

Face Masks and Emotional Blindness: The Impact of Facial Occlusion on Emotion Recognition Among Indonesian Adolescents

Putri Umrotur Rizqi¹, Muhammad Yasin²

¹Universitas Negeri Malang, Indonesia

²STAI Sangata Indonesia, Indonesia

Correspondent : putriumroturrizqi@gmail.com¹

Received : May 29, 2025

Accepted : July 16, 2025

Published : July 31, 2025

Citation: Rizqi, P. U., Yasin, M. (2025). Face Masks and Emotional Blindness: The Impact of Facial Occlusion on Emotion Recognition Among Indonesian Adolescents. *Psychosocia : Journal of Applied Psychology and Social Psychology*, 3(3), 154-166.

ABSTRACT: The COVID-19 pandemic has transformed nonverbal communication by introducing face masks into daily interactions, particularly affecting adolescents during a critical phase of socioemotional development. This study investigates how face masks influence the accuracy and cognitive processing of basic facial emotion recognition among Indonesian adolescents. Employing a between-subjects experimental design, 200 adolescents aged 12–18 were randomly assigned to view masked or unmasked facial expressions depicting six basic emotions. Emotion recognition accuracy, reaction times, and confidence ratings were collected using the Labvanced platform. The results indicate that face masks significantly reduce the accuracy of emotion recognition, with the most pronounced impairments observed for disgust and fear. Reaction times were longer across all masked conditions, suggesting increased cognitive load. Anger and sadness, which are more discernible from the eye region, maintained relatively higher recognition rates. Adolescents employed compensatory strategies, such as focusing on the eye region and contextual cues, but these were insufficient to fully counteract the interpretive challenges introduced by masking. The findings have critical implications for adolescent mental health and educational environments. Impaired emotion recognition may contribute to social withdrawal, miscommunication, and emotional dysregulation, ultimately affecting academic performance and peer relationships. These challenges are further complicated by cultural norms in Indonesia that may discourage overt emotional expression. Prolonged mask-wearing may also disrupt the development of emotional intelligence and social cognition. Interventions that promote emotion literacy particularly those that address masked and ambiguous facial cues are recommended. Schools, parents, and policymakers should work collaboratively to support adolescents through targeted educational programs and culturally sensitive socioemotional training.

Keywords: Emotion Recognition; Face Masks, Adolescents, Cognitive Load, Social-Emotional Development, Indonesia, Cultural Context.



This is an open access article under the CC-BY 4.0 license

INTRODUCTION

Facial emotion recognition is a fundamental skill for communication, empathy, and social interaction. For adolescents, who are in a critical stage of socioemotional development, accurate

interpretation of facial cues supports peer relationships, identity formation, and resilience (Chester et al., 2022; Verroca et al., 2022). Cognitive processes involved in emotion recognition also involve integrating both facial and contextual cues, suggesting a complex interplay between cognitive abilities and social functionalities (Ziccardi et al., 2021). Enhancing these skills during adolescence is essential for establishing relationships and understanding interpersonal dynamics, indicating the importance of fostering environments where such skills can be developed and honed (Fuchs et al., 2024; Ross & George, 2022).

Emotional literacy and perception continue to evolve during adolescence, as teenagers build deeper levels of self-awareness and empathy. A comprehensive understanding of emotions through facial expressions not only facilitates stronger peer connections but also reinforces positive identity formation. Adolescents who possess higher emotional acuity tend to display enhanced coping mechanisms in social settings, resilience in conflict resolution, and better psychological well-being. These developmental traits underpin the argument that emotion recognition should be viewed not only as a psychological function but also as a foundational life skill vital for adolescent success in varied social contexts.

The COVID-19 pandemic has catalyzed a seismic shift in nonverbal communication modalities, particularly among school-aged populations. With widespread mask-wearing as a public health measure, visibility of critical emotional expressive cues has been dramatically hindered (Hysenaj et al., 2024; Marini et al., 2021). This obstruction has necessitated adaptations in communication strategies since children and adolescents rely heavily on facial expressions to interpret emotions and derive meaning from social interactions (Freud et al., 2022; Levitan et al., 2022). Emerging evidence suggests a corresponding increase in social anxiety and communication difficulties during this period, likely due to the challenges in reading masked faces, which complicates social exchanges within educational settings (Grahlow et al., 2022). These alterations in nonverbal communication underscore the importance of heightened emotional awareness and adaptability in adolescents as they navigate these unprecedented challenges (Barrick et al., 2021; Gülbetekin et al., 2023).

Prolonged mask use may have lasting consequences, forcing adolescents to rely on compensatory strategies such as eye-region focus and contextual inference. However, these strategies may not fully replace holistic facial interpretation, raising concerns for long-term social fluency.

Research concerning the effects of mask-wearing on emotion recognition has yielded nuanced insights that vary across different age groups. Generally, younger children show varying degrees of detriment in their ability to identify emotions due to their developmental stage and reliance on facial expressions for social cues (Proverbio & Cerri, 2022). Older adolescents and adults demonstrate somewhat improved recognition abilities for certain emotions, notably anger and sadness, which are often less affected by the occlusion of the lower half of the face (Tsantani et al., 2022). Nevertheless, studies consistently show that overall accuracy in recognizing emotions decreases with mask-wearing, with specific emotions like happiness and disgust proving particularly difficult (McCrackin et al., 2023). This points to a collective need to investigate targeted

interventions that can support emotional recognition in educational contexts during and after the pandemic.

These findings also highlight the relevance of emotion-specific vulnerability to occlusion. For example, while anger may be signaled robustly through brow and eye movements, emotions like happiness rely heavily on mouth visibility. This divergence reinforces the necessity for emotion-targeted training interventions, which might help mitigate perceptual losses. Schools and counseling systems can be instrumental in this process by incorporating emotion recognition modules tailored to the current masked reality.

Cultural contexts further complicate the landscape of how facial emotions are interpreted. Previous studies indicate that cultural background significantly influences the perception and expression of emotions, with variations in how individuals interpret facial cues based on cultural education and socialization (Grenville & Dwyer, 2022). For instance, collectivist cultures may emphasize emotional expressions that convey group harmony, while individualistic cultures may reward more overt emotional displays of personal satisfaction (Kulke et al., 2021). This cultural variability highlights the importance of contextual and cultural factors in emotion recognition, suggesting that global studies must consider these differences to fully understand the dynamics of expression and interpretation in diverse populations. Such considerations also emphasize the necessity of culturally sensitive approaches in educational and psychological practices designed to enhance emotional recognition skills.

Within the specific realm of Indonesian adolescents, existing studies on emotional development and perception accuracy are sparse yet emerging. Research indicates that this demographic, much like their global peers, faces emotional perception challenges exacerbated by social norms and environmental factors unique to their cultural context (Kastendieck et al., 2023). The pandemic has likely influenced this further, with adolescents in Indonesia experiencing disruptions in traditional forms of socialization that facilitate nonverbal communication mastery (Mastorogianni et al., 2024). Nonetheless, the intersectionality of cultural identity and emotion perception provides fertile ground for examining localized approaches to enhance emotion recognition frameworks, thereby adapting global understandings to culturally relevant practices that support Indonesian adolescents in navigating their emotional development more effectively (Marini et al., 2021).

Therefore, this study investigates how face masks affect the accuracy, reaction times, and confidence of Indonesian adolescents when recognizing basic facial emotions. We hypothesize that mask-wearing will significantly reduce recognition accuracy and increase cognitive load, with variations across specific emotions.

METHOD

This study employed a between-subjects experimental design. Participants were randomly assigned using a computerized randomization algorithm into one of two conditions: masked-face

or unmasked-face. Randomization ensured equal probability for each participant to be assigned to either condition, minimizing selection bias.

A total of 200 Indonesian adolescents (aged 12 to 18) were recruited from junior and senior high schools. This age range was selected because it represents a critical developmental stage in socioemotional growth, during which facial emotion recognition skills undergo significant refinement (Rodger et al., 2015). The sample was stratified by age and gender to ensure representativeness across early and late adolescence. Informed consent was obtained from all participants and guardians, with ethical clearance secured through the institutional review board.

Facial stimuli were selected from validated emotion recognition stimulus sets, including the Geneva Emotion Recognition Test (GERT), the Ekman Emotion Hexagon Test, and the Diagnostic Analysis of Nonverbal Accuracy (DANVA). These tools were chosen based on their cross-cultural validation and high internal consistency in identifying universal emotions (Jenkins, 2017).

Stimuli included high-resolution images with and without surgical masks digitally superimposed, ensuring that the mask condition altered only the lower facial area while preserving consistency in the upper-face region. To minimize bias, emotions were presented in randomized order across participants.

The experiment was conducted online using the Labvanced platform, an interactive web-based research tool widely adopted in psychological research (Matsumoto & Wilson, 2022). The platform allowed researchers to track both reaction times and selection accuracy with millisecond precision. Participants accessed the platform via personal or school-issued devices in supervised settings.

Each session began with practice trials followed by 30 test trials, five for each emotion. Each image was displayed for five seconds, and participants responded by selecting one of six emotion labels. Reaction times were automatically recorded. Participants also rated their confidence on a 7-point Likert scale after each response.

- Accuracy Score: Proportion of correctly identified emotions.
- Reaction Time: Time (in milliseconds) from stimulus onset to response selection.
- Confidence Rating: Self-reported certainty about response on a scale of 1 (not confident) to 7 (very confident).

Data were analyzed using SPSS version 26. Descriptive statistics (means, standard deviations) were calculated for each dependent variable. Inferential analyses included:

- Independent Samples t-test: To assess mean differences between masked and unmasked groups for each emotion.
- Two-Way ANOVA: Examining interaction effects between face condition and emotion type on accuracy and reaction time.

- Repeated Measures ANOVA: Applied to within-subject comparisons for accuracy across emotion types (where applicable).

Where assumptions of normality or homogeneity of variance were violated, non-parametric alternatives such as the Mann-Whitney U test or Kruskal-Wallis test were used (Levy, 2022). Effect sizes (Cohen's d or η^2) were reported to assess practical significance.

- Stimulus Validity: Stimuli were pilot-tested on a separate sample to ensure clarity and cultural relevance.
- Technical Integrity: Labvanced settings ensured consistent latency across devices.
- Participant Engagement: Real-time feedback and minimal delay were incorporated to sustain attention.

The selected stimulus sets (GERT, DANVA, Ekman Hexagon) are widely used and reliable in cross-cultural research. They were selected because they minimize cultural bias by focusing on universal facial cues, which is particularly relevant in Indonesia where standardized local instruments are limited. The Labvanced platform was used for its precision and adaptability in remote experimental settings.

The study followed APA ethical guidelines, including informed consent, confidentiality, and the right to withdraw. No identifiable personal data were collected. Results were anonymized and stored securely for analysis.

This rigorous methodological framework was designed to yield reliable insights into how face masking affects adolescents' emotional perception in a controlled yet ecologically valid setting.

RESULT AND DISCUSSION

Emotion Recognition Accuracy

Descriptive analysis revealed a consistent pattern of lower recognition accuracy under the masked condition across all six basic emotions. For instance, recognition of disgust dropped from 88.8% (unmasked) to 73.4% (masked), while anger dropped from 85.6% to 76.1%. In practical terms, this means that adolescents were much more likely to misinterpret disgust or anger when a mask covered the lower half of the face.

These findings reflect broader trends noted in existing literature. Adolescents tend to recognize happiness and anger with greater accuracy due to their more distinct facial cues, particularly in the upper face (Rodger et al., 2015; Vetter et al., 2018). Emotions like sadness and fear, typically scoring around 40–60% in some studies (Dan, 2020), also exhibited diminished recognition here, although slightly above the lower bounds of typical adolescent ranges. The results corroborate earlier reports that face masks obscure key emotional indicators, particularly for expressions dependent on the lower half of the face (Blazhenkova et al., 2022).

Misinterpretation was especially evident for disgust, which was often confused with anger or sadness. This aligns with research noting disgust as particularly vulnerable to misinterpretation due to occlusion of the mouth and nose areas, which contain critical muscular cues (Perry et al., 2017). Meanwhile, anger recognition remained relatively resilient, confirming previous assertions about the robustness of upper facial indicators such as eyebrow compression and intense gaze ((Reigeluth et al., 2016).

Reaction Time

Reaction times were consistently longer in the masked condition. For example, adolescents took an average of 947 ms to recognize disgust in unmasked faces but needed 1212 ms when the face was masked. In everyday interactions, this slower response may translate into hesitation or delayed reactions during conversations, potentially affecting smooth social exchanges.

This delay in reaction time is indicative of elevated cognitive load, as confirmed by prior findings that complex or ambiguous facial cues prolong decision-making (Volkaert et al., 2024). Emotions that were easier to identify, such as happiness and anger, also maintained faster recognition times and higher confidence ratings, supporting the notion that faster recognition often correlates with confidence (Patel et al., 2022).

Adolescents' susceptibility to delayed recognition, particularly for emotions like fear and disgust, suggests developmental limitations in quickly resolving ambiguous cues (Høyland et al., 2017)). Their ongoing socio-emotional maturation could explain this heightened sensitivity to facial occlusion, as supported by Simcock et al. (2020) and Taylor et al. (2015).

Normative Comparison and Interpretation

The normative reaction time for adolescents in emotion recognition tasks generally ranges from 500 milliseconds to approximately 3000 milliseconds, depending on stimulus complexity and context (Yuan et al., 2015). The mean reaction times in this study, while within this range, indicate that mask-induced ambiguity nudges response latencies toward the upper end. Such temporal shifts reinforce the interpretation that face masking increases the perceptual demands placed on adolescent viewers.

Summary of Findings

Overall, the results show a clear pattern: masks reduce both the accuracy and speed of emotion recognition. Adolescents most often struggled with disgust and anger, while happiness and neutral expressions remained the easiest to identify. These findings suggest that in classrooms or peer interactions, adolescents may misread negative emotions or respond too slowly, creating potential barriers to social communication.

These results provide empirical support for the hypothesis that facial masking impairs adolescents' ability to identify and interpret emotional expressions. The findings carry important implications for educational and social policy as they suggest that persistent use of masks in adolescent environments could hinder nonverbal emotional communication.

Interpretation of Key Findings

This study demonstrates that mask-wearing significantly reduces recognition accuracy and increases reaction times among Indonesian adolescents, with disgust and fear most affected. These findings confirm global evidence (McCrackin et al., 2023) but add new insights by showing that the effects also hold in a Southeast Asian, collectivist cultural context. The contribution lies in highlighting that even within cultural norms of emotional restraint, adolescents still struggle with masked expressions, suggesting a universal impact of masks on emotion recognition.

Compensatory Strategies

A major factor influencing adolescents' ability to cope with masked social environments appears to be the strategic reallocation of visual attention. The shift in gaze toward the eye region when the lower face is obscured reflects a well-documented compensatory behavior that leverages available emotional cues (Ikeda, 2021). This adaptation underscores the importance of the upper facial region, which continues to provide reliable indicators for interpreting emotions such as sadness, fear, and anger (Hildebrandt et al., 2016). However, this strategy has limitations. For emotions like happiness and disgust, the lower facial area carries distinctive features such as smiles or nose wrinkling that are critical for accurate interpretation. When these features are masked, even strategic eye fixation may not compensate for the loss.

Adolescents, still in the process of refining social-cognitive abilities, may not yet fully master these compensatory techniques. Their reliance on the eye region is promising but may not entirely bridge the interpretive gap introduced by masking, especially for complex or subtle emotions. Additionally, some adolescents may rely more on contextual or environmental information to decode emotional states, pointing to a multi-modal compensatory strategy that integrates body language, tone of voice, and situational awareness. Understanding these strategies can help shape interventions that enhance resilience in masked or visually restrictive environments.

Developmental and Cultural Considerations

The developmental trajectory of emotion recognition during adolescence intersects profoundly with cultural norms and practices. Adolescents are increasingly responsive to social cues and heavily influenced by peer dynamics. This developmental sensitivity makes them particularly vulnerable to disruptions in emotional perception caused by face masking. Compounded with cultural expectations, such as emotional restraint in collectivist societies like Indonesia, these adolescents may face compounded challenges. Cultural scripts that prioritize group harmony over individual emotional expressiveness can lead to muted or ambiguous emotional displays, making facial emotion recognition even more challenging under mask conditions (Kuehne et al., 2021).

This cultural emphasis on restraint may also shape how adolescents interpret others' emotions. In such settings, adolescents might be less accustomed to overt emotional cues, thereby placing greater reliance on subtle facial signals that are compromised by masking. As a result, interventions aimed at improving emotion recognition must be culturally nuanced, taking into account localized expressions, emotional norms, and display rules.

Psychological and Educational Implications

The inability to recognize emotions accurately can contribute to miscommunication, anxiety, and withdrawal, consistent with previous studies (Ikeda, 2021). Our findings extend this evidence by linking slower reaction times to increased cognitive load, which in school settings may manifest as hesitation in peer interactions or reduced participation. This makes the case for schools to integrate social-emotional learning programs tailored for masked or ambiguous communication.

The educational system has a responsibility to recognize these psychological dimensions and provide scaffolding to help adolescents navigate the masked or partially obscured social world. Schools should consider integrating social-emotional learning (SEL) curricula that incorporate modules on interpreting partial facial expressions, nonverbal communication, and empathy-building exercises. Such programs could serve as both preventive and rehabilitative measures for socioemotional disruptions brought about by face masking.

Reaction Time as Cognitive Load Indicator

The increased reaction times observed in this study suggest that facial occlusion imposes a cognitive toll on adolescents. When essential visual cues are removed, adolescents require more time to interpret what they see, reflecting greater mental effort and reduced processing fluency. This finding is consistent with broader psychological theories that associate longer reaction times with heightened cognitive load, especially in tasks involving ambiguity or incomplete information (Volkaert et al., 2024).

These findings have real-world implications. In fast-paced social or educational settings where quick emotional interpretation is essential such as classroom discussions, peer feedback, or conflict resolution slower emotional recognition may impair adolescents' ability to respond appropriately or in a timely manner. Over time, this lag in emotional processing can contribute to social missteps or miscommunication, further reinforcing anxiety or social withdrawal.

Longitudinal Effects of Mask-Wearing

The sustained use of face masks during a formative developmental period may yield long-term consequences for adolescents' socioemotional growth. Prolonged exposure to partially visible faces may interfere with the internalization of emotional cues, a process typically solidified during middle and late adolescence. This deprivation may weaken the neural pathways responsible for automatic emotion recognition, potentially stunting the development of emotional intelligence, empathy, and social problem-solving skills (Iffland & Neuner, 2020).

Longitudinal data will be necessary to fully understand the extent of this impact, but existing cross-sectional findings are concerning. If left unaddressed, these deficits could extend into adulthood, affecting future relationships, workplace dynamics, and emotional resilience. Preventive educational programming and parental engagement will be essential to support healthy socioemotional development during and after extended periods of masked interaction.

Adaptive Resilience and Educational Strategies

While adolescents showed adaptability through eye-gaze shifts and contextual inference, the variation across individuals indicates unequal resilience. Building on these strengths, structured training such as classroom roleplays or digital emotion recognition modules could help standardize coping skills. This study therefore contributes practical recommendations for educational policy and intervention in Indonesia.

Educational strategies should be multifaceted. Training programs can include simulations of masked and unmasked interactions, interactive role-plays, and visual cue identification exercises. Technological tools, such as augmented reality (AR) or virtual emotion simulators, could be used to improve adolescents' proficiency in decoding emotions with partial information. Teachers and school psychologists should also receive training in identifying signs of socioemotional disruption linked to impaired emotion recognition.

Parental and community involvement further enhances these efforts. Encouraging open conversations about emotions at home, validating adolescents' interpretive challenges, and modeling effective emotional communication can create a more supportive ecosystem for emotional learning. The goal should be to create environments both digital and physical that nurture adolescents' emotional growth despite the constraints imposed by mask-wearing.

CONCLUSION

This study demonstrates that face masks significantly impair Indonesian adolescents' ability to recognize basic facial emotions. The data showed a reduction in recognition accuracy, especially for disgust and fear, and increased reaction times, reflecting added cognitive load. These findings confirm global evidence while extending it to a collectivist cultural context, highlighting both universal and culture-specific challenges in emotion perception during adolescence.

However, the study has several limitations. The use of static images rather than dynamic interactions may not fully capture real-life social exchanges, and the sample was limited to school-based adolescents in Indonesia, which may restrict generalizability. Future research should employ longitudinal designs to examine whether mask-related difficulties persist after adolescence and explore the role of multimodal cues such as body language and vocal tone.

Despite these limitations, the results underscore the need for culturally sensitive interventions that strengthen adolescents' emotion literacy. Schools and policymakers should consider integrating social-emotional learning programs that address masked and ambiguous facial expressions. By acknowledging both the vulnerabilities and adaptive capacities of adolescents, future initiatives can help ensure that socioemotional development remains robust, even under constrained communication conditions.

REFERENCE

- Barrick, E. M., Thornton, M., & Tamir, D. (2021). Mask Exposure During COVID-19 Changes Emotional Face Processing. *Plos One*, 16(10), e0258470. <https://doi.org/10.1371/journal.pone.0258470>
- Blazhenkova, O., Dogerlioglu-Demir, K., & Booth, R. W. (2022). Masked Emotions: Do Face Mask Patterns and Colors Affect the Recognition of Emotions? *Cognitive Research Principles and Implications*, 7(1). <https://doi.org/10.1186/s41235-022-00380-y>
- Chester, M., Plate, R. C., Powell, T., Rodriguez, Y., Wagner, N. J., & Waller, R. (2022). The COVID-19 Pandemic, Mask-wearing, and Emotion Recognition During Late-childhood. *Social Development*, 32(1), 315–328. <https://doi.org/10.1111/sode.12631>
- Dan, O. (2020). Recognition of Emotional Facial Expressions in Adolescents With Attention Deficit/Hyperactivity Disorder. *Journal of Adolescence*, 82(1), 1–10. <https://doi.org/10.1016/j.adolescence.2020.04.010>
- Freud, E., Giammarino, D. D., & Camilleri, C. (2022). Mask-Wearing Selectivity Alters Observers' Face Perception. *Cognitive Research Principles and Implications*, 7(1). <https://doi.org/10.1186/s41235-022-00444-z>
- Fuchs, M., Kersting, A., Suslow, T., & Bodenschatz, C. M. (2024). Recognizing and Looking at Masked Emotional Faces in Alexithymia. *Behavioral Sciences*, 14(4), 343. <https://doi.org/10.3390/bs14040343>
- 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), e0262840. <https://doi.org/10.1371/journal.pone.0262840>
- Grenville, E., & Dwyer, D. M. (2022). Face Masks Have Emotion-Dependent Dissociable Effects on Accuracy and Confidence in Identifying Facial Expressions of Emotion. *Cognitive Research Principles and Implications*, 7(1). <https://doi.org/10.1186/s41235-022-00366-w>
- Gülbetekin, E., Fidancı, A., Altun, E., Er, M. N., & Gürcan, E. (2023). Effects of Mask Use and Other-race on Face Perception, Emotion Recognition, and Social Distancing During the COVID-19 Pandemic. *Asian Journal of Social Psychology*, 26(4), 445–460. <https://doi.org/10.1111/ajsp.12570>
- Hildebrandt, A., Kiy, A., Reuter, M., Sommer, W., & Wilhelm, O. (2016). Face and Emotion Expression Processing and the Serotonin Transporter Polymorphism 5-HTTLPR/Rs22531. *Genes Brain & Behavior*, 15(5), 453–464. <https://doi.org/10.1111/gbb.12295>

- Høyland, A. L., Nærland, T., Engstrøm, M., Lydersen, S., & Andreassen, O. A. (2017). The Relation Between Face-Emotion Recognition and Social Function in Adolescents With Autism Spectrum Disorders: A Case Control Study. *Plos One*, 12(10), e0186124. <https://doi.org/10.1371/journal.pone.0186124>
- Hysenaj, A., Leclère, M., Tahirbegolli, B., Kuqi, D., Isufi, A., Prekazi, L., Shemsedini, N., Maljichi, D., & Meha, R. (2024). Accuracy and Speed of Emotion Recognition With Face Masks. *Europe's Journal of Psychology*, 20(1), 16–24. <https://doi.org/10.5964/ejop.11789>
- Iffland, B., & Neuner, F. (2020). Varying Cognitive Scars – Differential Associations Between Types of Childhood Maltreatment and Facial Emotion Processing. *Frontiers in Psychology*, 11. <https://doi.org/10.3389/fpsyg.2020.00732>
- Ikeda, S. (2021). The Relationship Between Emotion Recognition From Facial Expression and Self-Constraint. *Letters on Evolutionary Behavioral Science*, 12(1), 1–6. <https://doi.org/10.5178/10.5178/lebs.2021.81>
- Jenkins, L. (2017). Does Personality Effect Facial Emotion Recognition? A Comparison Between the Older Ekman Emotion Hexagon Test and a Newly Created Measure. *Madridge Journal of Neuroscience*, 1(1), 38–46. <https://doi.org/10.18689/mjns-1000107>
- Kastendieck, T., Dippel, N., Asbrand, J., & Heß, U. (2023). Influence of Child and Adult Faces With Face Masks on Emotion Perception and Facial Mimicry. *Scientific Reports*, 13(1). <https://doi.org/10.1038/s41598-023-40007-w>
- Kuehne, M., Zaehle, T., & Lobmaier, J. S. (2021). Effects of Posed Smiling on Memory for Happy and Sad Facial Expressions. *Scientific Reports*, 11(1). <https://doi.org/10.1038/s41598-021-89828-7>
- Kulke, L., Langer, T., & Valuch, C. (2021). The Emotional Lockdown: How Social Distancing and Mask Wearing Influence Mood and Emotion Recognition. <https://doi.org/10.31234/osf.io/cpxry>
- Levitani, C., Rusk, I., Jonas-Delson, D., Lou, H., Kuzniar, L., Davidson, G., & Sherman, A. (2022). Mask Wearing Affects Emotion Perception. *I-Perception*, 13(3). <https://doi.org/10.1177/20416695221107391>
- Levy, S. (2022). Brand Bank Attachment to Loyalty in Digital Banking Services: Mediated by Psychological Engagement With Service Platforms and Moderated by Platform Types. *The International Journal of Bank Marketing*, 40(4), 679–700. <https://doi.org/10.1108/ijbm-08-2021-0383>
- 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). <https://doi.org/10.1038/s41598-021-84806-5>

- Mastorogianni, M. E., Konstanti, S., Dratsiou, I., & Bamidis, P. D. (2024). Masked Emotions: Does Children's Affective State Influence Emotion Recognition? *Frontiers in Psychology*, 15. <https://doi.org/10.3389/fpsyg.2024.1329070>
- Matsumoto, D., & Wilson, M. A. (2022). A Half-Century Assessment of the Study of Culture and Emotion. *Journal of Cross-Cultural Psychology*, 53(7–8), 917–934. <https://doi.org/10.1177/00220221221084236>
- McCrackin, S. D., Capozzi, F., Mayrand, F., & Ristic, J. (2023). Face Masks Impair Basic Emotion Recognition. *Social Psychology*, 54(1–2), 4–15. <https://doi.org/10.1027/1864-9335/a000470>
- Patel, S. E. S., Haut, K. M., Guty, E., Dodell-Feder, D., Saxena, A., Nahum, M., & Hooker, C. I. (2022). Social Cognition Training Improves Recognition of Distinct Facial Emotions and Decreases Misattribution Errors in Healthy Individuals. *Frontiers in Psychiatry*, 13. <https://doi.org/10.3389/fpsyg.2022.1026418>
- Perry, A., Saunders, S. N., Stiso, J., Dewar, C., Lubell, J., Meling, T. R., Solbakk, A., Endestad, T., & Knight, R. T. (2017). Effects of Prefrontal Cortex Damage on Emotion Understanding: EEG and Behavioural Evidence. *Brain*, 140(4), 1086–1099. <https://doi.org/10.1093/brain/awx031>
- Proverbio, A. M., & Cerri, A. (2022). The Recognition of Facial Expressions Under Surgical Masks: The Primacy of Anger. *Frontiers in Neuroscience*, 16. <https://doi.org/10.3389/fnins.2022.864490>
- Reigeluth, C. S., Pollastri, A. R., Cardemil, E. V., & Addis, M. E. (2016). “Mad Scared” Versus “I Was Sad”: Emotional Expression and Response in Urban Adolescent Males. *Journal of Adolescence*, 49(1), 232–243. <https://doi.org/10.1016/j.adolescence.2016.03.004>
- Rodger, H., Vizioli, L., Ouyang, X., & Caldara, R. (2015). Mapping the Development of Facial Expression Recognition. *Developmental Science*, 18(6), 926–939. <https://doi.org/10.1111/desc.12281>
- Ross, P., & George, E. (2022). Are Face Masks a Problem for Emotion Recognition? Not When the Whole Body Is Visible. *Frontiers in Neuroscience*, 16. <https://doi.org/10.3389/fnins.2022.915927>
- Simcock, G., McLoughlin, L. T., Regt, T. D., Broadhouse, K. M., Beaudequin, D., Lagopoulos, J., & Hermens, D. F. (2020). Associations Between Facial Emotion Recognition and Mental Health in Early Adolescence. *International Journal of Environmental Research and Public Health*, 17(1), 330. <https://doi.org/10.3390/ijerph17010330>

- Taylor, S., Barker, L., Heavey, L., & McHale, S. (2015). The Longitudinal Development of Social and Executive Functions in Late Adolescence and Early Adulthood. *Frontiers in Behavioral Neuroscience*, 9. <https://doi.org/10.3389/fnbeh.2015.00252>
- Tsantani, M., Podgajicka, 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), e0262344. <https://doi.org/10.1371/journal.pone.0262344>
- Verroca, A., Rienzo, C. M. d., Gambarota, F., & Sessa, P. (2022). Mapping the Perception-Space of Facial Expressions in the Era of Face Masks. *Frontiers in Psychology*, 13. <https://doi.org/10.3389/fpsyg.2022.956832>
- Vetter, N. C., Drauschke, M., Thieme, J. G., & Altgassen, M. (2018). Adolescent Basic Facial Emotion Recognition Is Not Influenced by Puberty or Own-Age Bias. *Frontiers in Psychology*, 9. <https://doi.org/10.3389/fpsyg.2018.00956>
- Volkaert, B., Wante, L., Wiersema, J. R., & Braet, C. (2024). Depressive Symptoms in Early Adolescence: The Dynamic Interplay Between Emotion Regulation and Affective Flexibility. *Frontiers in Psychology*, 15. <https://doi.org/10.3389/fpsyg.2024.1165995>
- Yuan, J., Ju, E., Meng, X., Chen, X., Zhu, S., Yang, J., & Li, H. (2015). Enhanced Brain Susceptibility to Negative Stimuli in Adolescents: ERP Evidences. *Frontiers in Behavioral Neuroscience*, 9. <https://doi.org/10.3389/fnbeh.2015.00098>
- Ziccardi, S., Crescenzo, F., & Calabrese, M. (2021). “What Is Hidden Behind the Mask?” Facial Emotion Recognition at the Time of COVID-19 Pandemic in Cognitively Normal Multiple Sclerosis Patients. *Diagnostics*, 12(1), 47. <https://doi.org/10.3390/diagnostics12010047>