



Face Masks and Emotion Literacy in Preschool Children: Implications During the COVID-19 Pandemic

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Abstract

With the arrival of the COVID-19 pandemic, safety regulations, such as face mask wearing, have become ubiquitous. Due to such regulations, many children's interpersonal interactions occurring outside of the home now involve face coverings. The present study examined young children's ability to identify emotions in an adult model wearing a face mask. Children ($n=77$) between the ages of 3 and 5 were shown 16 different graphics of a model expressing four common emotions (happy, sad, angry, scared) across four conditions: still unmasked photo, still masked photo, masked video verbally implying the emotion, masked video verbally explicitly stating the emotion. We found that children were better able to identify emotions in an unmasked model and when the masked model explicitly stated or implied the emotion. No difference was found between an unmasked model, an explicitly stated emotion, or a verbally implied emotion. Children who were older, had more exposure to adults wearing masks, and attending group care were better able to identify the emotions. No relationship was found between the type of emotion, or participant's gender or race and the ability to identify the emotions. Implications of these results are discussed.

Keywords COVID-19 · Early childhood · Emotional literacy · Facial expression · Mask-usage · Social emotional development

Introduction

In the early months of 2020, the COVID-19 virus began to infect individuals throughout the world, leading to unprecedented closures of businesses, schools, and social gatherings. During March 2020, school closures directly impacted approximately 1.5 billion students in the United States (Spitzer, 2020). Given the economic and health impacts of this global pandemic, mitigating transmission of COVID-19 has been critical. The Center for Disease Control (CDC) recommends face masks as a key tool in reducing transmission of the virus from person to person. While there is a paucity of research regarding how face masks may affect various critical processes, such as social-emotional development in children, some research suggests that the wearing of

masks can interfere with the identification of an emotional expression in others (Carbon, 2020). Given the unknowns regarding mask wearing, the present study examined the impact that mask-wearing had on young children's ability to interpret the facial expressions of an adult across four different conditions: unmasked photo, masked photo, video verbally implying the emotion, and video explicitly stating the emotion.

Emotional Literacy in Early Childhood

Emotional literacy is defined as “the ability to identify, understand, and respond to emotions in oneself and others in a healthy manner” (Joseph et al., 2005). Emotion identification, an aspect of emotional literacy, underlies the ability to regulate diverse emotional experiences in healthy ways. The emotional development of young children can predict significant aspects of their lives, including their ability to tolerate distress, control impulses, become self and socially aware, form meaningful interpersonal relationships, and

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achieve academic success, even after accounting for variations in IQ (Denham & Brown, 2010; Denham et al., 2012; Graziano et al., 2007; Izard, 2001; Joseph et al., 2005; MacCann et al., 2020; Tominey et al., 2017) and researchers have found that children who attend high quality group care exhibit higher levels of social competence (Broekhuizen et al., 2018).

Evident throughout literature, young children's emotional skills lay the foundation for their academic performance to flourish (Birch & Ladd, 1997; Raver, 2002). Exploring factors that may be influencing this relationship, Curby and colleagues (2015) investigated the social-emotional competence and preliteracy skills of 91 preschool children, finding children's emotion knowledge a significant predictor of both alphabet identification and phonological and print awareness. These pre-literacy skills provide the foundation for which later language and literacy abilities develop, highlighting the importance of early development of young children's social-emotional skills.

Further, in three meta-analyses exploring the influence of emotion knowledge on school success in children aged three to 12 years old, Voltmer & von Salisch (2017) found significant associations between emotion knowledge and all three dimensions of school success: academic performance, peer acceptance, and school adjustment. Namely, students with higher emotional literacy tend to behave better in school, are more academically engaged, achieve higher academic success, and are more accepted by peers in comparison to classmates with lower emotional literacy (Voltmer & von Salisch, 2017). Paralleling these findings, in a study examining the relationship between emotion knowledge of children in pre-kindergarten and later math and reading achievement, Ursache and colleagues (2020) found children with higher levels of emotion knowledge at the end of preschool performed better on math and reading achievement tests in both kindergarten and second grade. Of note, these findings were observed after controlling for sociodemographic characteristics, school intervention status, pre-academic skills (motor skills, concept knowledge, language abilities), and other social-emotional skills (adaptive behavior, positive peer relations, self-regulation).

Emotion Identification

Early in childhood, children begin using emotions to convey nonverbal messages to others in social situations (Denham et al., 2012). Emotions function as key information for the appraisal and understanding of one's own experiences and the experiences of others (Bretherton et al., 1986). Accurately identifying these emotions allows children to regulate and communicate feelings they experience and observe in

others (Denham et al., 2003, 2012; Izard, 2001). A mediator between verbal ability and social skills, emotion identification provides the grounding for positive emotional experiences such as empathy, sympathy, positive emotionality, and sociability which facilitate healthy interactions, encourage moral behavior, and encompass social and emotional competence (Denham & Couchoud, 1991; Denham et al., 2012; Izard, 2002; Mostow et al., 2002). A main component of emotion regulation is the ability to identify emotions. There are two key features that work in concordance to facilitate accurate emotion identification: expressive sources and situational cues (Bretherton et al., 1986; Denham & Couchoud, 1990). Expressive sources of information include the facial expressions one exhibits when experiencing a particular emotion, such as a smile when one feels happy. Situational cues refer to the contextual clues of the situation, such as assuming one is happy when they receive a gift.

Of particular relevance, Denham & Couchoud (1990) conducted a study assessing children's accuracy at identifying four key emotions: happiness, sadness, anger, fear. In their study, 45 preschoolers aged two to four years old were first shown puppets with the four different emotion expressions drawn on and asked to verbally name how each puppet is feeling. Next, participants were shown all puppets at once and required to nonverbally point out specific emotions asked by the experimenters. Finally, the researchers assessed participants' ability to interpret emotional situations by engaging them in vignettes using puppets with neutral facial expressions. After each vignette, participants were asked to identify how the protagonist's puppet was feeling. Findings from this study revealed that young children were more successful in identifying and interpreting positive emotions and situations (i.e., happiness) than negative emotions (i.e., sadness, anger, and fear).

Face Masks

The face masks employed to slow the spread of COVID-19 veil the bottom half of the face, potentially causing difficulty in identifying emotions. Saunders and colleagues (2021) examined how face masks influence communication, finding that participants reported difficulty reading other people's facial expressions without the ability to rely heavily on the lips and face for communication. Some mask-wearers may intentionally make less formulated emotional expressions based on the assumption that others will not be able to see them, potentially making it even more difficult to identify their emotions. Gori and colleagues (2021) discuss the effect of mask wearing on one's ability to correctly identify emotions. The authors posit that young children are in a critical stage of development regarding social emotional

learning and that those who have had more exposure to individuals wearing masks will be more likely to correctly identify emotions than those children who had less exposure to individuals wearing masks.

Given the difficulty that can occur when aspects of a face are covered, it is critical to examine how these difficulties can be remediated when mask regulations are required. Researchers conducted a study of women wearing Islamic face coverings compared emotion recognition in an individual wearing a niqāb versus a cap and scarf covering the same exact areas of the face (Kret & de Gelder, 2012). They found that despite both covering the same areas, happiness and sadness were better recognized in the cap and scarf condition. Therefore, when faces are partially covered, it appears familiarity plays a significant role in how an individual perceives another's emotion. The use of language to communicate emotions must also be considered. Prior research has demonstrated that auditory cues may be necessary for communicating emotions to young children (Akhtar & Gernsbacher, 2008; Baldwin & Moses, 1996; Sauter et al., 2013). Sauter and colleagues (2013) found that children as young as five may be able to interpret emotional cues from vocal signals, such as non-verbal vocalizations and inflected speech, and that this skill improves with age. Although this research did not examine children under five, it seems as if these young children may not have developed this skill yet. Therefore, perhaps the addition of verbal cues may assist young children in successfully identifying emotions when the user is wearing a face mask.

Age, Race, and Gender

During the pandemic, the CDC issued guidelines for children to wear face masks in schools and childcare centers to mitigate the spread of the COVID-19 virus. The obfuscation of facial movement by protective masks and the effects this may have on young children's ability to recognize emotions are still unknown. Although there is a dearth of research related to the current pandemic, previous research has indicated that children become more accurate in recognizing facial expressions as they age. Brechet (2017) found that 7-year-old children performed better than 5-year-old children in a task that required choosing an emotion from a bank of predetermined emotions and allocating it to a target facial expression. This is in line with earlier work conducted by Denham & Couchoud (1990), who found that older children were more accurate at identifying emotional expressions than younger subjects. These results indicate that chronological age is a predictor of a neurotypical child's ability to identify emotions from facial expressions.

While research on the relationship between gender and *young children's* emotion identification is limited, research has found that *adult* females are generally better at correctly identifying expression of emotions (Hall et al., 2000). Hall and colleagues (2000) conducted a study on gender and emotion and found that a person's ability to accurately interpret nonverbal cues (decoding accuracy) remained consistent across age, gender of the model, task, and culture. An earlier meta-analysis from the same author found that females scored higher than males in emotion identification tasks, including recognizing emotions from photos of facial expressions (Hall, 1978). Palmer and colleagues (2005) evaluated gender differences in emotional intelligence utilizing a psychometric approach. Females significantly outperformed males on the Mayer–Salovey–Caruso Emotional Intelligence Test Version 2.0, an evaluation that measures a participant's ability to perceive, use, comprehend, and manage emotions, further indicating that adult females may be better than males at identifying emotions. While the research indicates that this may be true for adults, little is known as to when these differences begin.

When it comes to race, Segal and colleagues (2019) posit that much of the research surrounding the effects of race and culture conflate cultural background and race; therefore, much of the data is inconclusive. However, when controlling for cultural differences, Segal et al. (2019) suggest that race alone may not significantly affect emotion recognition. Hancock & Rhodes (2008) consider the other-race effect (ORE), which suggests more accurate facial recognition for one's own-race than for faces from another race, in their work examining the amount of contact that participants ($n=48$) had with other-race faces. They found that higher levels of contact with other-race faces were associated with lower levels of ORE. These results suggest that individuals who have had more exposure to other-race faces prior to the face mask mandates may have less difficulty recognizing emotions in those faces than individuals with less exposure.

The Present Study

Given the importance of emotion identification skills and the high prevalence of mask wearing during the COVID-19 pandemic, our study examined young children's ability to identify facial expressions on an adult masked model. To do this, we conducted an online study asking children to identify four main emotions (angry, happy, sad, scared) across four conditions (unmasked, masked, masked with emotion verbally implied, masked with emotion verbally stated). We had two main research questions:

1. How do face masks influence young children's ability to correctly identify facial expressions?
 - a. It was hypothesized that children would be more likely to identify an expression on an unmasked face than on a masked face.
 - b. It was also hypothesized that increasing levels of verbal cues would enhance children's ability to correctly identify emotions.
 - c. Finally, it was predicted that children would be more likely to correctly identify happiness than the other emotions.
2. What characteristics are associated with correct emotion identification?
 - a. It was hypothesized that children with more exposure to adults wearing masks would be better able to identify emotions.
 - b. It was hypothesized that children who attended group care would be better able to identify emotions.
 - c. It was predicted that girls would correctly identify more emotions.
 - d. It was predicted that older children would correctly identify more emotions.
 - e. Finally, it was hypothesized that the race of the child would not play a role in the amount of correctly identified emotions.

Method

Procedure

IRB approval was obtained for this study. A recruitment flyer was created targeting parents of children ages 3–5 years old. A variety of snowball sampling recruitment methods were utilized, including posting on relevant social media sites, networking through local pediatrician offices, childcare centers, and other child-based community organizations, and encouraging potential participants to share information about the study with others. The study took place online via Qualtrics at a time and location of the participant's choosing. Data was collection from March 2021 through November 2021. The measures were anonymous and no incentives were provided for participation. After providing informed consent, parents completed a demographic form. Then they were told to transition their device to their child, along with a reminder that they should not aid the child in their responses as it is important to see the perspectives of children. A video was used to both obtain assent from children

and to teach the corresponding emojis for the four emotions under examination in this study (happy, sad, angry, scared).

Children agreeing to participate were shown 16 different graphics of a model expressing four common emotions (happy, sad, angry, scared) across four conditions: still unmasked photo, still masked photo, video verbally implying the emotion, video verbally explicitly stating the emotion. Individual items were presented in a randomized order and not sorted by condition. The items were randomized using an online randomizer tool (random.org/lists). After viewing each item, an audio recording asked the child to identify how the model was feeling. To indicate their response, the child selected one of four emojis. After choosing an emoji response, children were automatically directed to the next question.

Participants

Participants were 77 children between the ages of 3 and 5 years old ($M = 53.21$ months; $SD = 10.853$). Gender was fairly evenly split, with 35 ($n = 45.4\%$) of the participants identifying as female, 41 as male ($n = 53.2\%$), and one ($n = 1.3\%$) selecting "prefer not to answer". All caregivers reported English as being their child's primary language. The majority (72.7%; $n = 56$) of participants were White, had attended group care outside of the home (87%; $n = 67$), and had exposure to adults wearing masks on a daily basis (80.5%; $n = 62$). The majority of caregivers had a Master's degree or higher (61%; $n = 47$), with most people reporting this information for the biological mother (72.7%; $n = 56$). Participants were from higher income families, the most frequently reported income range being \$100,001–\$200,000 (44.2%; $n = 34$). Three participants (4%) identified as having a disability, specifically two with a communication impairment /speech delay and one with attention deficit hyperactivity disorder (ADHD). See Table 1 for participant demographics.

Measures

Our measure was developed by the research team for the purpose of this study. The images used in this project were obtained from the FACES database (Ebner et al., 2010) and used with permission. The FACES database consists of 2,052 images of male and female adults expressing six emotions (neutrality, sadness, disgust, fear, anger, and happiness). We selected one model (White, young adult, female) and picked both a static and dynamic image of this model displaying each of the four emotions under examination (sadness, happiness, fear, anger). Dynamic images were

Table 1 Participant Demographics

	%	<i>n</i>
Gender		
Male	41	53.2
Female	35	45.5
Prefer not to answer	1	1.3
Race		
White	56	72.7
Non-White	16	20.8
Unknown/Prefer not to answer	5	6.5
Ever attended group care		
Yes	67	87.0
No	10	13.0
Frequency of exposure to adults wearing masks		
Daily	62	80.5
Less than daily	15	19.5
Highest level of education by any parent/guardian		
High school diploma or less	0	0
Associate's degree	1	1.3
Some college	4	5.2
Vocational or technical school	2	2.6
Bachelor's degree	22	28.6
Master's degree or higher	47	61.0
Parent/guardian's education level are referring to		
Mother	56	72.7
Father	18	23.4
Both	3	3.9
Household income		
< \$25,000	0	0
\$25,001- \$50,000	3	3.9
\$50,001-\$100,000	6	7.8
\$100,001- \$200,000	34	44.2
> \$200,001	26	33.8
Prefer not to answer	8	10.4

N = 77

included as part of the FACES database and were created using a variety of static photos to show the transition from a neutral expression to the desired emotion. With permission, these images were then modified by our research team to incorporate masks and dialogue using Procreate, Adobe Photoshop, and Adobe Premiere Pro.

After the tool was created, it underwent two rounds of review. First, five graduate students who were not working on this project completed the study. Then a small group of five young children and their parents were asked to pilot the study. After each round, feedback was reviewed and changes were incorporated into the measure. Some edits that were made as a result of these reviews included: rewording the questions to be more user-friendly; reformatting the measure to be more accessible across a variety of platforms; the addition of the verbal question “how am I feeling?” for each image; and changing the tool to automatically go to the next

question after a response was selected (vs. requiring the participant to select the “next” button).

The study was mobile-friendly and consisted of 27 multiple-choice items (11 demographic items completed by the parent and 16 emotion identification items completed by the child). It took an average of 6.18 min to complete. The first section of this study consisted of 11 questions examining demographic information, asking caregivers to provide each participant's: month and year of birth, gender, race, primary language, approximate household income, highest level of education obtained by a parent/guardian, whether a disability, impairment, or other any other special needs were present, whether they have attended group care outside of their home, and frequency of exposure to adults wearing masks. This was followed by 16 questions assessing the child's ability to identify four key emotions (happy, sad, angry, scared) across the four conditions (still unmasked photo, still masked photo, masked video- emotion verbally implied, masked video- emotion verbally stated). In the unmasked condition, the model was shown exhibiting each of the four emotions without any modification. These same four photos were used for the still masked photo condition, with the addition of a plain, black, cloth face mask covering the lower half of her face. For the dynamic video conditions, participants were shown the transition from neutral to the target emotion by the same model wearing the same cloth mask. Audio situational cues in which the model either implied or explicitly stated how she is feeling were added. In the implied condition, the audio described a situation evoking an emotion (e.g., *It was dark and I just heard a loud noise*). In the explicit condition, the audio directly stated how the model was feeling (e.g., *I'm so angry that someone ate all of my cookies!*). After the presentation of each face, the child was verbally prompted “how am I feeling?” and presented with four emojis. The emoji responses and their order remained the same for each item, including the teaching condition.

Data Analyses

SPSS, version 26 was used to conduct all analyses for this study. Data were first descriptively analyzed in order to describe participants (Table 1) and summarize responses (Table 2). For our first research question, examining how face masks influence young children's ability to correctly identify emotions, we utilized a chi square test of independence to determine if children were more likely to identify an expression on an unmasked face than on a masked face and if increasing levels of verbal cues would enhance children's ability to correctly identify emotions. A one-way repeated measures Analysis of Variance (ANOVA) was used

Table 2 Total number of correct responses and mean number of correct responses for each condition

Condition		
	Total # correct responses * (%)	<i>M</i> (<i>SD</i>)
Masked- still	244 (79.2)	3.17 (1.04)
Masked- implicitly stated	264 (85.7)	3.43 (0.90)
Unmasked, still	266 (86.4)	3.45 (0.93)
Masked- explicitly stated	271 (88.0)	3.52 (0.87)

* Total possible correct responses = 308 (100)

to assess if children were more likely to correctly identify happiness than the other emotions. A series of simple linear regressions were run to determine which demographic characteristics were associated with correct emotion identification, with exposure to adults wearing masks, attending group care, being female, being older, and being White as independent variables and the number of correctly identified emotions as the dependent variable.

Results

Facial Masks & Emotion Identification

When examining how face masks influence young children's ability to correctly identify emotions, descriptive statistics were utilized. The total number of correct responses and the mean number of correct responses were calculated for each of the four conditions (see Table 2). Chi square test of independence was used to evaluate the significance of these differences. Results show a significant relationship between the four conditions ($\chi^2(3, N = 1232) = 10.66, p = .01$). When comparing the unmasked to the still masked condition, children were significantly more likely to correctly identify emotions in the unmasked condition ($\chi^2(1, N = 616) = 5.52, p = .02$). When it comes to increasing level of support, children were better able to identify emotions in the implicit masked condition ($\chi^2(1, N = 616) = 4.49, p = .03$) and in the explicit masked condition ($\chi^2(1, N = 616) = 8.63, p = .003$) than in the still masked condition. Interestingly, no difference was found between the implicit masked condition and the explicit masked condition ($\chi^2(1, N = 616) = 0.70, p = .40$) and there was no difference found between the explicit masked, implicit masked, and unmasked conditions ($\chi^2(2, N = 924) = 0.73, p = .69$). When examining if children were better able to identify positive emotions, a one-way repeated measures ANOVA was conducted. No significant differences were found between ability to identify positive or negative emotions, $F(2, 152) = 0.79, p > .05$.

Characteristics & Emotion Identification

A series of simple linear regressions were run to determine which characteristics were associated with correct emotion identification with a Bonferroni adjusted alpha level of 0.01 (0.05/5) per test. Exposure to adults wearing masks, attending group care, and child gender, age, and race were separately run as independent variables and the number of correctly identified emotions in masked conditions was the dependent variable. Children with more exposure to adults wearing masks were better able to identify emotions in masked faces, $F(1, 75) = 8.95, p < .01$, accounting for 10.7% of the variation of identified emotions in masked figures with adjusted $R^2 = 9.5\%$, a medium size effect according to Cohen (1988). Children who attended group care were also better able to identify emotions in masked faces, $F(1, 75) = 9.87, p < .01$, accounting for 11.6% of the variation of identified emotions in masked figures with adjusted $R^2 = 10.5\%$, a medium size effect according to Cohen (1988). Age significantly predicted ability to identify emotions in masked faces, $F(1, 66) = 10.50, p < .01$, accounting for 13.7% of the variation of identified emotions in masked figures with adjusted $R^2 = 12.4\%$, a medium size effect according to Cohen (1988). No significant relationship was found between the number of correctly identified masked faces and gender $F(1, 74) = 0.34, p = .56$ or race $F(1, 70) = 1.16, p = .28$.

Discussion

In this study, we attempted to examine the impact of mask wearing on young children's ability to correctly identify emotional expressions in an adult model. Not surprisingly, results indicated that children were better able to identify emotion expressions when the adult model was unmasked versus masked, consistent with the work of Saunders and colleagues (2021). They also suggest that when a masked figure explicitly stated how they were feeling or verbally implied their feeling, children were able to successfully identify the emotion. This was also expected as research prior to the pandemic showed that children benefited from auditory cues when identifying emotions (Akhtar & Gernsbacher, 2008; Baldwin & Moses, 1996; Sauter et al., 2013). Interestingly, no difference was found between whether the emotion was explicitly stated or implied and children were equally able to identify emotions in an unmasked face and when the adult explicitly stated or verbally implied how they were feeling. This indicates that when adults are wearing masks, children may benefit from adults stating or implying how they are feeling along with the visual cue of their facial expression.

Although prior research has found that young children tend to be more successful at identifying positive emotions (Denham & Couchoud, 1990), we did not find this. In our study, children were equally as successful when identifying positive (happy) and negative (sad, scared, angry) emotions. It is possible that the use of a human model, as opposed to the puppets used in earlier work (Denham & Couchoud, 1990), provided children with an advantage in terms of the range of emotions they were able to successfully identify. Additionally, in our study, verbal cues were paired with facial expressions, while in Denham and Couchoud's (1990) work, the puppets had neutral expressions. Perhaps adding the facial expression to the verbal cues enhances a young child's ability to correctly identify negative emotions.

We also attempted to describe how child characteristics relate to their ability to successfully identify emotions. We found that exposure to adults wearing masks and attending group care enhanced children's ability to identify emotions. It is also noted that we asked if children had ever attended group care, but did not ask when, or if they were currently attending. Although more information is needed here, perhaps attending group care provided for a stronger foundation of emotion identification skills overall, which falls in line with the work of Broekhuizen and colleagues (2018). It could be that this overall higher skill set carried over to the pandemic, where children are now required to identify emotions when the other person is wearing a mask. Alternatively, it is possible that increased exposure to others wearing face masks helps enhance this skill (Gori et al., 2021) and, if children were attending group care during the pandemic, this also increased their exposure.

When it comes to age, research has shown that children's ability to identify emotional expressions increases as the child ages (Serrat, et al, 2020; Denham & Couchoud 1990). This is consistent with our results, where older children were better able to identify emotion expressions on masked faces. Although prior research indicates that the ORE would give participants of the same race as the model an advantage in identifying aspects of the face (Kelly et al., 2008), our results did not indicate this distinction. Rather, in line with Segal and colleagues (2019), results indicate that race did not significantly affect emotion recognition ability. A possible explanation for this is described in research by Hancock & Rhodes (2008), who found that higher levels of contact with other-race faces were associated with lower levels of ORE. Therefore, this may indicate that non-White participants in this study have had enough contact with White individuals that the ORE did not significantly impair their ability to correctly identify emotions in the White model.

Finally, data suggests that gender did not play a role in emotion identification. Although prior research in adults (Hall, 1978; Hall et al., 2000; Palmer et al., 2005) has

found that females may have an advantage in identifying emotions, this research has been conducted primarily on adults. It could be that this difference develops over time as a result of exposure to social norms and stereotypes. Our results suggest that there are no gender differences in this skill in young children. While further research is needed to more firmly state this conclusion, if supported by additional research, this information can be important to consider when reflecting on gender differences in the area of emotion identification.

Implications

Research has suggested that the ability to accurately label expressive cues is a necessary precursor to being able to identify emotional situations (Denham & Couchoud, 1990). Therefore, unsurprisingly, preschool children tend to rely heavily on expressive cues when identifying emotions, but gradually transition into more dependency on situational cues as they age through elementary school (Kurdek & Rodgon, 1975). Consistent with this, our results also indicate that young children benefit from adults verbally identifying their emotions. Both explicitly stating the feeling and verbally implying the emotion by describing the situation helped children identify that emotion, to the level that when these supports were added, they were able to identify emotions as well as they could in an unmasked model. Regularly pairing an emotional facial expression with a verbal statement of that emotion may help support children's development of this skill during the pandemic and beyond.

Our results also suggest that children with exposure to adults wearing masks and attending group care are better at identifying emotions. This is especially important to consider for a young child who is starting group care for the first time. If masks are being worn in the program, perhaps providers should add the caregiver wearing a mask around the child to increase their exposure, and thus, ability to practice reading emotions, to their list of suggestions to help the child prepare for their first day. We also need to consider the impact of the child's age on this ability. Prior to the pandemic, emotion identification was a skill that many young children still needed to develop. During a pandemic, whether it is due to mask wearing, not having as much contact with others, or just to the overall stress of the situation, we cannot be surprised that this skill may develop later in some children. What we can do in the meantime, is to provide clear verbal cues, opportunities to practice, and some patience and understanding.

Limitations & Areas for Future Research

Although this study provides new information, it is not without limitation. First, this study was conducted in one state in the United States at one point in time during 2021 of the pandemic, limiting its generalizability. Results were taken from a relatively small sample size. In addition, results were gathered from still and video models, which may not generalize to the real world, where people may not be as intentionally expressive when wearing a mask (Saunders et al., 2021). Further limiting generalizability is the sample demographics. Participants consisted mainly of White children from middle to high income families with parents with high levels of education. Furthermore, the study was only administered in English. Additional research is needed with other populations to determine if these results apply outside of this group. We had also originally planned to examine the influence of disability on emotion identification in masked adults, but did not have enough representation in the sample to conduct this analysis. It is recommended that a similar study be conducted with children with various disabilities (i.e. deaf/hard of hearing, autism, ADHD, communication impairments) to determine which factors help support their success in identifying emotions in masked individuals. When examining race, data did not allow for analysis to be broken down by individual races; rather, we analyzed the data based on White (same as the model) or non-White (different than the model). We also made the decision to use one model (White, young adult, female). This does not allow for full consideration of race or gender. Future research is needed with a more diverse participant pool and using models with differing ages, races, and genders. Also, as research in this area is relatively new, this study looked at the association between individual predictors and emotion identification. Further research is needed examining the interaction of these variables.

Additionally, although caretakers were told not to assist their children during data collection, the researchers were not present during data collection and have no way of knowing if caretakers provided guidance. A similar study with in-person data collection could eliminate this variable. Also, while we were looking at increasing levels of support, these levels were verbally provided. For some children, difficulty in this task could have indicated challenges with receptive language, not emotion identification. Similarly, due to the age of the children, they were provided with emojis to indicate their responses. This allows for the possibility that children who cannot identify facial expressions can also not identify emotions on the emojis, despite the inclusion of a task designed to teach this skill. In future studies, alternative methods of responding should also be included.

Conclusion

The pandemic and related restrictions, including mask-wearing, has caused many to wonder what impact these restrictions will have on our youngest learners. The good news is that our results seem to indicate that we can help support children in identifying emotions by providing verbal cues stating or implying our emotion. They also suggest that with practice, exposure, and age, children will continue to grow their ability to read the facial expressions of others, with or without masks covering their faces.

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