The psychology of wearing face masks in times of the COVID-19 pandemic

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Running title: Acceptance of wearing face masks

Abstract

Background

Wearing face masks in times of COVID-19 is one of the essential puzzle stones for to effectively decrease the rate of new infections and thus, to mitigate the negative consequences for individuals as well as the society. Acceptance for wearing masks is still low in Europe—many people just feel strange when wearing masks because others do not wear them. This induces a severe problem for imposing obligations of wearing masks and so for keeping the pandemic at bay.

Methods

Eighty-six participants had to assess how strange they felt when wearing a face mask while being exposed to displays of groups of persons with varying frequencies of mask wearers. Three different types of face masks were shown: simple surgery masks, FFP2 masks and loop scarfs.

Findings

The mere exposure to social groups wearing masks substantially reduced the strange feeling of wearing a mask. The higher the frequency of people wearing masks in the displayed social group, the less strange participants felt about themselves. This effect of a descriptive social norm was particularly effective when people saw others wearing less intrusive masks, here, simple surgery masks.

Interpretation

The more people use masks, the less strange it feels for the people to wear masks and so the higher the acceptance for using them in a sustainable way. This assists to efficiently and effectively reduce the risk of infecting others.

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Introduction

With more than 2.5 million cases of COVID-19 (Coronavirus disease 2019) worldwide (effective 24 April 2020), most of the epidemics in West European states appear to be stable; in some regions they are declining already[1]. These "flattening curves" are promising as they are the basis for keeping the rate of new infections at a level that can be handled by the given hospital infrastructures. Psychologically, this promising development is dangerous, because it can make people believe that the pandemic is under control, which could in turn end up in a premature liberalization of containment measures.

The WHO Strategic and Technical Advisory Group for Infectious Hazards (STAG-IH) regularly reviews and adjusts the assessment of risks and needed measures to mitigate the infection of SARS-CoV-2 (Severe acute respiratory syndrome coronavirus 2) causing COVID-19. One of the pragmatic ways to reduce the chance of transmitting respiratory viruses in general is to use face masks[1] [2], which has recently been recommended for the specific situation of COVID-19 as well [3].

Besides providing a physical barrier to the virus, face masks can have further functions: They can, for instance, cue adequate behavior in a social situation, they may trigger additional, positive hygiene practices [4], and they can reduce fears and thus facilitate active partaking in social life, especially for very vulnerable persons or people with intolerance of uncertainty [5].

Wearing masks is not a sufficient [6] but a necessary facet of the full spectrum of interventions set up to delay a major surge of the pandemic and to level the demand for hospital

[1] The term "mask" will be used within this paper to refer to typical face masks used by non-professionals, including improvised masks, e.g. loop scarfs, dust and surgical masks – such protective items are now frequently called *community masks*.

beds, while protecting those persons who are most vulnerable to a severe progress of COVID-19 (elderly people, people with respiratory problems and other comorbidities) [7].

Although the multifaceted benefits of face masks are sufficiently known, people in many areas of the world are not used to wearing them. Consequently, the frequency and acceptance of wearing masks is still low in Europe, which stands in stark contrast to the high usage rates in various Asian communities, see [8,9]. One major reason for not wearing a face mask in the West is the feeling that one may look strange or be judged as being strange by others. Feeling strange (or normal, on the other hand), is closely linked to descriptive social norms that are present in a given Umwelt, the social environment. This implies that the mere frequency of mask wearers in society might be an essential factor to move individuals to wear face masks as well. This is a paradigmatic example for the importance of understanding the psychology of pandemics [5]. A psychological perspective allows assessing why people do or do not do certain things, which is the prerequisite for finding ways to change behavior. In case of mask wearing, the question is: How can we change the attitude towards and the feelings about wearing masks? The psychological answer, in terms of a hypothesis is: Via the social norm, as one possibility [10,11]. The present study tested this account by confronting participants with pictures that show social groups with varying frequencies of persons who wear different kinds of face masks. We assessed whether the different social norms, that were thus implicitly communicated, affected the participants' feeling about wearing a face mask themselves.

Methods

Participants. The needed sample size of $N = 90$ was calculated a priori via power analysis [12] targeting a one-tailed matched paired *t*-test which is able to detect a small-to-medium effect size

of d_z = 0.3 [13], given an α = 0.05 and a test power (1-β) = 0.80. As we aimed to understand the acceptance of wearing masks in one country specifically (Germany), we had to exclude data sets from people originating from different countries yielding a final number of complete data sets of N = 86 (M_{age} = 28.9 years [15-87 years], N_{female} = 61) which reduced the achieved post hoc test power to 0.79.

Material. Based on frontal photos of 12 Caucasian faces (6 female, 6 male) taken from the Color Feret database [14,15] we crafted different versions of displays of these faces. The base version showed all faces without masks at random places of the display making up a social group. For the further displays we employed different masks which we photographed correctly positioned on an artificial head model: 1) a typical homemade (beige) community mask—in the following called "simple mask", 2) an FFP2 mask (N95; white), and 3) a black loop scarf (see Figure 1), We cut out the images of the masks via Photoshop to be able to apply them to the different faces of the social group.

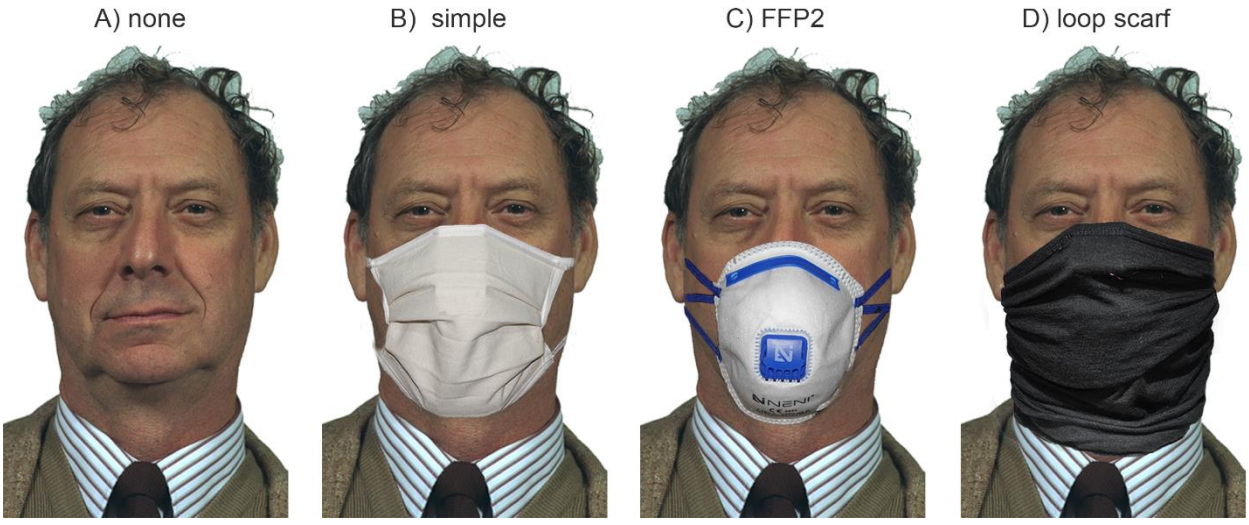

Figure 1: One of the employed faces with different mask conditions: A) none, B) simple, C) FFP2, and D) loop scarf.

For each mask, we generated five different configurations, always consisting of the 12 faces: 1) only one female wearing a mask, 2) only one male wearing a mask, 3) one female and one male wearing masks, 4) three females and three males wearing masks and 5) all persons wearing masks. This yielded 1 [base] + 3 [mask type] × 5 [configurations] = 16 versions. The stimulus material can be retrieved from the https://osf.io/gu6xr/.

Figure 2: Exemplary display presented, here with six (3 female, 3 male) people wearing simple masks.

Procedure. The experiment realized via SoSciSurvey online engine was conducted between 20 April (15:47 local time) and 23 April (16:56 local time). This was before any general legal obligations to wear masks in Germany were in action. Prior to the experimental session, written informed consent was obtained from each participant. All data were collected anonymously. The participants were exposed to all display versions, one by another, with order of the displays

being randomized across participants. Participants were asked to imagine the social situation they were in when confronted with a group of displayed persons ("You are wearing a mouth-nose mask on yourself and are now facing those persons. How do you feel in such a situation?"). While observing the scene without time pressure ($M_{\text{response time}}$=20.0 s), they were asked to answer two consecutive questions on a 7-point scale (1= *not strange at all*, 7= *very strange*): A) *Feel myself*: "While wearing MY mask I am feeling ...", B) *Feel others*: "The others appear ..." [capital lettered MY was also used in the experimental version]. There was no time limit for giving a response. This should allow a full unfolding of the participants' imagery for the social scenes signalled by the watched displays. The general study design (psychophysical testing) was given ethical approval by the local ethics committee of the University of Bamberg. The entire procedure lasted approximately 5-10 minutes.

Results

Data were submitted to further data processing executed by R 3.6.3 [16], with linear mixed models being analyzed via toolbox *lmer* [17]. The entire, anonymized, data set is available at the Open Science Framework https://osf.io/gu6xr/.

As we were mainly interested in the impact of the number of persons in the Umwelt (social environment) wearing masks on the feeling of wearing masks (and because we did not find significant differences between ratings for single male and female mask wearers, $p > .6164$, *n.s.*), we pooled data for both conditions where only one single mask wearer showed up. As shown in Figure 3, we uncovered a clear decrease of feeling strange about one's own wearing a mask with increasing numbers of masks worn by the displayed persons. Meanwhile, the participants evaluated the appearance of the persons shown in the social scene as being more and

more stranger as the number of mask wearers increased. Both effects were found significant when tested with linear mixed models against a base model without taking number of mask wearers into account (*p*'s<.0001). The size of the *Feel myself* effect was large-to-very large ($\eta_{p(Feel\ myself)}$=.367) whereas the *Feel others* effect was qualified as small ($\eta_{p(Feel\ others)}$=.066).

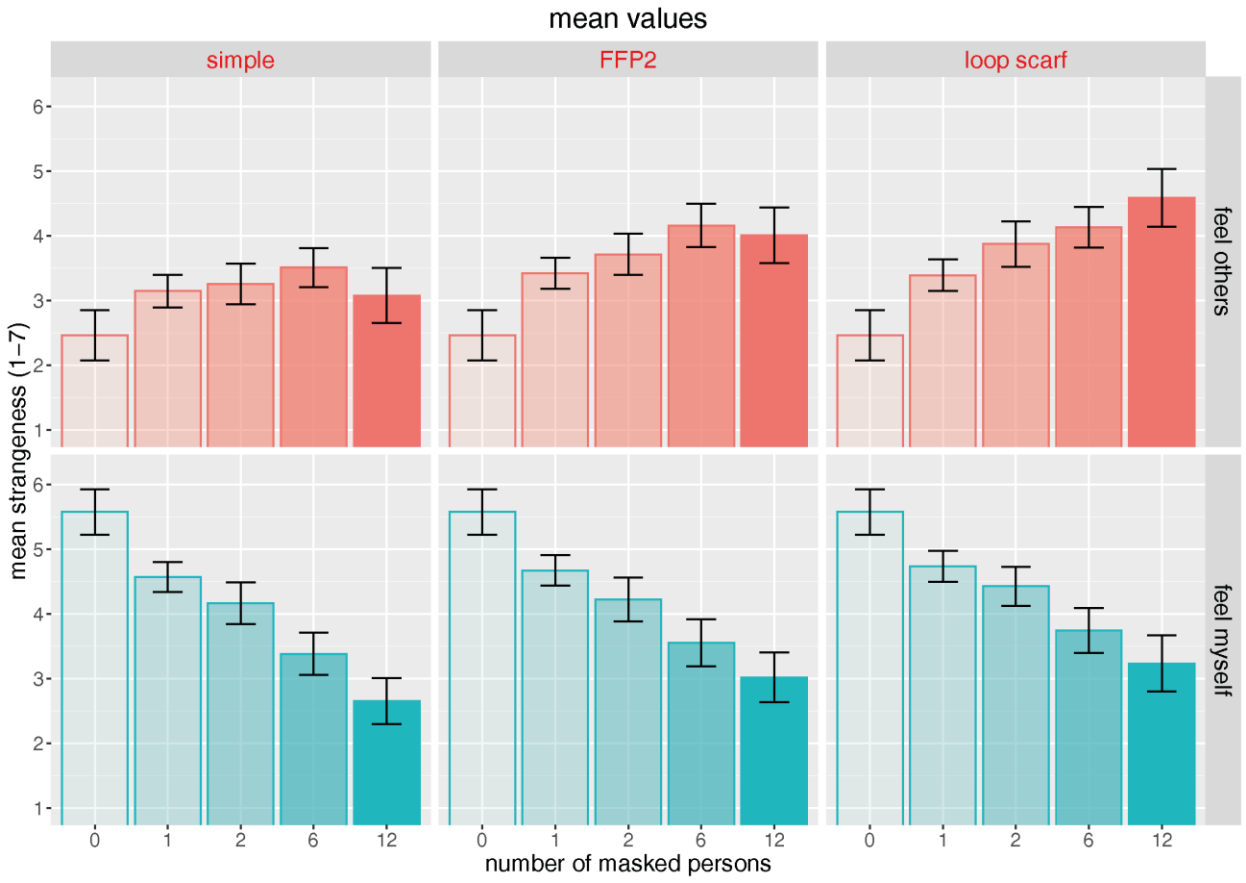

Figure 3: Mean evaluations of strangeness for different displays. Top row: evaluations of others appearing strange, bottom row: evaluations of participants feeling strange about themselves while watching the displays. Error bars indicate confidence intervals CI-95% based on adjusted values for taking within-subjects variances into account [18].

Most importantly, we could show that the drop of feeling strange about oneself wearing a mask was particularly strong when directly comparing the all mask wearers scenario against the no mask wearers scenario (very large effect: Cohen's *d* = -1.562, *p*<.0001). The effectiveness of reducing the strange feeling about wearing a mask was comparable across the three presented

mask types, but was particularly pronounced for the simple mask (*simple*: Cohen's d = -1.835, *FFP2*: Cohen's d = -1.529, *loop*: Cohen's d = -1.351).

Discussion

Wearing face masks in times of COVID-19 is one of the essential puzzle stones for effectively to decrease the rate of new infections and to mitigate the negative consequences for individuals as well as society. Acceptance for wearing masks is still low in Europe—many people just feel strange when wearing masks and therefore, will not follow recommendations to put on masks in the public. Here we show how the mere exposure to people in the Umwelt (social environment) who do wear masks can dramatically change the feeling of strangeness when of wearing a mask oneself. This was particularly effective when people saw others wearing less intrusive masks, here simple self-made masks. First, they are easy and comfortable to use [19], they can be easily and privately produced with simple means, and they are cheap enough to equip many people around the globe by high quantities and fresh qualities. Second, as the suggestions of wearing masks for private persons is referring to the of protecting others and because there is no clear evidence of a difference in protecting others between simple masks and FFP2/N95 masks [3], simple masks prevent shortage of professional medical masks that should be primarily reserved for medical workers. Third, in our study, they showed the highest acceptance rate in terms of feeling least odd when imaging to wear such a mask; this is an important pre-condition that face masks will actually be worn in different situations and over a longer span of time see [8,20]. Our results will also assist decision makers to predict future acceptance of wearing masks when generally more people apply to these new hygienic practices.

Conflict of Interest Statements

No conflicts to be reported

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I would like to thank the Hesslinger family for equipping me with different types of face masks.

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Tables

No tables available

Figures

Figures are listed within the body text to ease up the reviewers' reading.

1 **Figure Legends**

2 See figures.

3