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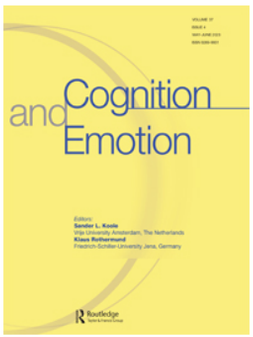

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Empathising with masked targets: limited side effects of face masks on empathy for dynamic, context-rich stimuli

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ABSTRACT

Multiple studies revealed detrimental effects of face masks on communication, including reduced empathic accuracy and enhanced listening effort. Yet, extant research relied on artificial, decontextualised stimuli, which prevented assessing empathy under more ecologically valid conditions. In this preregistered online experiment ($N = 272$), we used film clips featuring targets reporting autobiographical events to address motivational mechanisms underlying face mask effects on cognitive (empathic accuracy) and emotional facets (emotional congruence, sympathy) of empathy. Surprisingly, targets whose faces were covered by a mask (or a black bar) elicited the same level of empathy motives (affiliation, cognitive effort), and accordingly, the same level of cognitive and emotional empathy compared to targets with uncovered faces. We only found a negative direct effect of face coverings on sympathy. Additional analyses revealed that older (compared to young) adults showed higher empathy, but age did not moderate face mask effects. Our findings speak against strong negative face mask effects on empathy when using dynamic, context-rich stimuli, yet support motivational mechanisms of empathy.

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Wearing face masks in public has become a widely accepted and globally adopted means to protect one's own and others' health in recent years. Apart from the health benefits, however, concerns emerged that face masks have unintended and undesirable psychological side effects for communication, empathy, and social relationships (e.g. Fortin, 2020). A substantial number of recent studies provided evidence that face masks diminish empathic accuracy (e.g. Carbon, 2020; Grundmann et al., 2021), speech comprehension (Giovanelli et al., 2021), and face re-identification (Marini et al., 2021). If face masks would impair social interaction in such important ways, the real-life implications would be significant and would give reason to investigate alternatives to wearing face masks as a widespread health behaviour.

Before any firm conclusions can be drawn, however, two aspects deserve attention. First, extant research has largely relied on static and/or decontextualised material, namely images of faces. It remains to be seen whether face mask effects would extend to dynamic and contextualised tasks that resemble real-life conditions more closely. In this study, we relied on an empathy film task in which targets, who do or do not wear a face mask, retell autobiographical events, and express authentic emotions. Besides improving the ecological validity of testing materials, this paradigm offers the additional advantage that empathy can be studied more comprehensively, including cognitive (empathic accuracy) and emotional components (emotional congruence and sympathy; Cuff et al., 2016). Second, extant research

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has largely limited itself to testing whether face masks undermine emotion perception and related aspects of social communication, but neglected to examine the underlying mechanisms. Understanding the reasons for face mask effects on empathy is important to predict why face mask effects occur, and by extension, how such effects can be modulated. In fact, empathy might be largely context-dependent and guided by motives to avoid or approach engaging with others' feelings (Zaki, 2014). Face masks appear to undermine perceived closeness with targets and increase listening effort (Giovanelli et al., 2021; Grundmann et al., 2021; Kastendieck et al., 2022), which may thwart these motives. Therefore, studying face mask effects on empathy allows for testing motivational mechanisms of empathy in real-life conditions of interacting with masked others. Below, we describe earlier empirical findings of face mask effects on empathy and review the motivated account of empathy. We then derive predictions on motivational pathways underlying face mask effects on cognitive and emotional empathy.

Face masks and empathy

Empathy refers to the understanding and sharing of others' affective states and experiencing sympathy towards them, which often triggers prosocial action (Batson et al., 2009). It can be regarded as a fundamental human experience enabling cooperation and helping in social groups. Empathy is considered a multifaceted phenomenon with cognitive and affective components (Cuff et al., 2016). The cognitive component is *empathic accuracy* (also labelled emotion recognition or identification), referring to accurately inferring others' feelings. Knowing what others feel goes hand in hand with two affective components: *emotional congruence*, the sharing of others' feelings, and *sympathy*, which entails feelings of compassion and concern for the other (Wieck et al., 2021).

Triggered by the sudden increase of mask wearing in public, multiple recent studies have collected evidence that face masks undermine empathic accuracy (e.g. Carbon, 2020; Grahlow et al., 2022; Grundmann et al., 2021; Henke et al., 2022; Marini et al., 2021; Pazhoohi et al., 2021). The large majority of these studies have used images of faces featuring various emotion expressions under different experimental conditions: Faces are either fully visible or partly covered by face masks. Participants are tasked to infer the correct emotion or rate emotion intensities. Although insightful, the use of static and/or decontextualised material to study empathic accuracy has been criticised for its low ecological validity (Wieck et al., 2022). A similar concern was raised regarding the initial wave of research on the effects of face masks on emotion recognition (Pavlova & Sokolov, 2022). Under real-life conditions, emotions unfold dynamically across multiple modalities (face, voice, and gesture) and observers have contextual information from the surroundings or the target's utterances. Rather than staged, emotions are expressed naturally and often more subtle than is the case in the typical experimental materials which often rely on rather extreme displays of affect (see also Pavlova & Sokolov, 2022 for a similar observation). In the presence of other contextual cues, emotion recognition is possibly less affected by face masks. In fact, studies using dynamic stimuli (although ultra-short and without target utterances) sometimes find (Henke et al., 2022; Langbehn et al., 2022) and sometimes do not find (Kastendieck et al., 2022) that face masks compromise emotion perception. Even more compelling, an observational study on mother-infant interactions in their homes revealed no differences in interaction quality between sequences where mothers wore face masks vs. not (Tronick & Snidman, 2021).

Furthermore, the use of static and/or decontextualised material does not allow studying affective components of empathy, including emotional congruence and sympathy. Examining these components requires tasks emotionally potent enough to elicit authentic emotional reactions in observers (Wieck et al., 2022). Real-life interactions do not only involve "cold" emotion identification, but also the experience of self-related (e.g. emotion sharing) or other-related (sympathy) emotions. It is these emotional reactions in observers that transmit empathy's effects on prosocial behaviour (e.g. cooperation, helping). Although the interrelatedness of cognitive and affective empathy components (e.g. Cuff et al., 2016; Wieck et al., 2022) makes it likely that face mask effects extend beyond cognitive empathy and are also detectable for emotional empathy, this possibility still awaits empirical testing.

Motivated account of empathy

Traditionally assumed that empathy occurs reflexively and largely outside of people's awareness, Zaki (2014) argued that empathy is better captured as a

motivated process that varies along with situational characteristics. Some motives, such as affiliation and positive affect, stimulate people to engage with others' feelings, whereas other motives, such as avoiding cognitive effort and negative emotions, stimulate people to disengage from others' feelings.

Face masks are likely to affect these motives. Regarding the affiliation motive, others tend to perceive people wearing face masks as more trustworthy (Cartaud et al., 2020; Marini et al., 2021; Oldmeadow & Koch, 2021; but see also Marini et al., 2022; Oliveira & Garcia-Marques, 2022), more approachable (Guo et al., 2019; Lau, 2021), and more socially desirable (Olivera-La Rosa et al., 2020) compared with their unmasked counterparts. Face masks also dampen the negative effect of expressing negatively-valenced emotions on trait judgements (Grundmann et al., 2021). One may conclude from these findings that when social interaction partners wear face masks, people's affiliation motive is strengthened. However, the studies reporting a positive relationship between mask wearing and social evaluations largely relied on static images of people expressing various emotions in prototypical ways as experimental stimuli. Critically, results of studies which utilised more ecologically valid stimuli such as short videos (Kastendieck et al., 2022) or examined participants' autobiographical experiences (Saunders et al., 2021; Wong et al., 2013) paint a contrasting picture. They suggest that face masks may undermine rather than bolster the affiliation motive (Saunders et al., 2021; Wong et al., 2013). Participants who were asked to reflect on the role of face masks during their interactions with others reported that they felt less connected to and were less willing to engage with the other person (Saunders et al., 2021). Hence, outside the laboratory, face masks may thwart people's affiliation motive, negatively impacting empathy responses in turn.

Face masks may also affect the motive to avoid cognitive effort. Specifically, they may lower the likelihood that a person empathises with their social interaction partner by increasing resource demands. Face masks – by virtue of covering up relevant information of the face and preventing lip reading – were found to increase errors in emotion identification (Carbon, 2020; Grundmann et al., 2021; although see Kastendieck et al., 2022), make emotion expressions more ambiguous (Tsantani et al., 2022), and impede recognition upon re-exposure (Marini et al., 2021). In addition, face masks increased the amount of effort people had to invest to understand others' utterances in a simulated video conference (Giovanelli et al., 2021). Thus, by making everyday interactions more effortful, face masks may decrease people's willingness to engage with others' feelings.

Altogether, there is evidence suggesting that when interaction partners wear masks, people may experience lower affiliation with the target and increased cognitive effort to emphasise with them. These are exactly the types of contextual factors that are predicted to reduce the motivation towards empathy (Zaki, 2014). Therefore, if face masks undermine empathy by shifting empathic motives (decreasing affiliation and enhancing cognitive effort), this would provide important evidence for context effects in line with a motivated account of empathy.

The present study

In June 2021, a time when face masks were still mandatory in public in the Netherlands, we conducted a preregistered online experiment. Dutch participants were randomly assigned to watch short empathy-inducing film clips in their original version (unmasked), with a 3D mask superimposed on the face (masked), orwith a moving black bar covering similar regions as the face mask (bar). We included a bar condition to disentangle whether mask effects are unique to masks or merely due to partial coverage of the face. We assessed three components of empathy (empathic accuracy, emotional congruence, sympathy) along with two empathy motives (affiliation, cognitive effort). We also measured participants' recollection of the content of what was communicated (see Supplemental Material). We expected that earlier findings of face mask effects on emotion recognition would extend to all three empathy components, such that empathy responses would be diminished when the target face is covered (vs. not). Reasoning from the motivated account of empathy, we hypothesised that empathy motives would mediate the effects of face coverings on empathy (also see preregistration). Sense of affiliation with a target and cognitive effort should be respectively diminished and increased when the target face is covered (vs. not), and, in turn, predict respectively increased or diminished empathy responses.

As an additional exploratory question, we investigated the role of observer age, as age has previously been linked to empathy (e.g. Wieck et al., 2021).

Theoretically, as people grow older, they tend to place higher priority on affiliation with others (Carstensen, 2006), yet also become more selective in their allocation of cognitive effort (Hess, 2014). At the same time, older adults generally show higher emotional stability than younger adults (Röcke et al., 2009), which may make them less susceptible to face mask-induced shifts in empathy motives. To our knowledge, only two prior studies have examined age differences in face mask effects. Using static stimuli, Kang et al. (2021) found that masks compromised emotion perception more with increasing age. In contrast, Henke et al. (2022) found no age differences in face mask effects with dynamic stimuli. Given the complex age contingencies suggested by developmental theories and our focus on dynamic and contextualised stimuli, we refrained from formulating specific predictions. Rather, we explored the possibility that observer age moderates effects of face covering (vs. not) on empathy motives and responses. To this end, our sample was recruited from two age groups (young vs. old).

Method

Participants

We determined the required sample size to detect the indirect effect of covering the face (vs. not) on the empathy responses with a power of 0.80 by performing a Monte-Carlo power analysis using a Shiny app developed by Schoemann et al. (2017). We approximated our analytic approach with the two-parallel mediator model with a single predictor (face covered vs. not) and outcome (empathy response) variable. The correlation between the predictor on the one hand and the first mediator (cognitive effort), the second mediator (sense of affiliation), and the outcome on the other hand was assumed to be large, medium, and large, respectively (Funder & Ozer, 2019). We further assumed a medium-to-large correlation between both mediators and the outcome. The mediators were not expected to correlate. The results of the *a priori* power analysis (seed = 272; number of replications = 1000, Monte Carlo draws per replication = 20000) indicated that at least 230 participants are needed to reach sufficient statistical power. Given that we planned to include a second predictor (bar vs. mask) in the mediation model and to explore the role of age, we sought to recruit 300 participants. This also provided us with a safeguard against a potential loss of power due to preregistered participant exclusions.

In the end, we recruited 304 Dutch-speaking participants for an online study on people's perception of storytellers. Participants were recruited through panel Inzicht (www.panelinzicht.nl). As preregistered, we excluded 17 participants for failing the attention check, 11 participants for having a response variance of zero across all film clips for target- or self-rated emotions, and 4 participants for having response variances of zero for at least two film clips for target-rated emotions. Following these exclusions, our sample comprised 272 participants. Out of the 272 participants, 57 were younger women (21–35 years,[1] M = 29.9, SD = 4.23), 74 were older women (60–75 years, $M = 69.2$, $SD = 4.31$), 86 were younger men (21–35 years, $M = 28.5$, $SD = 4.3$) and 55 were older men (60–75 years, $M = 67.8$, $SD = 4.58$). All participants received 1.90€ for their participation.

Stimuli

Four film clips were selected from a larger set of Dutch film clips that were developed to assess empathy in the work context (Scheibe et al., 2023) based on procedures outlined in Wieck et al. (2022). Detailed characteristics of the larger film database and film production procedures are provided in Scheibe et al. (2023). In brief, to develop the set of film clips, an age-diverse group of male and female employees were recruited as targets. In an individual laboratory session, the targets were instructed to remember a negative or positive event they had experienced in the last year in the workplace by an interviewer. After targets had selected a suitable experience, the interviewer left the room. The targets were given time and space to sort their thoughts about the event, and to take ten seconds to relive the emotions from the event quietly. Then, the targets were videotaped as they retold their selected experience. To keep the clips standardised, all participants were asked to look straight at the camera during retelling. Additionally, participants were asked to not name specific emotions that they felt during the event, as this could influence how research participants might perceive their emotions. After recording and again after video editing, targets were asked to rate the intensity of the emotions they had felt during the retelling.

For the current study, four clips (Film IDs 19, 24, 28, and 54; see Scheibe et al., 2023 for further information) were selected specifically from the larger pool of film clips based on four criteria. First, only films of targets retelling a negative experience were used, as measuring empathy for negative stimuli is more relevant. Second, the four clips were each unique in both target gender and age; they included a 24 year-old woman, a 25 year-old man, a 58 year-old woman, and a 51 year-old man. Third, targets in selected clips had to remain relatively still during the retelling of the experience to limit the difficulty of the face mask editing. Finally, the selected clips had received medium to high ratings on emotion expressivity and intensity by two independent trained raters (minimally a score of 3 on a 5-point Likert scale, see Scheibe et al., 2023). The topics of the film clips were hearing about a customer's fatal disease, being physically threatened by a customer, dealing with a non-cooperating customer, and having a frustrating interaction with a young client. The primary emotions expressed by the targets were sadness, anxiety, and anger; and the film clip duration ranged from 71 to 116 seconds (see Table S2 for more information).

Films were copied and edited such that each target featured in three separate videos corresponding to the study conditions. The control condition films were raw original videos without editing. For the other conditions, film clips were edited such that virtual moving elements were superimposed on the target face using Lens Studio, a free open-source software tool used for creating augmented reality content such as 3D imagery. For the face mask condition, this meant a virtual face mask covering the mouth, nose and cheeks of the target (including face mask-like features such as following curves in the target faces and apparent attachments to behind target ears). For the bar condition, this meant a black bar fully covering the lower half of the face of the target (excluding any face mask-like features, yet still covering the same facial elements of the mask condition; see Figure 1 for sample stimuli from each condition). During a pilot study with 37 psychology students (92% female, 76% between the age of 18 and 20 years) who received course credit for their participation, 19 participants in the masked condition were asked whether they found the artificial nature of the face masks distracting. Results indicate that the level of distraction was at an acceptable level ($M = 2.32$, $SD = 1.39$; range from 1 = not at all disturbing, 5 = very disturbing).

Procedure and measures

The study was conducted online from June 2 to July 1, 2021. Before participating in the study, participants gave consent for participation in accordance with Ethics Committee regulations of the Faculty of Behavioral and Social Sciences at the University of Groningen. The study had a between-subjects design: Participants were randomly allocated to one of the three conditions ($n = 91$, 88, and 93 for the mask, bar, and control conditions, respectively). In each condition, participants viewed the respective version (original, mask, bar) of four short film clips of targets retelling a negative autobiographical event from the workplace. Films were presented to the participants in random order. After viewing a clip, participants were asked to rate the target's and their own emotional state using a 5-point Likert scale (1 = not at all, 5 = extremely) on 15 emotions (*angry, mad, upset, sad, downhearted, grieved, afraid, alarmed, worried, happy, glad, delighted, proud, productive, satisfied*). These self- and other reports of emotion intensity were subsequently matched with the original emotion ratings of the target's self-ratings during the film production phase to calculate scores

Figure 1. Sample Stimuli From Each of the Three Conditions, including (A) Control Condition, (B) Masked Condition, and (C) Bar Condition. *Note*: The sample stimuli have been blurred in the current manuscript to protect the target's identity.

for *empathic accuracy* (Cronbach's α = 0.76 of the four correspondence scores between target's self-ratings and observers' other-ratings in terms of intraclass-correlation coefficients; see Wieck et al., 2022 for details) and *emotional congruence* (α = 0.78, correspondence between target's self-ratings and observers' self-ratings). Additionally, participants were asked to rate to what extent they felt *compassionate*, *moved*, and *sympathetic*, culminating in a *sympathy* score (ω_{within} = 0.83; $\omega_{between}$ = 0.85; mean of the three additional items).

Then, participants answered questions regarding their cognitive effort, sense of affiliation, and further target characteristics (for an overview of all measures, see Table S1 in the Supplemental Material). Film-specific scores of all variables were averaged across all four films to create single scores per participant. To measure *cognitive effort,* participants were asked how much effort was required to accurately identify the target's emotions (3 items, ω_{within} = 0.81, $\omega_{between}$ = 0.96, e.g. "estimating the emotions of the person was difficult") on a 5-point Likert scale (1 = not at all, 5 = extremely). To measure *sense of affiliation*, participants indicated how connected they felt to the target (3 items, ω_{within} = 0.84; $\omega_{between}$ = 0.80; e.g. "I feel connected to the person"), on the same response scale. After watching the four films, participants completed a memory test (see Supplemental Materials for details and findings).

Analytic strategy

We used R (R Core Team, 2020) and functions from the Hmisc package (Harrell Jr, 2021) as well as from the tidyverse (Wickham et al., 2019) for data processing, plotting, and basic statistical tests. We examined the mediation models using Hayes (2017) PROCESS macro for SPSS, requesting bias-corrected bootstrap intervals (based on 10,000 bootstrap samples) for individual paths. We checked for outliers based on Malahanobis distance using a conservative cut-off (p < .001; Tabachnick et al., 2007); yet found none.

Results

Hypothesis tests

We tested hypotheses using three mediation models, one for each of the three empathy responses. Prior to model fitting, we transformed participants' ICC scores into Fisher z-scores to normalise them (also see Wieck

Table 1. Descriptive statistics (overall and for subgroups) and intercorrelations between key study variables.

		Per condition			Per age group							
Variable	Overall	Control	Mask	Bar	Young adults	Older adults	1	2	3	4	5	6
1. Cognitive effort	1.96 (0.85)	1.92 (0.80)	2.03 (0.86)	1.94 (0.90)	2.03 (0.86)	1.89 (0.84)	–					
2. Sense of affiliation	3.37 (0.65)	3.32 (0.56)	3.36 (0.68)	3.42 (0.71)	3.30 (0.63)	3.43 (0.67)	−.04	–				
3. Empathic accuracy	0.48 (0.27)	0.48 (0.26)	0.47 (0.31)	0.49 (0.25)	0.40^{a} (0.32)	0.57^{b} (0.18)	−.34*	.03	–			
4. Emotional congruence	0.28 (0.24)	0.29 (0.24)	0.27 (0.26)	0.29 (0.24)	0.21^{a} (0.24)	0.36^{b} (0.22)	.02	.17*	.64*	–		
5. Sympathy	2.62 (0.78)	2.72 (0.73)	2.59 (0.81)	2.56 (0.81)	2.51^{a} (0.76)	2.75^{b} (0.80)	.29*	.50*	−.05	.31*	–	
6. Age	47.80 (20.2)	44.71 (20.20)	50.80 (19.89)	48.05 (20.43)	29.08^{a} (4.34)	68.60^{b} (4.47)	−.07	.13*	.27*	.30*	.15*	–

Notes: N = 272. For empathic accuracy and emotional congruence, the mean and standard deviation were computed using raw ICC scores, while correlations were computed using Fisher z-transformed scores (see Measures section for details). Conditions did not significantly differ from each other (all Fs < 2.11). Regarding the age groups, different superscripts indicate significant mean differences (p < .05). * p < .05.

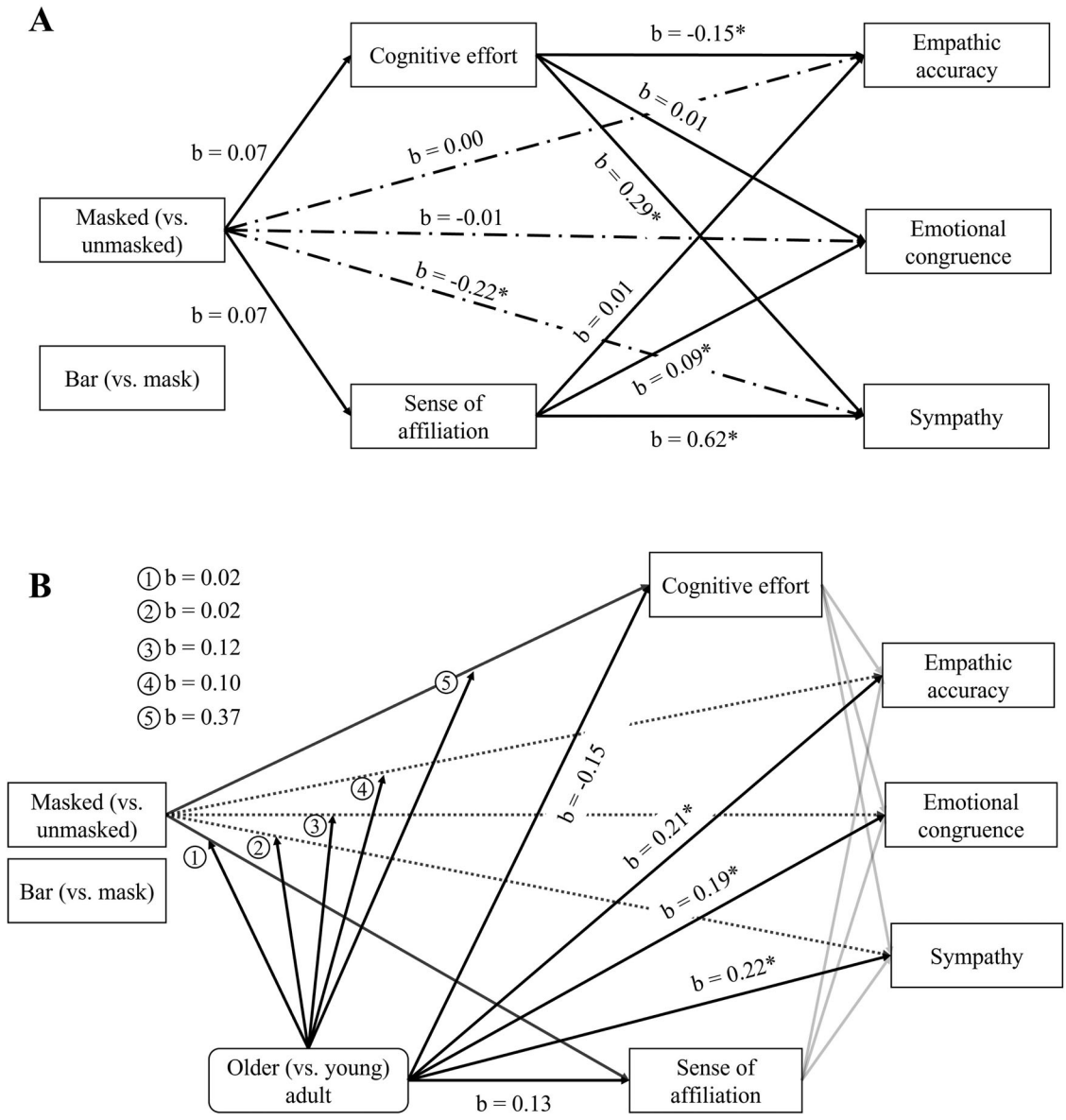

Figure 2. Results of Mediation Analyses Testing Direct and Indirect Effects of Face Coverings on Empathy Without (Panel A) and With Age as Moderator (Panel B). Note: Effects of reducing facial information with a bar (vs. mask) on the mediator and empathy responses have been omitted for clarity. * $p < .05$.

et al., 2021; 2022). General tendencies and correlations can be found in Table 1. As shown in Figure 2(A), covering the face (vs. not) did neither significantly affect cognitive effort ($b = 0.07$, $SE = 0.11$, $p = .543$, 90% CI [−0.11, 0.25]) nor sense of affiliation ($b = 0.07$, $SE = 0.08$, $p = .376$, 90% CI [−0.06, 0.21]). However, increased cognitive effort predicted lower empathic accuracy ($b = -0.15$, $SE = 0.02$, $p < .001$, 90% CI [−0.19, −0.10]) and increased sympathy ($b = 0.29$, $SE = 0.05$, $p < .001$, 90% CI [0.22, 0.37]). Cognitive effort's effect on emotional congruence was insignificant, $b = 0.01$, $SE = 0.02$, $p = .601$, 90% CI [−0.03, 0.05]. Increased sense of affiliation predicted increased emotional congruence ($b = 0.09$, $SE = 0.03$, $p = .004$, 90% CI [0.04, 0.13]) and sympathy ($b = 0.62$, $SE = 0.06$, $p < .001$, 90% CI [0.53, 0.72]), but was unrelated to empathic accuracy ($b = 0.01$, $SE = 0.03$, $p = .724$, 90% CI [−0.04, 0.07]). In line with the insignificant effects of face covering (vs. not) on the mediators, none

of the indirect effects on empathy responses via cognitive effort and sense of affiliation were significant (all *ps* > .05).

Looking at the direct effects of covering the face (vs. not), one significant effect emerged. Independent of its effect on cognitive effort and sense of affiliation, covering the face (vs. not) predicted a decrease in sympathy ($b = -0.22$, $SE = 0.08$, $p = .008$, 90% CI [−0.35, −0.08]). The direct effect of covering the face (vs. not) was neither significant for empathic accuracy nor emotional congruence (both *ps* > .05). Similarly, none of the total effects of covering the face (vs. not) on empathy responses were significant (all *ps* > .05). The effect of covering the face with a bar (vs. mask) on the mediators (cognitive effort and sense of affiliation) as well as the direct effects on the three empathy responses (empathic accuracy, emotional congruence, sympathy) were all non-significant (all *ps* > .05).

Moderating role of age

To explore age main and moderation effects of covering the face (vs. not) on cognitive effort, sense of affiliation, and empathy responses, we extended the mediation models by including age (coded as 0 = young adults, 1 = older adults) as a moderator. As shown in Figure 2(B), being an older (vs. young) adult did not have a significant effect on cognitive effort ($b = -0.15$, $SE = 0.10$, $p = .139$, 95% CI [−0.36, 0.05]) or sense of affiliation ($b = 0.13$, $SE = 0.08$, $p = .110$, 95% CI [−0.03, 0.29]). Similarly, the effect of covering the face (vs. not) on cognitive effort ($b = 0.37$, $SE = 0.22$, $p = .093$, 95% CI [−0.06, 0.81]) or sense of affiliation ($b = 0.02$, $SE = 0.17$, $p = .921$, 95% CI [−0.32, 0.35]) did not differ between the age groups. However, being an older (vs. young) adult predicted higher levels of empathic accuracy ($b = 0.21$, $SE = 0.04$, $p < .001$, 95% CI [0.13, 0.29]), emotional congruence ($b = 0.19$, $SE = 0.04$, $p < .001$, 95% CI [0.12, 0.27]), and sympathy ($b = 0.22$, $SE = 0.08$, $p = .005$, 95% CI [0.07, 0.37]) independent of condition and the mediators. The inclusion of age as a moderator did not affect the direct effect of covering the face (vs. not) on empathic accuracy and emotional congruence, nor the contrast mask vs. bar (all *ps* > .05). The direct effect of covering the face (vs. not) on sympathy remained statistically significant ($b = -0.25$, $SE = 0.11$, $p = .021$, 95% CI [−0.46, −0.04]). All 95% confidence intervals for the (moderated) indirect effects included zero except for the indirect effect of face cover (vs. not) on empathic accuracy ($b = -0.04$, 95% CI [−0.09, −0.00) and sympathy ($b = 0.09$, 95% CI [0.00, 0.19]) via cognitive effort for older but not for young adults. However, because face cover (vs. not) was not a significant predictor of cognitive effort, we refrained from interpreting these indirect effects.

Discussion

Recent research suggests that face masks undermine observers' ability to correctly identify emotions in faces that are partially covered by a face mask. Nearly all these studies used still images of target faces. However, such images represent a rather decontextualised way of perceiving affective responses and preclude the investigation of emotional (as compared to cognitive) components of empathy. In our study, we examined whether face mask effects would hold once the presentation mode was changed to observing film clips of people talking about autobiographical events, and whether such effects would extend to emotional components of empathy (i.e. emotional congruence and sympathy). Our findings indicate that under these more ecologically valid conditions, face masks do not have an effect on empathic accuracy and emotional congruence. Face masks also did not shift empathic motives related to affiliation and cognitive effort. Covering the face by either a mask or by a black bar did, however, reduce feelings of sympathy for the target persons.

Theoretical implications

The lack of face mask effects on empathic accuracy contradicts a wealth of studies with static and decontextualised stimuli, mostly face images of posed emotion expressions (Carbon, 2020; Grahlow et al., 2022; Grundmann et al., 2021; Marini et al., 2021; Pazhoohi et al., 2021). Nevertheless, our results are consistent with other studies that have used dynamic stimuli (Kastendieck et al., 2022) or dynamic face-to-face interactions (Tronick & Snidman, 2021), as these studies also failed to detect face mask effects on empathic accuracy and interaction quality. Overall, then, widespread concerns about the psychological side effects of face masks for emotion recognition may be unwarranted. In the presence of dynamic and context-rich information, people seem to be able to compensate for the missing cues from the mouth region underneath the mask to infer the

emotions of interaction partners and to share their emotional state. Nevertheless, the reduction in sympathy may still have a subtle dampening impact on people's prosocial responses to targets wearing face masks.

The finding that face mask effects are exclusive to sympathy, rather than affecting all three empathy responses, may be due to face masks' effect on the perceived intensity of emotional expressions (Kastendieck et al., 2022; Lau & Huckauf, 2021; Tsantani et al., 2022). Perceived emotional intensity may impact sympathy, as an other-directed emotion, more strongly than empathic accuracy and emotional congruence. While people seem to be able to accurately infer targets' emotions in situations which resemble real-life social interactions (this study; Kastendieck et al., 2022), they may underestimate the degree to which the target experiences them. In other words, an observer may correctly classify sadness as sadness when expressed by a masked target but consider the level of sadness to be lower than experienced. Assuming that people sympathise less with targets who express less intense emotions (but see Koopmann-Holm & Tsai, 2014), face masks may negatively impact people's concern for others by reducing perceived emotional intensity. Emotional congruence scores, in turn, are based on the correspondence between self- and other-perceived emotions, independent of the absolute level of emotion intensity. Thus, if observers perceive the target to have less intense emotions, and in turn, experience less intense emotions themselves, correspondence between emotion profiles can still be high.

In the current study, we further examined motivational mechanisms underlying face mask effects on empathy. Based on the motivated account of empathy (Zaki, 2014) and earlier research on face mask effects on perceived trust, closeness, ambiguity of emotion expression, and effort to understand others' utterances (Giovanelli et al., 2021; Grundmann et al., 2021; Saunders et al., 2021; Tsantani et al., 2022), we proposed that face masks would hamper participants' sense of affiliation with targets and increase their cognitive effort to identify the targets' emotions, and as a result, diminish empathy responses. However, our results did not support the idea that face coverings impact these motivational mechanisms. These null results are interesting for two reasons. For once, although participants in the face covering conditions were clearly cut off from emotion cues around the mouth and part of the nose as well as from lip movements, it appears that they could sufficiently rely on other information available to them (e.g. tone of voice, dynamic movements of the eyes, content of the utterance) without needing to invest additional cognitive resources. Second, the available evidence regarding the relationship between face masks and social evaluations is mixed. Some studies found a positive effect of face masks on social evaluations (e.g. Marini et al., 2021; Oldmeadow & Koch, 2021) while others found a negative effect (e.g. Kastendieck et al., 2022; Wong et al., 2013). As more studies appear that use a wider range of empathy stimuli, such as the present study, it becomes increasingly clear that stimulus type matters for findings on face mask effects. In studies in which static and decontextualised stimuli are used, social evaluations of masked (vs. unmasked) targets tend to be more positive (e.g. Lau, 2021; but see also Grundmann et al., 2021). In contrast, under conditions closer to real-life social interactions, face masks seem to negatively (e.g. Kastendieck et al., 2022) or not at all (this study) impact social evaluations. In these situations, what and how interaction partners communicate may be more important than the presence (vs. absence) of face masks for social inferences (see Everett et al., 2016; McAleer et al., 2014; Winter & Uleman, 1984). The results of the present study speak to this possibility, as we do not find a face-mask effect on participants' affiliation motive.

Nevertheless, our study did provide evidence in line with a motivated account of empathy, given that both sense of affiliation and cognitive effort predicted empathy responses. In fact, there was evidence of differential effects of the two empathy motives on the three empathy responses. We found that sense of affiliation primarily motivates people to engage emotionally with others, as seen in the positive associations with emotional congruence and sympathy. In contrast, cognitive effort but not sense of affiliation diminished empathy accuracy (i.e. the cognitive component of empathy). Sympathy was the odd one out, as it was positively predicted by both cognitive effort and sense of affiliation. It may come as a surprise that higher cognitive effort relates to more sympathy. Perhaps, the investment of effort may signal to people that they care about the interaction partner, and therefore entice them to experience more sympathy (see also Harmon-Jones et al., 2020).

Interestingly, participants from the older age group showed a higher level of all three empathy responses across conditions. This finding is somewhat contradictory to the literature, which revealed a

reduction in empathic accuracy with age (Henke et al., 2022; Wieck et al., 2021), and stronger negative face mask effects on older adults' emotion perception in one prior study with static face images (Kang et al., 2021). A possible explanation is that older participants could relate better than younger participants to some of the topics and emotions expressed in the film clips, which included fatal illness (sadness), physical threat (anxiety), and frustrating interactions with customers (anger). This would be in line with evidence that age-related deficits in empathy responses are reduced or even reversed when the materials are relevant and familiar to older adults (Katzorreck & Kunzmann, 2018; Wieck & Kunzmann, 2015). Alternatively, the age effect may have to do with younger adults' well-being being more strongly affected by the Covid-19 pandemic (Scheibe et al., 2022). Distressed individuals are generally more focused on their own state and less open to engage with others' experiences and feelings (Zaki, 2014).

Strengths, limitations, and future directions

In contrast to previous studies, our research used a standardised set of film clips of individuals talking about autobiographical episodes which were for two conditions manipulated to either contain a face mask, or a black bar covering the lower part of the face. This allowed us to directly compare the effects of masking to the control condition, as well as whether there is something specific about face masks beyond face covering by itself. We found the type of face covering to be inconsequential, contradicting the notion that people's cognitive associations or attitudes towards face masks would matter for empathy. Face masks are not value-free objects but have become cultural artefacts embroidered with meaning (e.g. Martinelli et al., 2021; Tateo, 2021). Indeed, different people can hold different attitudes toward face masks (Taylor & Asmundson, 2021). Critically, as empathy is a motivated process (this study; Zaki, 2014), the extent to which people show empathy with masked others may hinge on their beliefs about face masks. Those with negative rather than positive attitudes may be less willing to empathise with interaction partners wearing a face mask. While there is some evidence that masked-related attitudes influence social judgements (Dudarev et al., 2022; Grundmann et al., 2021; Hareli et al., 2013), our results do not suggest that they have downstream consequences for empathy responses. Still, people's attitudes toward face masks may have followed a normal distribution in our sample. This means that we cannot rule out the possibility that positive and negative effects of mask-related attitudes on empathy cancelled each other out. Thus, future research should explicitly assess attitudes toward face masks and explore their effect on empathy responses.

Regarding the set of film clips included in the study, the films were moderate to high in emotional expressivity. Including emotionally expressive stimuli is common in face-mask research and ensured that at least some participants would be able to accurately infer targets' emotions, preventing floor effects (e.g. Carbon, 2020; Grundmann et al., 2021). Yet, the absence of film clips with low expressivity of targets leaves it open whether or not face mask effects on empathy would generalise to very subtle emotion expressions. Earlier research suggests that individual differences in empathic accuracy (e.g. due to gender; Hoffmann et al., 2010) are more pronounced when emotional expressions are more subtle. Future research may test whether emotional expressivity moderates the effect of face masks on empathy responses.

We conducted our studies using Dutch participants. Like in many other Western countries, face masks were uncommon before the pandemic in the Netherlands, and the mask mandate was only introduced for a limited period. We therefore cannot rule out that there might be even less of a difference between the conditions in countries and cultures with more experience with face masks. However, our data suggest that even when face masks are a relatively novel phenomenon, individuals can adjust to the reduced availability of facial cues.

We superimposed moving face mask (and black bar) images on videos that were produced without face masks. Although this helped keep stimuli comparable across conditions (apart from the manipulated face coverings), it did not allow capturing natural communication behaviour of mask wearers. By using videos, we dealt with some of the issues of previous research on face masks (see Pavlova & Sokolov, 2022 for a review). However, future research needs to address additional challenges: Mask wearers may compensate by expressing emotions more with their eyes (Okazaki et al., 2021). Face masks also introduce changes in how well individuals understand spoken content (e.g., Corey et al., 2020; Magee et al., 2020). Future research should therefore replicate our findings with film stimuli recorded when speakers actually wear masks.

Due to the fact that this experiment was conducted online, we cannot verify with confidence that all participants looked at the stimuli for the whole duration of their presentation. To reduce the risk of participants seeing only part of the film clips, the experiment was programmed such that participants could only proceed to the next screen after the full duration of each film clip. The satisfactory reliabilities of the three empathy responses (see Section Procedures and Measures) attest that the online paradigm allows for reliable assessment of empathy. Moreover, the scores of the memory test reported in the Supplemental Material indicate that participants did indeed listen to the information presented.

Our research is limited to the communication of negative affective experiences. In previous research using static stimuli, oftentimes negative stimuli are compared to one type of positive stimulus (i.e. displaying happiness; e.g. Grundmann et al., 2021; Marini et al., 2021). This imbalance results from the limited range of distinct facial expressions for positive emotions. However, when taking into account additional bodily signals like vocal cues or posture, individuals seem to be able to distinguish several positive emotions (Sauter, 2010). Based on the present findings, we cannot generalise to positive emotions. Extending our logic to this domain would be an important task for future research.

Finally, although the current findings suggest that face mask effects on empathy responses may not be as strong as anticipated, we cannot rule out that face masks impact on other outcomes that were not considered in the current study. For example, previous studies on empathic accuracy (Carbon, 2020) and speech comprehension (Giovanelli et al., 2021) showed that face masks can undermine people's confidence in their ability to accurately perceive interaction partners' emotions or comprehend what others are saying. In fact, this is in line with the notion that face masks increase cognitive effort in observers, which may provoke some uncertainty about whether they accurately perceived the emotion or correctly understood what the target was saying.

Conclusion

Our findings speak against pervasive negative face mask effects on empathy when using dynamic and context-rich materials. It appears that under conditions that more closely resemble real-life interactions – such that they give people access to multiple information channels besides visual cues from the mouth region – people have sufficient information and are sufficiently motivated to affiliate and emphasise with their interaction partners. They are well able to infer an interaction partner's emotions and share the partner's emotions. At the same time, feelings of sympathy to the target may be reduced, which possibly undermines prosocial motivation to help and cooperate. These new insights underscore the importance of studying face masks and emotion perception with ecologically valid materials. These insights may also somewhat reduce worries about the negative psychological side effects of face masks as a widely used health behaviour.

Note

1. One person in this group reported an age of 40 years, thereby deviating from their response in the screening survey.

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References

Batson, C. D., Ahmad, N., & Lishner, D. A. (2009). Empathy and altruism. In S. J. Lopez, & C. R. Snyder (Eds.), *The Oxford handbook of positive psychology* (pp. 416–426). Oxford University Press. https://doi.org/10.1093/oxfordhb/9780195187243.013.0039

Carbon, C. C. (2020). Wearing face masks strongly confuses counterparts in Reading emotions. *Frontiers in Psychology*, *11*, Article 566886. https://doi.org/10.3389/fpsyg.2020.566886

Carstensen, L. L. (2006). The influence of a sense of time on human development. *Science*, *312*(5782), 1913–1915. https://doi.org/10.1126/science.1127488

Cartaud, A., Quesque, F., & Coello, Y. (2020). Wearing a face mask against Covid-19 results in a reduction of social distancing. *PLOS ONE*, *15*(12), Article e0243023. https://doi.org/10.1371/journal.pone.0243023

Corey, R. M., Jones, U., & Singer, A. C. (2020). Acoustic effects of medical, cloth, and transparent face masks on speech signals. *Journal of the Acoustical Society of America*, *148*(4), 2371–2375. https://doi.org/10.1121/10.0002279

Cuff, B. M. P., Brown, S. J., Taylor, L., & Howat, D. J. (2016). Empathy: A review of the concept. *Emotion Review*, *8*(2), 144–153. https://doi.org/10.1177/1754073914558466

Dudarev, V., Kamatani, M., Miyazaki, Y., Enns, J. T., & Kawahara, J. I. (2022). The attractiveness of masked faces is influenced by race and mask attitudes. *Frontiers in Psychology*, *13*. https://doi.org/10.3389/fpsyg.2022.864936

Everett, J. A. C., Pizarro, D. A., & Crockett, M. J. (2016). Inference of trustworthiness from intuitive moral judgments. *Journal of Experimental Psychology: General*, *145*(6), 772–787. https://doi.org/10.1037/xge0000165

Fortin, J. (2020). When face masks hide your smile and other emotions. *The New York Times*. https://www.nytimes.com/2020/06/23/style/face-mask-emotion-coronavirus.html

Funder, D. C., & Ozer, D. J. (2019). Evaluating effect size in psychological research: Sense and nonsense. *Advances in Methods and Practices in Psychological Science*, *2*(2), 156–168. https://doi.org/10.1177/2515245919847202

Giovanelli, E., Valzolgher, C., Gessa, E., Todeschini, M., & Pavani, F. (2021). Unmasking the difficulty of listening to talkers with masks: Lessons from the COVID-19 pandemic. *i-Perception*, *12*(2). https://doi.org/10.1177/2041669521998393

Grahlow, M., Rupp, C. I., & Derntl, B. (2022). The impact of face masks on emotion recognition performance and perception of threat. *PLOS ONE*, *17*(2), Article e0262840. https://doi.org/https://doi.org/10.1371/journal.pone.0262840

Grundmann, F., Epstude, K., & Scheibe, S. (2021). Face masks reduce emotion-recognition accuracy and perceived closeness. *PLOS ONE*, *16*(4), Article e0249792. https://doi.org/10.1371/journal.pone.0249792

Guo, K., Soornack, Y., & Settle, R. (2019). Expression-dependent susceptibility to face distortions in processing of facial expressions of emotion. *Vision Research*, *157*, 112–122. https://doi.org/10.1016/j.visres.2018.02.001

Hareli, S., David, S., & Hess, U. (2013). Competent and warm but unemotional: The influence of occupational stereotypes on the attribution of emotions. *Journal of Nonverbal Behavior*, *37*(4), 307–317. https://doi.org/10.1007/s10919-013-0157-x

Harmon-Jones, E., Clarke, D., Paul, K., & Harmon-Jones, C. (2020). The effect of perceived effort on reward valuation: Taking the reward positivity (RewP) to dissonance theory. *Frontiers in Human Neuroscience*, *14*. https://doi.org/10.3389/fnhum.2020.00157. https://www.frontiersin.org/articles/10.3389fnhum.2020.00157

Harrell Jr, F. E., with contributions from Charles Dupont, & many others. (2021). *Hmisc: Harrell miscellaneous*. https://cran.r-project.org/package=Hmisc

Hayes, A. F. (2017). *Introduction to mediation, moderation, and conditional process analysis: A regression-based approach*. Guilford Press.

Henke, L., Guseva, M., Wagemans, K., Pischedda, D., Haynes, J.-D., Jahn, G., & Anders, S. (2022). Surgical face masks do not impair the decoding of facial expressions of negative affect more severely in older than in younger adults. *Cognitive Research: Principles and Implications*, *7*(1), 63. https://doi.org/10.1186/s41235-022-00403-8

Hess, T. M. (2014). Selective engagement of cognitive resources: Motivational influences on older adults' cognitive functioning. *Perspectives on Psychological Science*, *9*(4), 388–407. https://doi.org/10.1177/1745691614527465

Hoffmann, H., Kessler, H., Eppel, T., Rukavina, S., & Traue, H. C. (2010). Expression intensity, gender and facial emotion recognition: Women recognize only subtle facial emotions better than men. *Acta Psychologica*, *135*(3), 278–283. https://doi.org/10.1016/j.actpsy.2010.07.012

Kang, J., Kang, S., Jeong, E., & Kim, E.-H. (2021). Age and cultural differences in recognitions of emotions from masked faces among Koreans and Americans. *International Journal of Environmental Research and Public Health*, *18*(19), Article 10555. https://doi.org/10.3390/ijerph181910555

Kastendieck, T., Zillmer, S., & Hess, U. (2022). (Un)mask yourself! Effects of face masks on facial mimicry and emotion perception during the COVID-19 pandemic. *Cognition and Emotion*, *36*(1), 59–69. https://doi.org/10.1080/02699931.2021.1950639

Katzorreck, M., & Kunzmann, U. (2018). Greater empathic accuracy and emotional reactivity in old age: The sample case of death and dying. *Psychology and Aging*, *33*(8), 1202–1214. https://doi.org/10.1037/pag0000313

Koopmann-Holm, B., & Tsai, J. L. (2014). Focusing on the negative: Cultural differences in expressions of sympathy. *Journal of Personality and Social Psychology*, *107*(6), 1092–1115. https://doi.org/10.1037/a0037684

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*(1), 105–117. https://doi.org/10.1007/s42761-021-00097-z

Lau, W. K. (2021). Face masks bolster the characteristics from looking at a face even when facial expressions are impaired. *Frontiers in Psychology*, *12*, Article 704916. https://doi.org/10.3389/fpsyg.2021.704916

Lau, W. K., & Huckauf, A. (2021). Effects of face masks on the appearance of emotional expressions and invariant characteristics. *Open Psychology*, *3*(1), 87–102. https://doi.org/10.1515/psych-2020-0113

Magee, M., Lewis, C., Noffs, G., Reece, H., Chan, J. C. S., Zaga, C. J., Paynter, C., Birchall, O., Azocar, S. R., Ediriweera, A., Kenyon, K., Caverlé, M. W., Schultz, B. G., & Vogel, A. P. (2020). Effects of face masks on acoustic analysis and speech perception: Implications for peri-pandemic protocols. *Journal of the Acoustical Society of America*, *148*(6), 3562–3568. https://doi.org/10.1121/10.0002873

Marini, M., Ansani, A., Paglieri, F., Caruana, F., & Viola, M. (2021). The impact of facemasks on emotion recognition, trust attribution and re-identification. *Scientific Reports*, *11*(1), Article 5577. https://doi.org/10.1038/s41598-021-84806-5

Marini, M., Paglieri, F., Ansani, A., Caruana, F., & Viola, M. (2022). Facial impression of trustworthiness biases statement credibility unless suppressed by facemask. *Current Psychology*. Advance online publication. https://doi.org/10.1007/s12144-022-03277-7

Martinelli, L., Kopilas, V., Vidmar, M., Heavin, C., Machado, H., Todorovic, Z., Buzas, N., Pot, M., Prainsack, B., & Gajovic, S.

(2021). Face masks during the COVID-19 pandemic: A simple protection tool with many meanings. *Frontiers in Public Health*, *8*. https://doi.org/10.3389/fpubh.2020.606635

McAleer, P., Todorov, A., & Belin, P. (2014). How do you say 'Hello'? Personality impressions from brief novel voices. *PLOS ONE*, *9*(3), Article e90779. https://doi.org/10.1371/journal.pone.0090779

Okazaki, S., Yamanami, H., Nakagawa, F., Takuwa, N., & Duncan, K. J. K. (2021). Mask wearing increases eye involvement during smiling: A facial EMG study. *Scientific Reports*, *11*(1), Article 20370. https://doi.org/10.1038/s41598-021-99872-y.

Oldmeadow, J. A., & Koch, C. (2021). Effects of face masks on person perception. *Perception*, *50*(10), 876–889. https://doi.org/10.1177/03010066211045172

Oliveira, M., & Garcia-Marques, T. (2022). The effect of facial occlusion on facial impressions of trustworthiness and dominance. *Memory & Cognition*, *50*(6), 1131–1146. https://doi.org/10.3758/s13421-022-01316-z

Olivera-La Rosa, A., Chuquichambi, E. G., & Ingram, G. P. D. (2020). Keep your (social) distance: Pathogen concerns and social perception in the time of COVID-19. *Personality and Individual Differences*, *166*, Article 110200. https://doi.org/10.1016/j.paid.2020.110200

Pavlova, M. A., & Sokolov, A. A. (2022). Reading covered faces. *Cerebral Cortex*, *32*(2), 249–265. https://doi.org/10.1093/cercor/bhab311

Pazhoohi, F., Forby, L., & Kingstone, A. (2021). Facial masks affect emotion recognition in the general population and individuals with autistic traits. *PLOS ONE*, *16*(9), Article e0257740. https://doi.org/10.1371/journal.pone.0257740

R Core Team. (2020). R: A language and environment for statistical computing. https://www.r-project.org/.

Röcke, C., Li, S. C., & Smith, J. (2009). Intraindividual variability in positive and negative affect over 45 days: Do older adults fluctuate less than young adults? *Psychology and Aging*, *24*(4), 863–878. https://doi.org/10.1037/a0016276

Saunders, G. H., Jackson, I. R., & Visram, A. S. (2021). Impacts of face coverings on communication: An indirect impact of COVID-19. *International Journal of Audiology*, *60*(7), 495–506. https://doi.org/10.1080/14992027.2020.1851401

Sauter, D. (2010). More than happy: The need for disentangling positive emotions. *Current Directions in Psychological Science*, *19*(1), 36–40. https://doi.org/10.1177/0963721409359290

Scheibe, S., De Bloom, J., & Modderman, T. (2022). Resilience during crisis and the role of age: Involuntary telework during the COVID-19 pandemic. *International Journal of Environmental Research and Public Health*, *19*(3), Article 1762. https://doi.org/10.3390/ijerph19031762

Scheibe, S., Wieck, C., & Kunzmann, U. (2023). *Technical report: Development and validation of Dutch film stimuli to assess empathy in the work context*. https://doi.org/10.31234/osf.io/af6ct

Schoemann, A. M., Boulton, A. J., & Short, S. D. (2017). Determining power and sample size for simple and complex mediation models. *Social Psychological and Personality Science*, *8*(4), 379–386. https://doi.org/10.1177/1948550617715068

Tabachnick, B. G., Fidell, L. S., & Ullman, J. B. (2007). *Using multivariate statistics (Vol. 5)*. Pearson.

Tateo, L. (2021). Face masks as layers of meaning in times of COVID-19. *Culture & Psychology*, *27*(1), 131–151. https://doi.org/10.1177/1354067X20957549

Taylor, S., & Asmundson, G. J. G. (2021). Negative attitudes about facemasks during the COVID-19 pandemic: The dual importance of perceived ineffectiveness and psychological reactance. *PLOS ONE*, *16*(2), Article e0246317. https://doi.org/10.1371/journal.pone.0246317

Tronick, E., & Snidman, N. (2021). Children's reaction to mothers wearing or not wearing a mask during face-to-face interactions. http://doi.org/10.2139/ssrn.3899140

Tsantani, M., Podgajecka, V., Gray, K. L. H., & Cook, R. (2022). How does the presence of a surgical face mask impair the perceived intensity of facial emotions? *PLOS ONE*, *17*(1). Article e0262344. https://doi.org/10.1371/journal.pone.0262344

Wickham, H., Averick, M., Bryan, J., Chang, W., McGowan, L. D. F., Grolemund, R., Hayes, A., Henry, L., Hester, J., Kuhn, M., Pedersen, T., Miller, E., Bache, S., Müller, K., Ooms, J., Robinson, D., Seidel, D., Spinu, V., Takahashi, K., … Yutani, H. (2019). Welcome to the Tidyverse. *Journal of Open Source Software*, *4*(43), Article 1686. https://doi.org/10.21105/joss.01686

Wieck, C., & Kunzmann, U. (2015). Age differences in empathy: Multidirectional and context-dependent. *Psychology and Aging*, *30*(2), 407–419. https://doi.org/10.1037/a0039001

Wieck, C., Kunzmann, U., & Scheibe, S. (2021). Empathy at work: The role of age and emotional job demands. *Psychology and Aging*, *36*(1), 36–48. https://doi.org/10.1037/pag0000469

Wieck, C., Scheibe, S., & Kunzmann, U. (2022). Development and validation of film stimuli to assess empathy in the work context. *Behavior Research Methods*, *54*(1), 75–93. https://doi.org/10.3758/s13428-021-01594-6

Winter, L., & Uleman, J. S. (1984). When are social judgments made? Evidence for the spontaneousness of trait inferences. *Journal of Personality and Social Psychology*, *47*(2), 237–252. https://doi.org/10.1037/0022-3514.47.2.237

Wong, C. K. M., Yip, B. H. K., Mercer, S., Griffiths, S., Kung, K., Wong, M. C. S., Chor, J., & Wong, S. Y. S. (2013). Effect of facemasks on empathy and relational continuity: A randomised controlled trial in primary care. *BMC Family Practice*, *14*(1), Article 200. https://doi.org/10.1186/1471-2296-14-200

Zaki, J. (2014). Empathy: A motivated account. *Psychological Bulletin*, *140*(6), 1608–1647. https://doi.org/10.1037/a0037679