

Source Analysis on Masking Research & Children

August 2021

<u>Article Name</u> Click on the article title to navigate to each source page	<u>Evidence-based</u> - Peer-reviewed - Published	<u>Findings/Conclusions</u> Further information provided on source page	<u>Limitations</u> Further explanation provided on source page	<u>Relevant to Inform</u> <i><u>no-mask Policy</u></i> <u>Decisions</u>
Review of Scientific Reports of Harms Caused by Face Masks, up to February 2021		Masks may cause side effects in healthy adults, infants, children, and in medical professionals such as surgeons. Evidence was presented regarding impacts on health, the safety of masks regarding pathogens, and the developmental and psychological effects that masking may have on children.	Research presented was bias and one sided (representing interests of Civil Liberties group). The literature provided was used to justify the researcher's argument.	No
The Impact of Face Masks on Emotional Reading Abilities of Children-A lesson from Joint School-University Project	<input checked="" type="checkbox"/>	Mask wearing may have impacts on children's abilities to read emotions thus diminishing future interest in Science, Technology, Engineering, and Mathematics (STEM) related fields.	Previous data was based on adult studies. Data is limited concerning how children perceive and recognize emotions when masked.	No
The Effects of Masks on Face Perception in Children		The study found both quantitative and qualitative changes in the processing of masked faces in children. Changes in face recognition performance due to mask wearing may have significant effects on children's social interactions with their peers and their ability to form important relationships with educators.	Future research is needed to explore how masking affects children's ability to recognize and process facial expressions and if their ability to do so effects their social interactions with their peers and educators.	No
Nonverbal Communication in Young Children	<input checked="" type="checkbox"/>	Further studies of nonverbal communicative developmental patterns in young children are	Literature is dated for 1984. There may be more current studies that provide more	No

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		needed in addition to further analysis of the patterns of miscommunication as related to the conception of nonverbal communication.	insight into a child’s nonverbal communication as related to their development.	
Masking Emotions: Face Masks Impair How We Read Emotions	<input checked="" type="checkbox"/>	Face masks could change or delay the development of social skills associated with face perception in early childhood. Emphasis was placed on the children’s development concerning social interaction skills, particularly related to education and rehabilitation. Due to critical periods in their development, children are likely to be affected by facial coverings.	Further studies are needed to determine if changes in facial expressions due to mask use might affect the development of emotional interpretation and the development of social interactions associated with face perception in early childhood.	Yes- Recommendations include designing devices for personal protection that allows visibility of the lower part of the face to aid the development of social and interaction skills in children, especially for children suffering from sensory or cognitive deficits.
How Face Masks Can Affect School Performance	<input checked="" type="checkbox"/>	Face masks, particularly transparent masks, help maintain access to the mouth which helps some listeners be able to read nonverbal emotional cues and help with lip reading. Face masks could affect school performance due to a reduction in	Cloth coverings were not discussed at length or similar studies about their level of noise reduction were not included.	Yes- Several recommendations for parents and teachers provided on improving speech volume and

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		visual facial expressions and nonverbal communication.		clarity while mask wearing.

Source 1

Citation: “Review of scientific reports of harms caused by face masks, up to February 2021,” Rancourt, D.G., Research Gate, February 2021, <https://www.researchgate.net/publication/349518677>

Author(s)	Title/Affiliations
Dennis G. Rancourt, PhD	<ul style="list-style-type: none">• Researcher, Ontario Civil Liberties Association

Brief summary of article:

The article by Rancourt [2021], provides supporting literature against the use of masks with the argument that there is no evidence that masks protect the public and, on the contrary, may cause adverse effects. Scientific articles within the Covid-19 context reference potential side effects of wearing surgical facemasks in public settings. Wearing masks in public provides a false sense of security and there may be additional options that should be considered before a global public health policy is employed that involves millions of people. The positive and negative side effects at a population level must be investigated before implementation (as cited in Lazzarino et al., 2020). Surgeons may be placed at risk by using personal protective equipment [PPE] and as a result, the patients may be placed at risk. The reasons stated include an increase in the surgeon’s body temperature and sweating, thus impairing the surgeon’s comfort, as well as side effects such as headaches and dermatoses. The associated discomfort and side effects may increase the surgeon’s anxiety and fatigue during operations thus placing patients at risk (as cited in (Frountzas, 2020)). The long-term health effects from wearing masks include hypoxia, hypercapnia, shortness of breath, increased acidity and toxicity, activation of fear and stress response, rise in stress hormones, immunosuppression, fatigue, headaches, decline in cognitive performance, predisposition for viral and infectious illnesses, chronic stress, anxiety, and depression. Long-term consequences may include the progression of chronic illness and premature death (as cited in Vainshelboim, 2020). In addition to healthcare workers, the risks to healthy adults, infants, and school children were also discussed. Masks have a marked negative impact on exercise parameters such as maximum power output (Pmax) and the maximum oxygen uptake (VO₂max/kg). FFP2/N95 masks show pronounced negative effects compared to surgical masks. Both masks significantly reduce pulmonary parameters at rest (FVC, FEV₁, PEF) and at maximum load (VE, BF, TV). Regarding pulmonary function, data has indicated that wearing a medical face mask has a significant impact on pulmonary parameters both at rest and during maximal exercise in healthy adults. Regarding cardiac function, data suggests myocardial compensation for the pulmonary limitation in the healthy volunteers. In patients with impaired myocardial function, compensation may not be possible (as cited in Fikenzer et al., 2020). An infant’s or school age child’s psychological and psychological development may be impaired. Physical side effects include the impairment of facial recognition and facial identification as well as the impairment of verbal and non-verbal communication. In addition to this, face masks block emotional signaling between the learner and the teacher (as cited in Spitzer, 2020). Possible microbial pathogen infections may occur if masks are not replaced regularly or washed properly when made of cloth, and the pathogens can accumulate in the mask. When improperly used, the risk of spreading the pathogen—including SARS-CoV-2 increases (as cited in Matuschek et al., 2020).

Evidence-based research: Yes OR **No**

Pre-print: Yes OR **No**

Peer-reviewed: Yes OR **No**

Any additional comments:

Source 2

Citation: “The Impact of Face Masks on Emotional Reading Abilities of Children-A lesson from Joint School-University Project,” Carbon, C.C. & Serrano, M., Sage, July 2021.

<https://journals.sagepub.com/doi/10.1177/20416695211038265>

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Brief summary of article:

The article by Carbon and Serrano states that wearing face masks has encouraged the problem of misunderstanding the emotions of others. Empirical evidence regarding face masks has primarily relied on adult data, thus neglecting school children who are reliant on effective nonverbal communication. The authors offer insights from a joint school–university project. The data provided indicates that the emotional reading of 9 to 11 years old students (N ¼ 57) was equally impaired as adults on an overall performance level. However, their performance on specific emotions differed. The children displayed extreme difficulties in reading emotions such as disgust, anger, fear, and sadness, while only mild effects on happiness were found when faces were masked. Relevant data about children’s perception was evident as well as how seriously conducted school projects can be utilized to encourage the interest and commitment for Science, Technology, Engineering, and Mathematics (STEM)-relevant topics. The study was conducted between November 3, 2020, to November 19, 2020, during the Covid-19 Pandemic. The experiment was set up as a Microsoft Forms project via a QR code that was distributed among participating school students. The participants were exposed to stimuli that was presented with fully randomized trials across participants. The entire routine was repeated three times on consecutive days to gain more data points and to check for training effects. Participants were asked to spontaneously assess the depicted person’s emotional state from a list of six emotions reflecting the same compilation of emotions shown by the different versions of the faces (angry, disgusted, fearful, happy, neutral, and sad). There was no time limit for giving a response, and the procedure lasted 3 x 8.5 ~ 25 minutes. The participants were debriefed afterwards, and the study and its rationale were presented by the second author on the above-mentioned STEM fair. The participants reached nearly 90% correct responses when faces were unmasked. In this study, the identification of sadness was the only emotion affected by masking the mouth area. Only mild negative effects were detected concerning happiness. Unexpectedly, the emotional state of anger and a neutral emotional state could even be better identified when face masks

were present. The study also identified a strong negative effect of face masks related to the recognition of disgust. The study indicates that scientist’s ability to attract young people into STEM is limited but interest was expressed by the children.

Evidence-based research: Yes OR No

Pre-print: Yes OR No

Peer-reviewed: Yes OR No

Any additional comments:

Source 3

Citation: “The Effects of Masks on Face Perception in Children [PDF].” Stajduhar, A., Tzvi, G., Avidan, G., Rosenbaum, R.S., & Freud, E., n.d.

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Brief summary of article:

This article by Stajduhar [n.d.], states that wearing masks hinders facial recognition in adults, but research is still needed to determine if the same is true for school-age children who have not fully developed facial perception. Previous studies indicated that there is a relationship between the degree of holistic processing in adults and the relationship between facial perception abilities. The accuracy of facial recognition was found to be correlated with different measures of holistic processing of faces (as cited in Wang, et al., 2012; Richler, et al., 2011). Mask-wearing conceals the lower part of the face hindering one’s ability to process facial expressions. The children tested were ages 6-14 years and the participants completed the CFMT-K with upright and inverted faces. The faces were presented both with and without masks (upright or inverted), and a deficit in facial recognition was identified. The decrease in facial recognition abilities was more marked in children than adults, but only when the task difficulty was adjusted between the two groups. The children displayed qualitative differences in the processing of masked vs. non-masked faces. Holistic processing was found to be disrupted for faces covered by masks as suggested by the face inversion effect. The findings of this study suggest considerable quantitative and qualitative alterations in facial recognition processing of masked faces in school-age children. The

wearing of face masks led to a significant decrease in face processing abilities measured by the CFMT-K, and this quantitative reduction was accompanied by a reduced inversion effect for masked faces, suggesting a qualitative change in the way masked faces are processed.

Evidence-based research: Yes OR **No**

Pre-print: **Yes** OR No

Peer-reviewed: Yes OR **No**

Any additional comments:

Source 4

Citation: "Nonverbal Communication in Young Children". Dil, N., University of Nevada, July 1984., <https://doi.org/10.1177/027112148400400207>

Author(s)	Affiliations
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Brief summary of article:

The article by Dil [1984], emphasizes that communicative competence is not solely a function of verbal language. Communication is dependent on nonverbal signals that are communicated through several media messages, such as emblems, illustrators, regulators, affect displays, and adaptors (as cited in Ekman & Friesen, 1969). Before young children acquire the use of verbal language, they can communicate nonverbally with the others around them to satisfy their survival, safety, and affective growth needs, and they are well equipped for affect displays, regulators, and adaptors. The article identifies the channels of nonverbal communication. The channels are as follows: touch (the most powerful medium of communication); smell (the acceptance or refusal of another person, and the approach to or avoidance of the person greatly depends on how he or she smells); visual channel (the most essential and primary mode of interpersonal communication); vocalizations (the precursor to overall communicative capabilities); facial expressions (head, forehead, eyes, eyelids, eyebrows, nose, cheeks, lips, mouth) with infants communicating their pleasure or displeasure, or satisfaction or dissatisfaction, and likes or dislikes; proxemics (spatial distances and the position of children with others play a significant role during socialization); Gestures (during the early stages of development is an integral part of socialization); auditory channel (infants follow an auditory stimulus with their eyes); taste (very young children display preferences to taste); body activity (a strong indicator of the intensity of states).

Evidence-based research: **Yes** OR No

Pre-print: Yes OR **No**

Peer-reviewed: **Yes** OR No

Any additional comments:

The article was first written in 1984. The data and research provided may be outdated. More current sources may be available.

Source 5

Citation: “Masking Emotions: Face Masks Impair How We Read Emotions”, Gori, M., Schiatti, L., & Amadeo, M.B., May 2021, <https://doi.org/10.3389/fpsyg.2021.669432>

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Brief summary of article:

The article by Gori, Schiatti, and Amadeo [2021], and the associated research concludes that the use of face masks influences a person’s ability at any age to infer facial expressions. The identification of emotions and facial movements is essential for an individual’s ability to interact with others and adjust one’s social behavior accordingly (as cited in Philippot and Feldman, 1990; Vicari et al., 2000; Barrett et al., 2019). A significant reduction was found to be particularly true in toddlers. The authors suggested that this was due to the different developmental stages of facial processing that is associated with emotional reasoning. These observations pose the question whether a deprivation of facial visual features, due to the COVID-19 pandemic, could change or delay the development of social skills associated with face perception in early childhood. The authors point to the development of personal protection equipment that allows for the lower half of the face to be visible. They stress that this is important to consider for children’s development concerning social interaction skills, particularly related to education and rehabilitation, especially with children who have cognitive or sensory deficits. A children’s emotional processing and social competence depend on their ability to interpret facial emotion movements. Due to critical periods in their development, children are likely to be affected by facial masking.

Evidence-based research: Yes OR No

Pre-print: Yes OR No

Peer-reviewed: Yes OR No

Any additional comments:

Source 6

Citation: “How Face Masks Can Affect School Performance,” Nobrega, M., Opice, R., Lauletta, M.M., & Nobrega, C.A., International Journal of Pediatric Otorhinolaryngology, August 2020, <https://doi.org/10.1016/j.ijporl.2020.110328>

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Brief summary of article:

The authors begin by stating that if verbal communication is to be effective, the listener must be able to understand auditory information. Daily communication occurs in situations that challenge and degrade acoustic information. Attempting to listen to distorted speech requires the listener to use other cognitive resources to be able to successfully understand the information. In the case of school-aged children, they communicate, learn, and socialize in environments that contain background noise. Children with minimal or mild hearing loss may have difficulties in speech perception in adverse hearing environments. In addition to this, they may also experience delays in speech, language, and socio-emotional development, thus affecting their academic performance. Due to these factors, face masks pose two major problems for children: 1) the common masks (cloth or medical) present a visual barrier to those who rely on nonverbal communication signals and expressions on the face (mouth, lips, teeth, tongue, and cheeks) and the child is unable to attain visual cues when the speaker’s face is hidden, and their lips cannot be read and 2) the voice of the educator is diminished and distorted. The authors stress that both nonverbal communication and linguistic communication are crucial when understanding social communication and interaction. Acoustic degradations were reported by Goldin, Weinstein, & Shiman where “medical masks act as lowpass filters and high frequencies (between 2000 and 7000 Hz) are attenuated by about 3–4 dB (dB) for simple surgical masks and up to 9–12 dB for N95 masks” (Nobrega, Opice, Lauletta, & Nobrega, 2020). An additional study the authors reference by Atcherson et al., “presents the maximum reduction of sound pressure level (SPL) reduction (in dB) of the different mask types as well as each type of mask in conjunction with a standard facial shield when compared to the condition without a mask” (Nobrega, Opice, Lauletta, & Nobrega, 2020). The data from both studies closely correlate with one another. The

presence of the face shield was reduced by up to 29 dB. Transparent masks mitigated the talk more than the non-transparent masks and produced a resonant peak between 5000 and 7000 Hz. Transparent masks reduced the level of sound pressure and likely degraded more speech than non-transparent face masks, however, they play an integral role in preserving nonverbal communication slopes on the face. The transparent masks (used with or without face shields) assist in maintaining access to the mouth, which aids some listeners in nonverbal cues, such as emotion and lip reading. Despite this, the degradation of speech acoustics “will overcome supplementation to speech understanding provided by any transparent windows. The degradation of speech quality, combined with the noise/reverberation of the room and the absence of visual cues, makes speech almost unintelligible for many individuals, especially for children who are in the process of acquiring and developing speech, language, in the process of literacy and acquisition of new knowledge” (Nobrega, Opice, Lauletta, & Nobrega, 2020).

Researchers provide guidance to help parents and teachers.

Parents

- Awareness the parents about how facial masks, associated or not to the face shield, can harm the intensity and quality of speech and how much this can impact on the school performance of their children.
- Be aware of your children’s daily school performance.
- Report what was given in class to certify the correct school understanding.
- Talk to children about the day at school and about the difficulties they may have
- Observe behavior changes that may indicate school difficulties.

Teachers

- Speak slowly and articulate.
- Use features and visual support and images in the activities.
- Reduce environmental noise and keep the child’s attention before speaking.
- Consider using a portable microphone.
- The teacher should ask the child to repeat the instructions received, making sure that the child has really understood.
- Repeat the instructions or rephrase your speech if the child is not understanding what is being requested.
- Do not speak loudly, do not overemphasize, or exaggerate your words.
- Do not talk to the child while walking; always make eye contact.
- Avoid using flashy masks as they can compete for the child’s attention, dispersing the listener’s focus.

Evidence-based research: Yes OR No

Pre-print: Yes OR No

Peer-reviewed: Yes OR No

Any additional comments: