoners' Dilemma game, participants were more likely to cooperate with another player when that player's mask-wearing behavior matched their own (Powdthavee et al., 2021). Those participants who typically wore masks were more likely to cooperate when they knew they were playing with a mask-wearing partner, and those who generally did not wear masks were more likely to cooperate with a non-mask-wearing partner (Powdthavee et al., 2021). When the mask-wearing tendencies of their partner were unknown, mask-wearing participants and non-mask-wearing participants showed similar levels of cooperation, suggesting that participants were more likely to cooperate with a member of their social group (Powdthavee et al., 2021).

These findings suggest that mask-wearing behavior may signify social identity and that cooperative behavior can be influenced by whether individuals share the same mask-wearing behaviors. The question then remains as to whether the social identity created by mask-wearing preferences affects our initial impression and degree of liking of another individual over and above other shared characteristics that may influence liking. Researchers studying interpersonal attraction have found links between shared attitudes and liking (Bahns et al., 2017; Byrne, 1961). Byrne (1961) surveyed participants about their attitudes on various issues (e.g., religion, politics, and entertainment preferences) and then later presented participants with the survey of a "stranger" whose responses varied in the degree of overlap with their own. Participants provided more positive ratings for strangers who either completely shared their attitudes or shared attitudes for the issues that they deemed most important (Byrne, 1961). Bahns and colleagues (2017) extended this work and others by sampling dyads in a naturalistic environment. They found that pairs of individuals who were more similar tended to have more corresponding attitudes regardless of whether they had known each other briefly or for a longer period (Bahns et al., 2017). This result suggests that the similarity of attitudes may be more important to the formation of the relationship and less likely to be the result of being in that relationship over time (Bahns et al., 2017). In other words, perceived similarity during a first meeting may affect the likelihood that a relationship will be formed.

2. The present study

The purpose of the current study was to examine whether mask-wearing tendencies influence relationship and group formation and to extend the previous research by exploring how someone's attitudes about masks and other COVID-19 precautions and mandates influence their perception of masked and unmasked faces. Our general hypothesis was that participants who had a more favorable attitude regarding masks and mask wearing would rate masked faces more positively than unmasked faces. Several more specific hypotheses are outlined below.

2.1 Hypothesis 1

Participants who had a more favorable attitude toward masks and mask wearing and wore masks on a more regular basis would rate the masked faces more positively than the unmasked faces.

2.2 Hypothesis 2

Participants who had a less favorable attitude toward masks and mask wearing and wore masks less frequently would rate the unmasked faces more positively than the masked faces.

2.3 Hypothesis 3

As the most salient characteristic of each image was expected to be the presence or absence of a mask, the reaction times for rating masked faces would be quicker across all groups in comparison to rating unmasked faces.

2.4 Hypothesis 4

Because of the salience of masks and the strong attitudes about mask wearing, other factors, including race/ethnicity, gender, or year in college, are not expected to play a significant role in the participants' ratings of the faces.

3. Method

3.1 Participants

Eighty participants were recruited from undergraduate psychology classes at Queens University of Charlotte and then scheduled to participate in person within a laboratory setting. To participate in the study, the recruited students needed to be 18 years of age or older at the time of participation. There were no additional inclusion criteria. All participants who enrolled in and completed the study were included in the analysis. The participants included 59 females, 20 males, and one non-binary student. The larger proportion of females among the participants reflects the makeup of the student population at Queens University of Charlotte. The average age of the female participants was 20 years, while the average age of the male participants was 21 years.

The majority of the students who took part in this study were first-year students (44%), followed by sophomores (18%), juniors (20%), and seniors (19%). The participants' race closely resembled that of the Queens University student population with about 49% white, 23% Hispanic, 11% African American, 11% of two or more races, and 5% Asian. The participants received extra credit in their respective psychology classes for taking part in this research.

3.2 Materials

3.2.1 Face stimuli

Fifty images were selected from the Chicago Face Database (CFD; Ma et al., 2015, 2021). First, the database's norming data and codebook were utilized to identify a subset of images where the actual and/or perceived age of the model was within the age range of a traditional undergraduate student. Next, from that subset, 50 images were chosen that mirrored the gender and racial demographics of the undergraduate student population at Queens University of

Charlotte.

The 50 images then were divided into two groups of 25 that matched demographically. Each image in the first group of 25 (unmasked) images was seen by all subjects once. For the second group of images, Creative Cloud Adobe Photoshop 2022 version 23.4.2 was utilized to place a black face mask on each face. Each image in the second group of 25 images was seen by all subjects twice, once in its original form from the CFD without a mask, and once with a digitally added face mask. The 75 total images were presented in a fixed random order to each participant. Sample images are included in Figure 1.



Note: Unmasked images are original photographs from the CFD (Ma et al., 2015, 2021). Masks were added digitally to the CFD images with Creative Cloud Adobe Photoshop 2022 version 23.4.2.

Figure 1. Sample unmasked and masked facial images

3.2.2 Post-rating questionnaire

A 17-item questionnaire was created to measure demographic variables and the participant's attitudes and behaviors regarding mask and vaccine mandates (see Appendix). Due to the novelty of the COVID-19 pandemic, and the lack of standardized scales for measuring mask-wearing behaviors and attitudes about mask and vaccine mandates, these questions were generated to assess pandemic-related behaviors relevant to the current study. Specifically, the goals of the questionnaire were to measure the mask-wearing behaviors of the participants, to assess their perceptions about the mask-wearing behaviors of others, and to determine their views regarding mask and vaccine mandates within and outside of our campus community. The first seven questions covered demographic information such as age, gender, year in college, and ethnicity. These demographic variables were measured to examine the hypothesis that masks would influence favorability ratings due to their salience, whereas other factors such as gender would not (hypothesis 4). The remaining 10 questions dealt with pandemic-related behaviors and attitudes including participants' personal mask-wearing behaviors, attitudes about mask-wearing behaviors of others, and Queens University's mask and vaccine mandates. The first two pandemic-related questions (questions 8 and 9) were designed to measure the frequency of the participant's mask-wearing and whether the participant usually wore their mask correctly. Questions 11-13 examined the participant's attitudes about the mask-wearing behaviors of others, and questions 10, 14, and 16 asked specifically about mandates for mask-wearing and the COVID-19 vaccine both on their campus and for schools and workplaces in general.

3.3 Procedures

During the consent process, participants were informed that they would be evaluating faces and completing a short questionnaire. The consent form did not indicate that some of the faces would be masked or that some of the questions would be related to their behaviors and attitudes about aspects of the COVID-19 pandemic. All participants were placed in front of a computer screen where each of the 75 faces was presented for exactly two seconds. Prior to seeing the images, the participants were instructed to imagine that they had signed up for a John Belk International Program trip for the following summer and that the images were the “practice” passport photos of other students who were planning to go on the same trip that were taken at information sessions. The John Belk International Program is a signature program at Queens University of Charlotte where all students have the opportunity to spend a few weeks abroad and visit a different country at minimal cost. Each trip includes between 15 and 20 students and one or two faculty instructors. Many students on campus take advantage of these overseas trips, and students in the same groups spend a great deal of time together during the trip.

Next, undergraduate participants viewed and rated a set of masked and unmasked images of individuals who were similar in age and demographic makeup as the students at their institution. They were instructed to indicate whether they would like the depicted individual to be a member of their smaller tour group by selecting an on-screen response option using the following three-point rating scale:

Yes: Strong interest in having the student as a group member (on the international program trip)

Maybe: Neutral interest in having the student as a group member

No: No interest in having the student as a group member

Response times were captured for each of the 75 judgments. Following the presentation and rating of all 75 images, each participant was asked to answer a questionnaire designed to measure their mask-wearing behaviors and attitudes about mask and vaccine mandates. Following the completion of the questionnaire, participants were informed about the full purpose of the study through a debriefing and thanked for their participation.

3.4 Data analysis

This study used a mixed-methods, quasi-experimental design where the independent variables were pre-existing attributes of the participants (gender, ethnicity, and attitudes toward mask wearing), and the experimenter-manipulated variable type of image: control, unmasked, and masked. The dependent variables were ratings of the stimulus images and response time to make those ratings. Responses were examined both between-subjects and within-subjects.

4. Results

4.1 Attitudes and mask-wearing behaviors

The responses of participants on the questionnaire regarding mask wearing indicated that 28 (35%) of the participants reported wearing masks “virtually always” regardless of any mandates. On the other hand, a similar number, 30 (38%) of the participants reported always wearing masks, but only when required, and 21 (26%) sometimes wearing a mask even when it is required. Finally, one participant reported never wearing a mask even if required by a mandate even though a mask mandate was heavily enforced at Queens University at the time of data collection.

There were several other questions on the questionnaire, many of which were found to be correlated significantly with the frequency of mask-wearing questions. Table 1 presents the Kendall rank order correlations (tau) between the mask-wearing behavior question and the other survey questions.

Table 1. Rank order correlations of mask-wearing behavior with other mask/COVID-19 survey questions

Attitudinal questions	Kendall's tau	<i>p</i>
How do you usually wear your mask?	.47	< .0001
Queens currently requires everyone to wear a mask in all indoor public settings (except dorm rooms or when eating or drinking). How do you feel about this policy being necessary and appropriate?	.58	< .0001
Other people who wear masks over their nose and mouth in indoor public settings make me feel (positive/negative).	.50	< .0001
Other people who DON'T wear masks in indoor public settings make me feel (positive/negative).	-.46	< .0001
Other people who wear masks under their nose or mouth in indoor public settings make me feel (positive/negative).	-.45	< .0001
Queens currently has a COVID vaccination requirement for all students, faculty, and staff (with limited medical or religious exemptions). How do you feel about this policy being necessary and appropriate?	.43	< .0001
Which group of people do you think should be required to wear masks in indoor public settings?	.50	< .0001
In a future election, all things being equal, would you be more or less likely to support a candidate who endorsed vaccine mandates in schools and workplaces?	.46	< .0001
Since March 2020, has one of your family members (perhaps including yourself) or close friends experienced a serious case of COVID infection?	.24	.02

Given the consistently high correlations of the survey questions with the mask-wearing behavior item, it was decided to focus on that very concrete behavioral question to group together sets of participants for later analysis. The responses to the frequency of mask-wearing questions were used to divide the participants into two groups: a “pro-mask” group, which was the combination of those students who claimed to always wear masks, either because of a mandate or on their own ($N = 58$), and an “anti-mask” group ($N = 22$), who claimed to wear a mask only sometimes or not at all, even when it was required.

4.2 Mask-wearing behavior compared to other participant attributes

As this study used a quasi-experimental design, it was important to assess whether observed differences in reactions to the images were driven by the participants' attitudes about mask wearing or if there were other characteristics like gender or race that might also correlate to the observed responses. Gender and race were selected as attributes for analysis due to the salience of these characteristics in the depicted models. Because participants viewed a static model, these perceptually salient variables would have the greatest potential to influence judgments based on the perceived demographic similarity between the model and the participant.

No relationship was found between gender (male/female) and attitude toward mask wearing (pro/anti). Similarly, no relationship was found between race (white/non-white) and mask wearing (pro/anti) or year in school (freshman/upperclassman) and mask wearing (pro/anti). Table 2 presents the percentage of female participants, white participants, and freshman participants within each of the pro-mask and anti-mask groups, along with the chi-square test statistics.

Table 2. Attitudes toward mask wearing compared to other participant attributes

Participant attribute	Pro-mask	Anti-mask	χ^2	df	<i>p</i>
Gender (% female)	79%	59%	2.40	1	.12
Race (% white)	47%	55%	0.15	1	.70
Year in school (% freshmen)	43%	45%	0.00	1	.95

4.3 Favorability ratings of images (*Hypotheses 1 and 2*)

Participants viewed each image for two seconds and then rated whether they would like to have that student in their travel group. Each image was rated either yes (1), maybe (0), or no (-1). Table 3 presents the percentage of yes/maybe/no breakdown for the pro- and anti-mask groups across the three sets of images.

Table 3. Percentage of yes/no/maybe ratings for each image set from pro-mask and anti-mask participants

	Control images	Unmasked images	Masked images
Pro-mask			
Yes	42%	40%	58%
Maybe	38%	37%	32%
No	20%	22%	10%
Net favorability	22%	18%	48%
Anti-mask			
Yes	47%	48%	45%
Maybe	28%	25%	32%
No	25%	27%	22%
Net favorability	22%	21%	23%

To quantify the preference for masked faces, a “net favorability” score was calculated. This “net favorability” score consolidated the yes/maybe/no ratings to a single representative value for each group and each image set by taking the percentage of yes responses for a given group and subtracting it from the percentage of no responses. For example, among the pro-mask participants rating the masked images, 58% gave a rating of yes, 32% maybe, and 10% no. The net favorability for this condition was 48% (58% yes - 10% no).

Figure 2 presents the net favorability ratings for the pro- and anti-mask groups across the three sets of images. For the anti-mask group, net favorability ratings were essentially the same across all three sets of images (22%, 21%, and 23%). In contrast, while the pro-mask group gave similar ratings to the control and unmasked images (22% and 18%), they gave a markedly higher net favorability rating to the masked images.

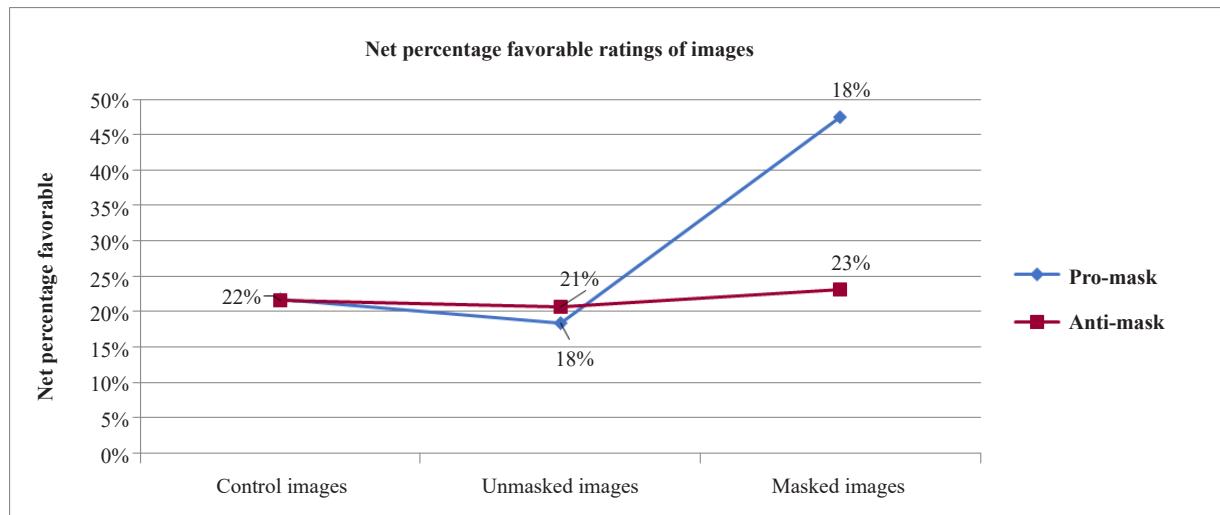


Figure 2. Net percentage favorable ratings of the three image sets, pro-mask, and anti-mask

A between-subjects analysis indicated that the pro-mask group rated the masked image set significantly more favorably compared to the anti-mask group, $t(29.95) = 2.38, p = .024$. The pro- and anti-mask groups did not differ in their ratings of either the control images ($t[42.47] = .01, p = .99$) or the unmasked images ($t[36.88] = -0.27, p = .79$).

A within-subjects analysis indicated that the pro-mask group rated the masked image set significantly more favorably than either the unmasked image set ($t[57] = 9.53, p < .0002$) or the control image set ($t[57] = 7.82, p < .0001$). Finally, within-subjects, ratings for the anti-mask group were not significantly different between the masked image set and either the unmasked image set ($t[21] = 0.32, p = .75$) or control image set ($t[21] = 0.18, p = .86$). These test values are presented in a tabular form in Table 4.

Table 4. Between-subjects and within-subjects net favorability ratings of pro-mask and anti-mask participants for the three image sets

Between-subjects comparison					
	Pro-mask	Anti-mask	<i>t</i> statistic	df	<i>p</i>
Control images	22%	22%	.01	42.47	.99
Unmasked images	18%	21%	-.27	36.88	.79
Masked images	48%	23%	2.38	29.95	.02
Within-subjects comparison					
	Comparison	<i>t</i> statistic	df	<i>p</i>	
Pro-mask					
	Control images vs unmasked images	-1.55	57	.13	
	Masked images vs control images	7.82	57	< .0001	
	Masked images vs unmasked images	9.53	57	< .0001	
Anti-mask					
	Control images vs unmasked images	-.22	21	.83	
	Masked images vs control images	.18	21	.86	
	Masked images vs unmasked images	.32	21	.75	

These results indicate that both the pro- and anti-mask groups rated the control and unmasked images the same while the pro-mask participants rated the masked images significantly more positively than the anti-mask group. Furthermore, based on the current results, the pro-mask participants rated the masked images significantly more positively than the unmasked and control images. Surprisingly, the anti-mask participants rated all three sets of images the same without any significant favoring of the unmasked images. These results indicated that the first hypothesis of this research was confirmed, predicting the pro-mask participants rated masked images more positively. However, the second hypothesis, expecting anti-mask individuals to rate unmasked images more favorably, was not confirmed.

4.4 Reaction time to rate images (Hypothesis 3)

In addition to capturing the evaluative judgments made for each image, the reaction times to make these judgments were also recorded for each participant. The pro-mask group rated the masked image set significantly faster than either the unmasked image set ($t[57] = 2.03, p = .048$) or the control image set ($t[59] = 3.91, p = .0003$). The anti-mask group also rated the masked image set significantly faster than either the unmasked image set ($t[21] = 3.07, p = .006$) or the control image set ($t[21] = 3.87, p = .0008$). Therefore, both the pro- and anti-mask groups made judgments for masked images significantly faster than for the control and unmasked images, confirming the third hypothesis of this research which predicted that the salience of masks makes judgments about those images significantly faster than unmasked images. Figure 3 illustrates the average response times.

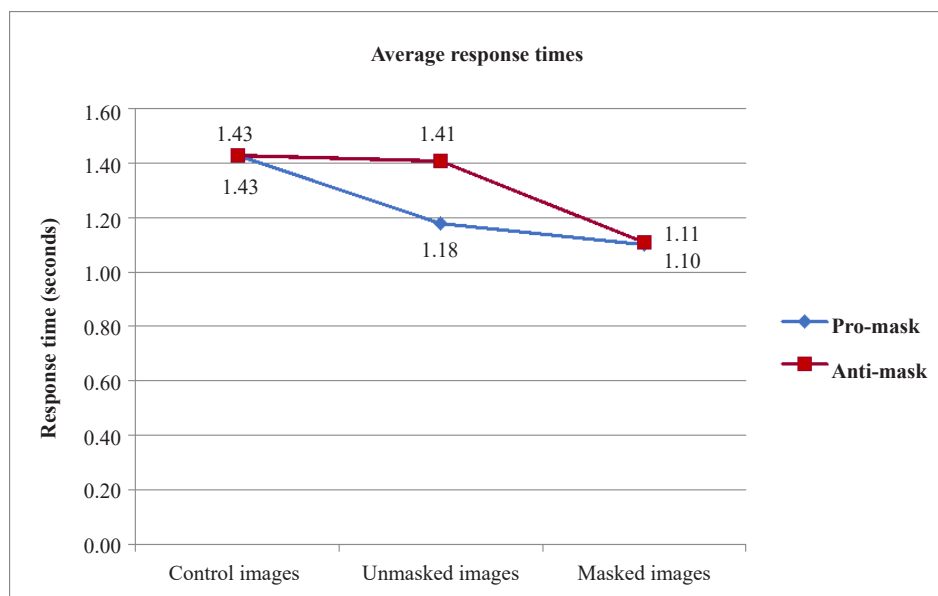


Figure 3. Average response times for the three image sets, pro-mask and anti-mask

4.5 Influence of other participant characteristics on image favorability ratings (Hypothesis 4)

Finally, no other factor, including gender, race, or year in college, emerged as a significant factor in personal mask-wearing behaviors/attitudes or the desirability judgments of the three image sets. Table 5 shows the between-subjects comparison of net favorability ratings for the three image sets looking at the race and gender of participants. The only significant difference observed was that females were more likely to give favorable ratings to the control images compared to males. Collectively, these findings are in line with the fourth hypothesis of this research, which predicted mask wearing to be the most important factor in participant ratings of the images.

Table 5. Between-subjects net favorability ratings for the three image sets by gender and race of participants

Between-subjects comparison: Gender					
	Male	Female	<i>t</i> statistic	df	<i>p</i>
Control images	8%	26%	-2.07	32.92	.047
Unmasked images	11%	22%	-.27	32.93	.26
Masked images	27%	46%	-1.79	28.49	.08
Between-subjects comparison: Race					
	White	Non-white	<i>t</i> statistic	df	<i>p</i>
Control images	20%	23%	-.34	77.89	.74
Unmasked images	16%	22%	-.69	77.47	.49
Masked images	41%	40%	-.08	78.87	.94

5. Discussion

The central question of this research was to determine the impact of mask-wearing tendencies on the favorability ratings of the masked and unmasked images of potential travel companions on a summer overseas trip. The main hypothesis, which was confirmed, presumed that students who wear masks regularly and agree with the university mask mandate, would be more likely to choose travel companions who also wear masks regularly. Conversely, the second hypothesis expected that those who do not wear masks regularly and do not agree with the existing mask mandate also would prefer those who do not wear masks regularly, as their co-travelers. However, the findings of this study do not support the second hypothesis; the anti-mask group seemed to be indifferent to the mask-wearing habits and practices of other potential travelers in their group. In short, those who wear masks regularly seem to be more concerned about others wearing masks than those who oppose masks.

From a pure epidemiological stance, these findings are consistent with the basic logic of avoiding the virus. Those who wear masks are more concerned about the COVID-19 virus and more determined to control it. Moreover, they wish others around them to make every effort to keep the virus from spreading further in the community, including in their travel group. On the other hand, those who are not concerned or feel threatened by the virus are not troubled by what others around them do and do not see the virus as a serious health hazard.

Alternatively, based on the theory of social identity and in-group/out-group attitudes, the pro-mask group seems to behave as though others who regularly wear masks belong to their in-group. By the same token, those who don't regularly wear masks are considered an out-group. We know from the established literature in social psychology that in-groups and out-groups are easily formed based on very little context (Tajfel, 1970, 1982), and group members seem to favor members of their group in comparison to outsiders (Everett et al., 2015; Fehr et al., 2008). Therefore, it is possible that in-group/out-group attitudes influenced the participants of this study and induced those who wear masks regularly to rate others with presumed similar attitudes (fellow mask wearers) more favorably; indicating the wish to travel with other like-minded students. Therefore, in-group preference clearly explains the fact that regular mask wearers prefer others who comport themselves similarly.

On the other hand, the anti-mask group in this study appeared to view wearing a mask as a personal habit that was not consistent with their own behaviors, and not sufficient grounds to reject anyone as a potential co-traveler. From the scientific approach, if the anti-mask group does not consider the COVID-19 virus a serious threat, then there is no reason to be concerned about the mask-wearing behaviors of others. Hence, they showed no significant degree of favoritism to others who were not wearing a mask. However, the in-group/out-group theory would have predicted that anti-mask participants would favor others who do not believe in wearing a mask. Obviously, no significant evidence of this type of bias was found in this study. Perhaps those in the anti-mask group are unconcerned by masks and do not view those who wear masks regularly as members of a different group. Rather they may have discerned no meaningful in-group/out-group construct in this setting; they personally do not take mask wearing seriously but are not concerned by who else wears or does not wear masks regularly. This inconsistency in the level of judgment about others' mask-

wearing behaviors between the pro- and anti-mask groups may point to a larger societal view about the COVID-19 virus. Those who take the virus seriously are more fearful and are willing to take various steps including masking and choosing those who wear masks to travel with. On the other hand, those who are not concerned about the virus may not necessarily be anti-mask, but simply are not fearful of the virus and consider masking and surrounding themselves with those who also wear masks as unnecessary. Consequently, those who are more concerned about the virus would consider others who have similar concerns as in-group members and preferred fellow travelers. Alternatively, those who are not concerned about the virus are indifferent about mask wearing in general and do not feel strongly enough about the issue to form any groups purely based on the mask-wearing behaviors of others.

Another question that this research tried to answer is whether masked images are rated faster than unmasked ones. To guard against any possible bias or confounding factors, a subset of images from the CFD (Ma et al., 2015, 2021) appeared once unmasked and once digitally masked. Both the pro- and anti-mask groups rated the masked images significantly faster than the unmasked or control images. Seemingly, regardless of one's view about masks, they are visually salient and consequently quickly judged. One potential reason for the quicker judgment of masked images is that there are fewer facial features or discernable emotions available to the participants to judge (Langbehn et al, 2022). When looking at an unmasked image, one can see the nose, mouth, cheeks, and chin in addition to the eyes and the forehead. On the other hand, masked images only allow the eyes and the forehead to be seen and analyzed, which naturally will make the decision-making process faster and the reaction time shorter. Another factor that may play a role in the speed of processing of the masked images is the salience of the masks. Masks are clearly visible and easy to process which in turn results in very quick reaction times and conceivably a quick formation of first impressions (Willis & Todorov, 2006). Since the reaction time for all the masked images across the pro- and anti-mask groups was faster, the participants' attitudes about masks seemed to play little role in the processing time of the masked or unmasked images.

Finally, as predicted, various demographic factors such as age, race, gender, or year in school did not play a significant role in the ratings of the images. The images for this study were chosen to represent approximately the same age, race, and gender demographics as Queens University, and the participants were, in a sense, judging others who looked like themselves. If there was racial or gender bias at play in rating other travelers for the overseas trip, it was not significant. Overall, the deciding factor in this study was the tendency to wear masks.

5.1 Limitations and future directions

The current study was designed and conducted from the late fall of 2021 through the early spring of 2022. During those months, the infection rate of COVID-19 in Mecklenburg County where Queens University is located was reported to be an average of 12.39% (Allen et al., 2022). Furthermore, the design of the current study necessitated that the students come to the psychology lab on campus and meet with the experimenters in person in order to participate. These factors limited the number of participants to only 80 students. Because of the limited sample size, the pro- and anti-mask groups were formed on the basis of a smaller sample. Moreover, participants who wore masks regularly regardless were combined with those who wore masks to comply with a mask mandate. A larger sample would have allowed these two groups to be measured and evaluated separately and perhaps answered more questions about the masking attitudes and habits of college students. Needless to say, if there was no pandemic, there would have been no need for masking or vaccination. Ironically, the very factors that propelled the authors to conduct this research inherently made it difficult to have a large sample size due to the necessity to participate in person.

Another factor that may have impacted the results is the strict mask mandate enforced by the university at the time of data collection for this study. The rate of infection throughout the pandemic remained negligible on Queens campus mostly due to the stringent masking and vaccination mandate that was enforced at that time. The same mandate that successfully kept the infection rates at bay for the campus community also may have influenced the results of this research. The heavily enforced university regulations made it almost impossible to be completely anti-mask. The only way to divide the pro- and anti-mask groups was through the questions about attitudes toward masking, in addition to considering that participants' answers about their mask-wearing habits also included their behaviors off-campus.

Skewed demographics are another limitation of this study. The number of female participants in the present research was almost three times the number of males (females 74%, males 25%, and non-binary 1%). The larger number of female participants was not a design or recruitment flaw, but a result of the current gender breakdown of Queens University. If males potentially are more likely to be anti-mask, then a larger female sample size may have an impact

on our results. Some studies reported that slightly older males are more likely to be anti-mask, while others found no significant impact of gender on mask-wearing attitudes and behaviors (Courtice et al., 2023; Howard, 2021). The gender analysis of the current sample did not indicate any influence of gender on the pro- or anti-mask attitudes or behaviors.

The ability to examine whether attitudes and behaviors about masking can influence in-group/out-group attitudes was born from an unexpected worldwide pandemic. No one is certain whether the infection rates of COVID-19 will increase in the future or if mask and vaccine mandates will make a comeback. If the number of cases was to significantly increase, and new mandates are put into place, further research can be conducted on the social aspects of mask wearing and how it divides or unites people. Overall, any potential future research in this field can be improved by including a more balanced gender representation, a larger sample size, and a setting with less stringent mandates.

5.2 Conclusion

Eighty participants rated 75 masked and unmasked images based on their preference to have the individuals in the images as co-travelers on a summer trip. The attitudes and behaviors about mask wearing of the participants were measured by a 17-item questionnaire. The results of the study indicated that those students who wear masks regularly are more likely to rate others who wear masks favorably, thus using the presence of a mask as a sign of group membership and shared values. However, those who were less likely to wear masks showed no significant preference for others who wear masks infrequently. Finally, both groups seemed to see masks as visually salient and rate masked images faster than the unmasked ones.

Acknowledgments

The authors would like to acknowledge the contribution of Matthew Halsted for his programming expertise which made this project possible. Additionally, we would like to thank Ananias Hayes, Max Hvasta, Kaela Norris, Matilde Sanchez, and Emma Rose Stockton for their invaluable assistance in recruiting participants and managing data collection. This research was approved by Queens University's Institutional Review Board. The approval number is 915-CAS-769.

Conflict of interest

The authors declare that they have no competing interests.

References

- Allen, J., Almukhtar, S., Aufrichig, A., Barnard, A., Bloch, M., Bullock, P., Cahalan, S., Cai, W., Calderone, J., Collins, K., Conlen, M., Cook, L., Gianordoli, G., Harmon, A., Harris, R., Hassan, A., Huang, J., Issawi, D., Ivory, D., ... Yourish, K. (2022, November 6). *Tracking coronavirus in Mecklenburg County, N.C.: Latest map and case count*. The New York Times. <https://www.nytimes.com/interactive/2021/us/mecklenburg-north-carolina-covid-cases.html>
- Bahns, A. J., Crandall, C. S., Gillath, O., & Preacher, K. J. (2017). Similarity in relationships as niche construction: Choice, stability, and influence within dyads in a free choice environment. *Journal of Personality and Social Psychology*, 112(2), 329-355. <https://doi.org/10.1037/pspp0000088>
- Byrne, D. (1961). Interpersonal attraction and attitude similarity. *The Journal of Abnormal and Social Psychology*, 62(3), 713-715. <https://doi.org/10.1037/h0044721>
- Cameron, M., Lacy, T. A., Siegel, P., Wu, J., Wilson, A., Johnson, R., Burns, R., & Wine, J. (2021). *2019–20 National Postsecondary Student Aid Study (NPSAS:20)* (NCES 2021-456). The National Center for Education Statistics. <https://nces.ed.gov/pubsearch/pubsinfo.asp?pubid=2021456>
- Carbon, C. -C. (2020). Wearing face masks strongly confuses counterparts in reading emotions. *Frontiers in Psychology*, 11, 566886. <https://doi.org/10.3389/fpsyg.2020.566886>
- Courtice, E. L., Quinn-Nilas, C., Bickram, D. A., Witoski, S., Hoskin, R. A., & Blair, K. L. (2023). Is the messenger the

- message? Canadian political affiliation and other predictors of mask wearing frequency and attitudes during the COVID-19 pandemic. *Canadian Journal of Behavioural Science*, 55(1), 1-13. <https://doi.org/10.1037/cbs0000297>
- Everett, J. A. C., Faber, N. S., & Crockett, M. (2015). Preferences and beliefs in ingroup favoritism. *Frontiers in Behavioral Neuroscience*, 9, 15. <https://doi.org/10.3389/fnbeh.2015.00015>
- Fehr, E., Bernhard, H., & Rockenbach, B. (2008). Egalitarianism in young children. *Nature*, 454, 1079-1083. <https://doi.org/10.1038/nature07155>
- Guo, K., Hare, A., & Liu, C. H. (2022). Impact of face masks and viewers' anxiety on ratings of first impressions from faces. *Perception*, 51(1), 37-50. <https://doi.org/10.1177/03010066211065230>
- Howard, M. C. (2021). Gender, face mask perceptions, and face mask wearing: Are men being dangerous during the COVID-19 pandemic? *Personality and Individual Differences*, 170, 110417. <https://doi.org/10.1016/j.paid.2020.110417>
- Kahane, L. H. (2021). Politicizing the mask: Political, economic and demographic factors affecting mask wearing behavior in the USA. *Eastern Economic Journal*, 47(2), 163-183. <https://doi.org/10.1057/s41302-020-00186-0>
- Langbehn, A. T., Yermol, D. A., Zhao, F., Thorstenson, C. A., & Niedenthal, P. M. (2022). Wearing N95, surgical, and cloth face masks compromises the perception of emotion. *Affective Science*, 3, 105-117. <https://doi.org/10.1007/s42761-021-00097-z>
- Ma, D. S., Correll, J., & Wittenbrink, B. (2015). The Chicago Face Database: A free stimulus set of faces and norming data. *Behavior Research Methods*, 47(4), 1122-1135. <https://doi.org/10.3758/s13428-014-0532-5>
- Ma, D. S., Kantner, J., & Wittenbrink, B. (2021). Chicago Face Database: Multiracial expansion. *Behavior Research Methods*, 53, 1289-1300. <https://doi.org/10.3758/s13428-020-01482-5>
- McCrackin, S. D., Capozzi, F., Mayrand, F., & Ristic, J. (2022). Face masks impair basic emotion recognition: Group effects and individual variability. *Social Psychology*. Advance online publication. <http://dx.doi.org/10.1027/1864-9335/a000470>
- National Center for Education Statistics. (2022). *Impact of the coronavirus pandemic on fall plans for postsecondary education. Condition of Education*. <https://nces.ed.gov/programs/coe/indicator/tpb>
- Powdthavee, N., Riyanto, Y. E., Wong, E. C. L., Yeo, J. X. W., & Chan, Q. Y. (2021). When face masks signal social identity: Explaining the deep face-mask divide during the COVID-19 pandemic. *PLoS One*, 16(6), e0253195. <https://doi.org/10.1371/journal.pone.0253195>
- Tajfel, H. (1970). Experiments in intergroup discrimination. *Scientific American*, 223(5), 96-103. <http://www.jstor.org/stable/24927662>
- Tajfel, H. (1982). Social psychology of intergroup relations. *Annual Review of Psychology*, 33, 1-39. <https://doi.org/10.1146/annurev.ps.33.020182.000245>
- Tajfel, H., & Turner, J. C. (1986). The social identity theory of intergroup behavior. In S. Worchel & W. G. Austin (Eds.), *Psychology of intergroup relation* (pp. 7-24). Hall Publishers.
- Todorov, A., Mandisodza, A. N., Goren, A., & Hall, C. C. (2005). Inferences of competence from faces predict election outcomes. *Science*, 308(5728), 1623-1626. <https://doi.org/10.1126/science.1110589>
- Trujillo, K. L., Shere, A., Klein, B., Ognyanova, K., Lazer, D., Baum, M., Safarpour, A., Perlis, R., Druckman, J., Santillana, M., Quintana, A., Uslu, A., Green, J., Lin, J., Qu, H., & Pippert, C. H. (2021). *The COVID states project #69: Student attitudes about university COVID-19 policies*. <https://doi.org/10.31219/osf.io/dtxv3>
- Wegemer, C. M., & von Keyserlingk, L. (2022). Dual pandemics of COVID-19 and systemic racism: The roles of perceptions of inequities, civic values, and conservatism in mask-wearing behavior. *Analyses of Social Issues and Public Policy*, 22(1), 66-88. <https://doi.org/10.1111/asap.12293>
- Willis, J., & Todorov, A. (2006). First impressions: Making up your mind after a 100-ms exposure to a face. *Psychological Science*, 17(7), 592-598. <https://doi.org/10.1111/j.1467-9280.2006.01750.x>

Appendix: Post-Rating Questionnaire

Demographics

1. Age
2. Gender
 - a. Female
 - b. Male
 - c. Non-binary
 - d. Prefer not to say
3. Year in college
 - a. Freshman
 - b. Sophomore
 - c. Junior
 - d. Senior
4. College major
5. Place of birth (state, country)
6. Race/Ethnicity
 - a. White
 - b. Black or African American
 - c. Asian
 - d. Hispanic or Latino
 - e. Other
 - f. Two or more races
7. College residence
 - a. On campus dorms
 - b. Off campus

Pandemic-related behaviors

8. How often do you wear a mask in **indoor public settings**?
 - a. Virtually always, regardless of any mandate or requirement
 - b. Virtually always, but only when mask wearing is required by mandate or policy
 - c. Sometimes, but only when mask wearing is required by mandate or policy
 - d. Rarely or never, even when mask wearing is required by mandate or policy
9. How do you usually wear your mask?
 - a. Always over both nose and mouth
 - b. Sometimes just over mouth
 - c. Usually over just mouth
 - d. Usually just over chin
10. Queens currently requires everyone to wear a mask in all indoor public settings (except dorm rooms or when eating or drinking). How do you feel about this policy being necessary and appropriate?
 - a. Completely agree
 - b. Somewhat agree
 - c. Not sure
 - d. Somewhat disagree
 - e. Strongly disagree
11. Other people who wear **masks over their nose and mouth** in indoor public settings make me feel (check all that apply):
 - a. Anxious
 - b. Angry
 - c. Reassured

- d. Safe
 - e. Annoyed
 - f. Indifferent (don't care)
12. Other people who **DON'T** wear masks in indoor public settings make me feel (check all that apply):
- a. Anxious
 - b. Angry
 - c. Reassured
 - d. Safe
 - e. Annoyed
 - f. Indifferent (don't care)
13. Other people who wear masks **under their nose or mouth** in indoor public settings make me feel (check all that apply):
- a. Anxious
 - b. Angry
 - c. Reassured
 - d. Safe
 - e. Annoyed
 - f. Indifferent (don't care)
14. Queens currently has a COVID vaccination requirement for all students, faculty, and staff (with limited medical or religious exemptions). How do you feel about this policy being necessary and appropriate?
- a. Completely agree
 - b. Somewhat agree
 - c. Not sure
 - d. Somewhat disagree
 - e. Strongly disagree
15. Which group of people do you think should be required to wear masks in indoor public settings?
- a. Only people who are not vaccinated against COVID
 - b. Everyone regardless of COVID vaccination status
 - c. Only people who wish to wear masks (but shouldn't be required)
 - d. No one should be required to wear a mask
 - e. Don't know
16. In a future election, all things being equal, would you be more or less likely to support a candidate who endorsed vaccine mandates in schools and workplaces.
- a. Much more likely
 - b. Somewhat more likely
 - c. Somewhat less likely
 - d. Much less likely
 - e. Don't know
17. Since March 2020, has one of your family members (perhaps including yourself) or close friends experienced a serious case of COVID infection.
- a. Yes
 - b. No
 - c. Not sure