

Extraversion Negatively Predicts Compliance with Social Distancing and Mask Usage Guidelines for Men but Not Women

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Abstract Weeks into the COVID-19 pandemic, health agencies began recommending social distancing and mask usage to slow the spread of COVID-19; however, not all individuals adhered to these guidelines as consistently as others. This study investigated if extraversion negatively predicted social distancing behaviors and mask usage in a sample of participants from North America. Additionally, based on research on sex differences and engaging in health risk behaviors, it was hypothesized that the relationships between extraversion, social distancing, and mask usage would be moderated by biological sex, such that the relationships would be stronger for men than women. Results showed that extraversion was negatively related to mask usage and social distancing guidelines for men and that no relationship between extraversion and complying with these guidelines occurred for women.

Keywords: compliance, COVID-19, extraversion, health risk behaviors, mask usage, sex differences, social distancing

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1. Introduction

In March of 2020, the World Health Organization declared a global pandemic due to the widespread transmission of COVID-19. Days after this announcement, state and territorial governments in the United States began issuing social distancing guidelines aiming to reduce in-person contact and the spread of COVID-19. Initially, these efforts were generally successful at reducing in-person interactions with individuals outside of one's household. However, people varied in the degree to which they complied with social distancing and mask usage guidelines. The purpose of this study is to determine whether compliance with social distancing and mask usage guidelines is predicted by one's trait-level extraversion and biological sex. The argument in support of such possibilities begins with an understanding of humans' need for forming and maintaining close relationships.

1.1. Extraversion and The Need to Belong

Humans are a social species who have a well-documented need to belong [1]. Similar to the adverse physical reactions experienced when people are deprived of food or water, a lack of social connection can result in

physical detriments such as increased risk of all-cause mortality [2] as well as psychological detriments such as depressive symptoms [3]. In particular, people who have higher levels of trait extraversion (i.e., those who are sociable, energetic, excitable, and talkative) are more likely to seek social connections [4] and engage in social activities [5] than those who are less extraverted, suggesting that they may engage in more social activities than others to satisfy their need to belong. Thus, stay-at-home orders and guidelines preventing in-person contact with others outside one's household may have been particularly challenging for the highly extraverted as the desire to connect with others in-person during the pandemic was viewed as a risky health behavior. Indeed, research conducted prior to the COVID-19 pandemic has affirmed this, with those who are less extraverted being more motivated to avoid infectious diseases [6]. Next, a brief review of the research regarding how extraversion and one's biological sex can correlate with engaging in risky health behaviors is provided.

1.2. Extraversion, Biological Sex, and Risky Health Behaviors

Considering that social distancing and mask usage guidelines are intended to prevent one from becoming infected with COVID-19 or transmitting the virus to others, the decision to forgo complying with such

guidelines would reasonably be considered a risky health behavior. Prior research has explored what predicts partaking in risky health behaviors, and two factors worth noting are one's trait level extraversion and one's biological sex. For example, extraversion has been shown to correlate positively with smoking cigarettes, binge drinking, and engaging in unprotected sex—all of which are considered risky health behaviors [7]. Likewise, research has demonstrated sex differences in engaging in risky health behaviors, with men being more likely than women to engage in binge drinking [8] and tobacco use [9]. Thus, considering the research on the need for maintaining social relationships, risky health behaviors, extraversion, and biological sex, the following hypotheses are posed.

H1a: Extraversion is negatively related to complying with social distancing guidelines.

H1b: Biological sex moderates the relationship between extraversion and complying with social distancing guidelines, such that this relationship is stronger for men than women.

H2a: Extraversion is negatively related to complying with mask usage guidelines.

H2b: Biological sex moderates the relationship between extraversion and complying with mask usage guidelines, such that this relationship is stronger for men than women.

2. Materials and Methods

2.1. Participants

Participants were recruited via a communication discipline listserv (Communication, Research, and Theory Network) and posts on the Health Communication Division Facebook pages for the National Communication Association and International Communication Association. The researcher also asked students in upper-division and graduate level communication courses to recruit family members and friends to participate. This study was conducted using a dataset collected across five questionnaires distributed between March 2020 and May 2021; however, the data used for this study's analyses were collected during the first and fourth questionnaires. Initially, 485 participants enrolled in the study by completing the first questionnaire. By the time the fourth data collection occurred approximately four months later, 235 participants were still actively participating. Those who did not participate in both the first and fourth questionnaires or who did not provide data on the variables tested in this study's analyses were removed from the sample. Following the end of data collection, twelve participants were randomly chosen to receive a \$50 (U.S. Dollars) Amazon eGift card.

Of the 235 participants in the final sample, the majority were women ($n = 193$), whereas 42 were men. Participants' ages ranged from 18-75 years ($M = 36.23$; $SD = 14.10$). The majority of the participants were White (67.7%), with other participants identifying as Asian/Pacific Islander (11.5%), Hispanic/Latinx (10.2%), Black (3.0%), or as multiple ethnicities (7.2%). One participant did not report their race.

2.2. Procedure

Participants completed an initial online questionnaire distributed between March 24 and May 10 of 2020. The initial survey included several demographic questions (e.g., sex, age, and race) as well as a measure of trait level of extraversion. In the fourth questionnaire, participants reported their propensity to comply with social distancing and mask usage guidelines, both of which were recommended by the Centers for Disease Control at the time of the data collection. Full details on these measures are reported next.

2.3. Measures

Table 1 presents the means, standard deviations, internal reliability estimates,¹ and intercorrelations of the study's variables.

Table 1. Descriptive Statistics and Intercorrelations of Study Variables (N = 235)

Variable	<i>M</i> (<i>SD</i>)	ω	1.	2.	3.	4.
1. Extraversion	3.17 (.79)	.93	-			
2. Social Distancing Compliance	5.76 (1.15)	.81	-.22*	-		
3. Mask Usage Compliance	6.69 (.66)	.77	-.09	.42**	-	
4. Age	36.23 (14.10)	-	-.18**	.27**	.08	-

Notes. All variables were measured with response choices ranging from 1 to 7 except for extraversion (measured with response choices ranging from 1 to 5). ω = the internal reliability statistic McDonald's omega. * $p < .01$ ** $p < .001$.

2.4. Extraversion

The Eysenck personality questionnaire brief version [10] was used to measure trait levels of extraversion during the initial survey. Participants responded to 12 Likert-style items (e.g., "do you like mixing with people?"). Response options ranged from 1 (not at all) to 5 (extremely), and two of the 12 items were reverse scored (e.g., "Are you mostly quiet when you are with other people?"). The scale demonstrated excellent internal reliability (McDonald's $\omega = .93$).

2.5. Compliance with Social Distancing Guidelines

The researcher developed a scale to measure how consistently people follow social distancing guidelines. The scale consisted of three 7-point Likert-type items: "In general, I have been good about following social distancing guidelines," "I always abide by social distancing guidelines," and a reverse coded item, "I sometimes go against social distancing guidelines." Response options ranged from 1 (strongly disagree) to 7 (strongly agree). The items demonstrated adequate internal reliability (McDonald's $\omega = .81$). This scale was

¹ Recent research recommends using McDonald's omega (ω) in place of Cronbach's alpha when reporting internal reliability [19]. Cronbach's alpha relies on the assumption of essential tau-equivalence—that all items measure the same latent variable to differing degrees of precision. McDonald's omega does not rely on this assumption, but when the assumption is met, McDonald's omega reduces to Cronbach's alpha.

administered to participants in July of 2020 as part of the fourth survey in the data collection.

2.6. Compliance with Mask Usage Guidelines

The researcher also developed a scale to measure compliance with mask usage guidelines. This scale also consisted of three 7-point Likert-type items: “I always wear a mask in public,” “I use a mask when interacting with strangers,” and a reverse coded item, “I do not wear a mask in public.” Response options ranged from 1 (strongly disagree) to 7 (strongly agree). The items were internally consistent (McDonald’s $\omega = .77$). This scale was also administered to participants in July of 2020—approximately 2-4 months after the initial survey, depending on when the participant enrolled in the study.

3. Results

Hypotheses 1a predicted a negative relationship between extraversion and consistently complying with social distancing guidelines, and hypothesis 1b predicted that this relationship would be moderated by biological sex such that the magnitude of this relationship would be stronger for men than women. To test this hypothesis, Hayes’s PROCESS macro [11] was used to conduct and analyze a moderation model. Specifically, Model 1 in PROCESS was utilized, as it allows for testing a single moderating variable (biological sex) on the relationship between an independent variable (extraversion) and a dependent variable (social distancing compliance). Age was included as a covariate, as it significantly positively correlated with social distancing behaviors and significantly negatively correlated with extraversion. As hypothesized, there was a significant negative relationship between extraversion and complying with social distancing guidelines, $F(4, 230) = 8.51, p < .001$, but this main effect was rendered uninterpretable by its inclusion in a disordinal interaction with biological sex. The results do show, though, that biological sex moderates the association between extraversion and adherence to social distancing guidelines. That is, extraversion negatively predicts complying with social distancing guidelines for men but not for women. Therefore, H1a was not supported, and H1b was supported.

Hypothesis 2a predicted a negative relationship between extraversion and complying with mask usage guidelines. H2b predicted that this relationship would be moderated by biological sex, such that the relationship would be stronger for men than women. PROCESS Model 1 was again used to construct a regression to test hypotheses 2a and 2b. All variables remained the same from the regression testing H1a and H1b except for the dependent variable, which was mask usage compliance instead of social distancing compliance. Although age did not significantly correlate with mask usage, its significant correlation with extraversion warranted its inclusion as a covariate. Results showed a significant negative relationship between extraversion and mask usage, $F(4, 230) = 12.47, p < .001, R = .42, R^2 = .18$, but this main effect was also rendered uninterpretable by its inclusion in a disordinal interaction with biological sex.

The results of the significant moderation did show that extraversion negatively predicted adherence to mask usage guidelines for men but not for women. H2a was not supported, and H2b was supported. Additional statistical results for all regressions appear in Table 2.

Table 2. Regressions Predicting Social Distancing Behaviors and Mask Usage from Extraversion and Biological Sex

	Dependent Variable (Y)	
	Social Distancing Behaviors	Mask Usage
Constant	4.82**	6.11**
Age (Covariate)	.02**	.003
Extraversion (X)	-.81**	-.76**
Biological Sex (W)	.30	.55**
Interaction (X × W)	.63*	.78**

Notes. Values in this table are unstandardized regression coefficients from PROCESS Model #1. Continuous variables have been mean centered. Biological sex was dummy coded as 0 = male and 1 = female. * $p < .05$; ** $p < .001$. Both significant interaction effects were disordinal, therefore negating any significant main effects.

4. Discussion

The goal of this study was to investigate reasons why people varied in their compliance with social distancing and mask usage guidelines during the COVID-19 pandemic. Based on the fundamental human need to develop and maintain close relationships [1] and the well-established characteristics of those who are highly extraverted [4,5], it was predicted that extraversion would negatively relate to complying with social distancing and mask usage guidelines. The results herein confirmed this prediction, but for men only. Whereas extraversion negatively predicted complying with social distancing and mask usage guidelines for men, there was no significant relationship between extraversion and these outcomes for women. Thus, these findings partially align with other recent research that has found a negative relationship between extraversion and engaging in social distancing during the COVID-19 pandemic regardless of one’s biological sex [12].

The results of the current study are not entirely surprising given that prior research has shown that men are more likely to engage in certain risky health behaviors, such as binge drinking [8] and tobacco use [9]. These results parallel recent studies on mask usage and social distancing across cultures. For example, although our sample was composed of participants from North America, a study using data from 38 countries across multiple continents showed that men are less likely to use masks than women [13]. Another study conducted in Qatar found that men were less likely than women to engage in social distancing [14], and a study conducted with participants in China showed that men wear masks less often than women [15].

What are the implications of these findings? For one, these findings reaffirm the importance people place on developing and maintaining close relationships that satisfy the fundamental human need for belonging. That is, people are willing to risk contracting a deadly, still not yet fully understood disease to satisfy their social needs. This is in line with other research that suggests engaging in

risky behaviors is related to a greater sense of a need to belong [16].

Additionally, discovering predictors of noncompliance with social distancing and mask usage behaviors, such as one's level of extraversion and biological sex, can be useful to public health agencies. For example, identifying these factors allows for public health experts to target specific demographics in health campaigns promoting adherence to social distancing and mask usage should a future pandemic occur, or the current COVID-19 pandemic continues due to the virus evolving into vaccine resistant variants. These findings also illustrate that noncompliance with COVID-19 guidelines is not only a potential function of cultural norms or political ideologies. Indeed, this aligns with prior research findings that social distancing adherence is likely predicted by a combination of individual differences (i.e. a personality trait such as extraversion and also one's biological sex), the contextual aspects of a given situation, and where one lives (i.e., an urban or rural community) [15].

4.1. Strengths, Limitations, and Future Directions

As with any research endeavor, the present study had strengths and endured limitations. One strength of this study was its longitudinal design. This allowed the researcher to demonstrate that one's level of extraversion, which was measured in the initial questionnaire, predicted mask usage and social distancing, which was measured in a subsequent questionnaire distributed several months into the pandemic. A second strength of the study was the dispersion of participants' ages. Unlike studies collected from college student samples that tend to consider only the experiences of young adults, participants' ages in this study ranged from 18 to 75, and the average age of this study's participants was just over 36 years old.

Some of the sample's demographics could be considered limitations. Although participants varied widely in age, the study was limited to only exploring the social distancing and mask usage compliance of adults. Future research should investigate why adolescents, specifically those who are old enough to understand the risks of contracting and transmitting COVID-19, at times eschew social distancing and mask usage guidelines. Extraversion and biological sex could potentially also explain these behaviors in adolescents, but factors such as the desire to adhere to peer norms could also influence such risky decisions. Indeed, the influence of peer norms on adolescents' behaviors has been shown in other contexts such as risky sexual behavior in online settings [17] and alcohol and cigarette use [18].

A second limitation of this study was that the dataset only included measures of extraversion and did not measure participants on the remaining four of the big five personality traits. Again, such a limitation provides an avenue for additional research, as future studies could consider what combinations of personality traits work in tandem to predict one's adherence to public health guidelines. Additionally, researchers should also simultaneously test a variety of socio-cultural factors (e.g., political ideology and education level) in conjunction with

personality traits to determine the extent to which compliance with public health guidelines is co-influenced by environmental factors and one's personality traits.

Finally, considering the sample was recruited from North America, this study's findings are geographically bound and should only be generalized to the adult population of North American countries—specifically the United States and Canada. These generalizations should also be made with caution, though, as some racial minorities were underrepresented in the sample. For example, approximately 13.4% of Americans identify as Black; however, only 3% of participants in this sample identified as Black.

5. Conclusion

This study determined that extraversion was negatively correlated with complying with COVID-19 health guidelines such as social distancing and mask usage, but only for men. These findings affirm the pervasiveness of the need to belong and demonstrate that certain people, based on trait-levels of extraversion and their biological sex, are more likely to engage in noncompliance with these public health recommendations. Although several additional studies should be done to further understand the factors predicting risky health behaviors regarding noncompliance with COVID-19 guidelines, the findings from this study provide an important starting point—that choosing to forgo wearing masks and social distancing is predicted, at least in part, by one's personality and biological sex.

Statement of Competing Interests

The author has no competing interests.

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