# The relations between age, face mask perceptions and face mask wearing

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### ABSTRACT

Popular press outlets have proposed that older individuals are less likely to wear face masks despite health benefits of doing so during the COVID-19 pandemic. The current article investigates this notion in four separate studies, and we also assess the mediating effect of face mask perceptions between age and face mask wearing using the eight-dimension Face Masks Perceptions Scale (FMPS). The sample-size weighted average correlation between age and face mask wearing was $-.07$ ($95\%C.I.[-.14, .001]$, $Z\text{-value} = -1.928$, $P = .054$, $n = 824$), indicating that older individuals are slightly less likely to wear face masks compared to younger individuals. Age did not have significant relations with any face mask perceptions, and the mediating effect of face mask perceptions was not robust or consistent. This indicates that the relation between age and face mask wearing is not explained by face mask perceptions, and researchers must turn to other explanatory mechanisms to understand this relation. We propose possible avenues, such as dual-system theories, to further investigate this research question as well as others associated with face mask perceptions, face mask wearing and the COVID-19 pandemic.

## Introduction

Although older individuals suffer higher rates of morality from COVID-19, popular press outlets have asserted that age has a negative relation with face mask wearing, in part due to older individuals' negative perceptions regarding the appearance and efficacy of face masks.[1–3] These popular press speculations are largely based on authors' observations and nonacademic surveys, but, if true, then identifying avenues to encourage older individuals to wear face masks could reduce the spread of COVID-19. Also, such a finding could provide notable theoretical implications. Younger individuals are known to perform riskier health behaviors,[4,5] but face mask wearing could be a rare instance in which older individuals perform a riskier health behavior. Subsequent investigations could then integrate risk-taking theory (e.g., dual-system theories;[6]) to provide explanations for the apparent differences regarding age's relations with face mask wearing and other health behaviors. The goal of the current article, therefore, is to provide a necessary initial investigation into the relation of age and face mask wearing.

We utilize four extant datasets to assess the relation of age and face mask wearing during the COVID-19 pandemic. We also assess the relation of age and face mask perceptions using the eight-dimension Face Masks Perceptions Scale (FMPS).[7] Dimension descriptions are provided in Supplemental Material A. By using the FMPS, we assess whether older individuals indeed have negative perceptions of the appearance and efficacy of face masks.[2–3] Perhaps more importantly, we test whether face mask perceptions mediate the relation of age and face mask wearing, which may identify explanatory mechanisms to target in future interventions.

By achieving these goals, the current article provides several benefits for research and practice. First, we identify a possible target population, older individuals, to encourage face mask wearing and reduce the spread of COVID-19. Second, we determine reasons that older individuals may refuse to wear face masks by studying perceptions, which can be addressed in future interventions. Third, we discover a possible health behavior in which older individuals may take more risk, face mask wearing, which opens avenues to investigate this counterintuitive finding. Fourth, the current research can further support the importance of individual differences in models of health behaviors (e.g., COM-B model;[8]), but it can also support that these models may not be universal. Age may not have identical relations with all health behaviors, but rather its effects may differ based on the specific health behavior. Fifth, the FMPS was recently created, and our results can provide support for the role of perceptions in face mask wearing.

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**Table 1** Correlations of age with face mask perceptions and behaviors

|  | Dataset 1 | Dataset 2 | Dataset 3 | Dataset 4 | $\bar{r}$ |
|---|---|---|---|---|---|
| 1.) Comfort | .03 | −.09 | .20** | .08 | .05 |
| 2.) Efficacy | −.00 | .03 | −.02 | .10 | .03 |
| 3.) Accessibility | −.06 | −.10 | −.02 | −.00 | −.05 |
| 4.) Compensation | −.05 | −.02 | .04 | −.02 | −.02 |
| 5.) Inconvenience | −.00 | −.12* | .07 | .09 | .01 |
| 6.) Appearance | .02 | −.04 | .02 | .15** | .04 |
| 7.) Attention | −.12* | −.06 | −.01 | .15** | −.01 |
| 8.) Independence | −.02 | −.00 | .05 | .07 | .02 |
| 9.) Worn within past six months | −.00 | – | −.09[a] | −.01[b] | −.02[c] |
| 11.) Worn within past three weeks | – | – | −.15*[a] | −.07[b] | −.11*[d] |
| 11.) Worn within past two weeks | – | – | – | −.08[b] | −.08[b] |
| 12.) Worn within past week | – | – | −.12[a] | −.07[b] | −.09*[d] |
| 10.) Worn within past three days | −.09[e] | – | – | – | −.09[e] |
| N | 465 | 327 | 250 | 330 | 1,372 |

Note: Sample sizes reported above may slightly differ from sample sizes reported in-text due to participants not providing their age. Sample-size weighted average of all correlations between age and face mask wearing was −.07 (95%C.I. [−.14, .001], Z-value = −1.928, P = .054, n = 824). $\bar{r}$ = sample-size weighted average correlation.

[a]Represents a sample size of 207 due to face mask wearing being measured at a different timepoint.

[b]Represents a sample size of 262 due to face mask wearing being measured at a different timepoint.

[c]Represents a sample size of 934 due to not including an effect size for dataset 2.

[d]Represents a sample size of 469 due to not including an effect size for datasets 1 and 2.

[e]Only includes responses of participants two went into public within the past three days, which resulted in a sample size of 245.

## Methods

We utilize four extant datasets. The first two were used for Study 2 (n = 393) and Study 3 (n = 327) in (Howard, 2020)[7]; the third was used for Study 1 (n = 209) in (Howard, Under Review)[11]; and the fourth was used for the study (n = 267) in (Howard, Under Review)[12]. None of these prior articles incorporated age into their analyses. Supplemental Material B includes complete information regarding our samples and applied measures.

## Results

Correlations are included in Table 1, including samples-size weighted average correlations calculated using a random-effects meta-analytic model. From the average of all four datasets, age did not have a statistically significant relation with any face mask perception (all P > .05). The sample-size weighted average correlation of age and face mask wearing was −.07 (95%C.I. [−.14, .001], Z-value = −1.928, P = .054, n = 824), which was extremely close to reaching statistical significance. When excluding measures of face mask wearing within the past six months, the sample-size weighted correlation was −.10 (95%C.I. [−.17, −.02], Z-value = −2.583, P = .01, n = 714), which was statistically significant. This result indicates that older individuals are less likely to wear face masks.

We applied Hayes's[9] PROCESS macro, which provides bootstrapped estimates of effects and standard errors, to assess the mediating effect of face mask perceptions between age and face mask wearing (Supplemental Material C). Datasets 1 and 3 did not produce any significant indirect effects. Dataset 4 produced multiple significant total indirect effects, but no individual indirect effects produced consistently significant results. This indicates that face mask perceptions overall may mediate the relation between age and face mask wearing, but this mediating effect is inconsistent and no specific perception is a robust mediator. Lastly, we replicated all results while controlling for whether the participants' location had a face mask ordinance when completing their final survey (Supplemental Material D). None of the correlations', direct effects', or total indirect effects' statistical significances differed between these analyses

and our primary analyses, supporting the robustness of our results.

## Discussion

These results empirically support recent popular press assertions, and researchers can now investigate face mask wearing in older populations with firmer confidence in the importance of their research questions; not only are older people more vulnerable, but they are less likely to perform this preventative behavior. Public health organizations can develop interventions to encourage older individuals to wear facemasks with greater assurance that such efforts are worthwhile, as targeting preventative behaviors in this population may have the best results.

In developing these interventions, researchers should reassess the role of individual differences in models of health behaviors. For instance, when creating the COM-B model, Bish and Michie[10] acknowledged the uncertain role of age in understanding preventative behaviors. It is possible, if not probable, that the effect of age is not identical across all preventative behaviors, and older individuals may be more likely to perform some preventative behaviors but not others. For instance, older individuals may be more likely to vaccinate but less likely to wear face masks. Such nuance may be necessary to develop effective interventions.

Future research should use other theoretical lenses beyond perceptions to identify relevant explanatory mechanisms. We suggest dual-system theories of risk taking,[6] which propose that risk taking is driven by two separate cognitive processes: affective and deliberative. While all ages engage similarly in deliberative processes, younger individuals are more susceptible to affective processes.[6] Face mask perceptions may reflect deliberative processes wherein individuals must ponder the characteristics of face masks. COVID-19, however, produces strong affective responses, perhaps causing younger individuals to instinctively wear face masks. Future research should therefore test whether affective rather than deliberative processes explain the relation of age and face mask wearing, given the current results regarding perceptions.

## Supplementary data

Supplementary data are available at the *Journal of Public Health* online.

## Conflict of interest

The present authors have no conflicts of interest to declare.

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