

Review on the Relationship between Facial Features and Social Perception

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Abstract. Faces are an important visual source for individuals to make social perceptual judgments, and face features can influence others' judgments of individuals' personality traits, emotional states etc. Therefore, social perception judgment based on face features has adaptive significance. This paper firstly introduces the basic relationship between facial features and social perception and its importance in social psychology; then it reviews in detail the progress and development of domestic and international research on the influence of facial features on social perception from the aspects of biological features of faces and social features of faces, and compares the advantages and disadvantages of different methods; finally, it analyzes and looks forward to the problems and development of the influence of facial features on social perception. The effect of facial features on social perception is a complex and multilevel process, and understanding this process not only helps individuals to understand the nature of human social behavior, but also provides theoretical support for applied research in related fields.

Keywords: Facial features; social perception; social psychology; personality traits

1. Introduction

In daily human social interactions, individuals tend to form a quick first impression based on the facial appearance of strangers when they first meet them. Such first impressions typically involve inferences about others' personality traits, including trustworthiness, competence, dominance, and affinities etc. These initial judgments based on facial features are largely automatic and unconscious and have a profound effect on subsequent social behavior. Research has shown that facial features not only influence people's perceptions of others' personality traits, but also have a significant impact on a range of social decisions such as hiring, political elections, and legislative judgments [1]. Therefore, understanding the relationship between face features and social perception is not only of theoretical significance in the field of social psychology, but also provides an important reference for practical applications. With advances in cognitive science, researchers have gained a deeper understanding of the mechanisms of how facial features influence social perception. These studies have explored everything from facial recognition and emotional expression to the complex relationship between facial attributes and social attributions. Social perception judgments based on facial features have adaptive significance, and the effect of facial features on social perception is a complex and multilevel process, understanding this process helps individuals to understand the nature of human social behavior.

2. Social Perception and Research Method

"Social perception" is used to describe the mental processes of how people understand and interpret the behaviors, emotions, and intentions of others. Specifically, social perception involves the process by which individuals infer the mental states, personality traits, and social intentions of others through their appearance, speech, behavior, and other social cues. In the process of social perception, people commonly utilize non-verbal cues such as facial expressions, body language, and voice intonation, as well as verbal cues such as the content of conversations, to form an impression of others, and the study of social perception focuses on understanding the mechanisms of interaction and interaction between individuals. Research has shown that how people perceive their socialization

with others is often influenced by factors such as stereotypes, preconceived notions, and cultural background. Overall, social perception is a multilayered and complex process that is not only concerned with an individual's performance in social situations, but also has a profound impact on the interaction patterns of their group and society. In this context, the impact of facial features on social perception is particularly important, as it helps individuals to quickly assess and respond to the behavior of others.

In the research on the relationship between facial features and social perception, scholars have used a variety of approaches to explore how facial features influence people's social judgments of others [2]. These included:

Experimental method: Participants are typically asked to view a series of pictures of static or dynamic faces and make a variety of social judgments (e.g., trustworthiness, attractiveness, competence, etc.) about these faces. The researcher manipulates specific features of the faces (e.g., eye size, mouth shape, face shape) to see how these features influence participants' judgments.

Computational Generation and Manipulation: researchers use software to generate or manipulate images of faces in order to precisely control specific facial features and change factors such as gender, race, and age of faces, and then observe the effects of these changes on social perceptions.

Surveys and interviews: researchers may design surveys to assess participants' subjective perceptions of certain face features. These surveys usually contain multiple dimensions, such as attractiveness, friendliness, and trustworthiness. Quantitative data can be used for statistical analysis to explore the relationship between different features. Qualitative interviews can provide insights into participants' psychological and emotional responses when confronted with different face features. This approach enables the design of questions that reveal the unique ways in which people perceive face features in different cultural contexts and provides insights into how cultural factors influence such perceptions and is particularly illuminating in exploring the influence of cultural context on the social perception of faces.

Behavioral observation methods: some studies have observed people's responses to different face features in real social situations. This approach may include video analysis of interpersonal interactions or on-site observation of social judgments of faces in group dynamics.

3. Facial Features affecting Perceived Social Interaction in Human Societies

3.1. Gender Characteristics of Faces

Indicators of gender dimorphism are often used when it comes to the gender characteristics of faces, with gender dimorphism referring to significant differences in facial features between males and females, such as stronger jaws and brow bones in males and softer facial lines in females. The more prominent dimorphic features of the male face, such as a broad jaw and deep eye sockets, are often associated with dominance, a sensation of power, and high status. In contrast, the softer lines and smaller facial proportions of a woman's face are often associated with gentleness, compliability, and approachability. These perceptions not only reflect an individual's stereotypical view of gender roles but may also influence behavioral expectations and responses in real life social interactions. Faces with strong gender dimorphic traits frequently exhibited a tendency to polarize in affinity ratings. For example, strong dimorphic sexual traits in males, while potentially enhancing dominance, may reduce affinity in certain scenarios. In contrast, significant dimorphic traits in females are typically associated with high affinity and attractiveness [3].

Rostovtseva et al conducted a test of trust in strangers by means of survey method and behavioral observation on subjects, the number of subjects was 176, primarily Dutch students, and all subjects were within 18-30 years old range [4]. The results of the study showed that women with more feminine faces were less trusted by both males and females, and men with more masculine faces were more trusted by females but less trusted by males. The results of the study showed that the gender and gender-related facial features of the person with whom the interaction took place had a significant effect on the trust of strangers. The survey method used in this study was able to collect a large amount

of data in a relatively short period of time and is particularly suitable for large-scale research, but the questionnaire and interview data relied on participants' self-reporting, which may be affected by the social desirability effect, and participants from different cultures may interpret the questionnaire or interview questions differently, making intercultural comparisons of the data difficult. While the behavioral observation method can more realistically reflect the role of facial features in daily social interaction, the behavioral observation data may be more complex, and external variables such as cultural background, situational factors, psychological state, and dynamic changes in social interactions can be easily ignored, making it difficult to control external variables.

Van den Akker et al found that males had better social perception outcomes for strangers than females under conditions of anonymity [5]. A study by Wang et al found that, regardless of gender, positive social information significantly increased ratings of facial attractiveness, while negative information decreased attractiveness, and that masculinized traits made male faces more attractive when combined with information about competence, while female faces were more attractive when combined with information about warmth [6]. These data show the different roles of different types of social information in the relationship between gender dimorphism and facial attractiveness and reveal the complex relationship between "external beauty" and "moral values" in the evaluation of facial attractiveness, as well as suggesting the importance of avoiding simplistic role modeling in the education of adolescents and young adults. Limitations of the study include the lack of diversity in the sample and the more limited control of context in the experimental design; future research should expand the sample and consider more contextual factors to further validate these findings.

3.2. Racial Characterization of Faces

McDonald et al used a population of 64 Canadian children, including 30 females and 34 males, and the researchers differentiated between races, causing people of different races to provide false information to test the subjects [7]. The results showed that most subjects chose to trust information provided by strangers of their own race over information provided by other races. This study provides insight into children's social perceptual behaviors in different racial contexts by distinguishing facial racial features and simulates a variety of real-life situations that children may face by having people of different races provide information. This design makes the findings more relevant. Although the study was more balanced in terms of gender ratio, the total sample size was only 64 children, a sample size that limits the generalizability and statistical validity of the results. The study sample was limited to Canadian children, which makes it potentially difficult to generalize the results to children from other cultures. Race relations and trust patterns may differ significantly across cultures, and future research needs to be validated in more cultural contexts.

3.3. Age Characteristics of Faces

Li et al designed a trust test game with young participants who made investment decisions on faces of different ages through the game [8]. The experiment was divided into two parts, using different face presentation times of 2000 milliseconds and 33 milliseconds to measure participants' trust in younger and older faces, respectively. Data analysis has shown that participants were more in favor of trusting the faces of older people. The shortcomings of this study are: there are limitations in the experimental conditions and sample characteristics that may affect the generalizability of the results, so future studies should consider diverse samples and more complex contextual designs to further examine these findings. He et al tested the hypothesis that the attractiveness of faces decreases with age through empirical and computational network science methods [9]. It was found that older people were less likely than younger and middle-aged people to perceive a decrease in the attractiveness of faces, and that men perceived changes in attractiveness more clearly than women. The attractiveness of older faces was judged more in terms of "elegance" than "beauty" or "charm". When judging attractiveness, observers tended to treat older faces as a category.

3.4. Characteristics of the Five Senses of the Face

The five features of the face include symmetry and averageness, etc. symmetry and averageness are two important aesthetic indicators of facial features, which have a significant impact on face attractiveness and social perception. Symmetry refers to the perceived degree of similarity between the features on the left and right sides of the face; greater symmetry is often thought to be associated with health and genetic stability, and thus symmetrical faces are often considered more attractive and reliable. Averageness refers to the degree to which facial features resemble the average face of the population as an entirety; faces with higher averageness tend to be perceived as more beautiful because they reflect the integration and consistency of a wide range of genetic traits and reduce the presence of extreme features. Averageness is also associated with the familiarity of faces, making these faces more acceptable and trustworthy in social interactions. Together, these two characteristics influence people's first impressions of strangers, shaping judgments about their attractiveness, trust, and social value. Ryali et al. designed an experimental with the objective of investigating the effect of facial features of the five senses on social cognition, and they concluded that symmetry and averageness are the key factors influencing the attractiveness and social evaluation of faces [10]. The team used Active Appearance Modeling to simulate facial features, modeling human face space and predicting human responses with AAM, using the CFD (Chicago Face Database) dataset, which contains 597 images of faces, along with real-world experiments, which involved a total of 41 undergraduate students from the University of California, San Diego, who had an average age of 20.6 years old, of which 24 were female. Participants intuitively rated faces on four dimensions: attractiveness, trustworthiness, dominance, and positivity. The findings from the experiment showed that symmetry and averaging of facial features had a significant effect on the social cognitive evaluation of faces. Research has shown that when faces are more symmetrical and closer to the average face in terms of geometric and textural features, these faces are generally rated as more attractive, trustworthy and positive.

4. Discussion and recommendations

In studies that explore the relationship between facial features and social perception, multidisciplinary crossover and technology integration will be an important trend in future research. As neuroscience, computer science, and psychology continue to converge, researchers can leverage more advanced technological tools, such as deep learning, neural networks, and brain-computer interfaces, to analyze and model the role of facial features in different social situations. This will not only help individuals to understand more deeply how facial features influence individuals' first impressions, emotional judgments, and feelings of trust, but also enable individuals to explore universals and idiosyncrasies across cultures. At the same time, researchers will increasingly utilize emerging technologies such as virtual reality (VR) and augmented reality (AR) to more realistically simulate and manipulate social environments to improve the ecological validity of experiments. In addition, future research could pay more attention to the effects of individual differences on face perception, exploring how factors such as age, gender, and cultural background modulate the relationship between face features and social perception. Such individualized research could help reveal the unique psychological mechanisms of different populations in social interactions and provide a scientific basis for the development of individualized social interaction strategies.

The research on face features and social perception also has a promising future in practical applications. With the rapid development of artificial intelligence and face recognition technology, the application of racial profiling in the fields of security monitoring, identity authentication, and emotional computing is also promising. In addition, the role of facial features in social media and online socialization deserves to be explored in depth. In today's digital social environment, facial features may influence the shaping of personal images, trust building in social networks, and the propagation of online perceptions. With the help of big data analysis methods, researchers can study how face features in massive social media data affect online social behavior and provide theoretical

support for optimizing the design of social platforms. In conclusion, future research needs to contribute to the understanding and improvement of human social behavior in terms of technological innovation and safety.

5. Conclusion

In summary, there is a close relationship between face features and social perception. Both social and biological features of faces play a crucial role in the formation of first impressions during initial meetings and in long-term social interactions. By recognizing and interpreting subtle facial features, individuals are able to quickly determine the trustworthiness, attractiveness, competence, and other social attributes of others. These findings provide an important theoretical basis for people's understanding of the complexity of human social behavior and hold broad promise for practical applications.

The effect of facial features on social perception has been extensively studied and has demonstrated far-reaching effects. At the theoretical level, face features have provided enriched research material for the intersection of social psychology and cognitive science, as well as revealed the underlying biases and mechanisms in human social judgments. In practice, facial characterization not only helps the development of face recognition technology, but also provides powerful support for the fields of social media design, emotional computing, and identity authentication. However, as technology advances, researchers also need to facilitate research and development while paying attention to its ethical and social implications to ensure fairness and sustainability in the application of technology. Future research will continue to deepen the understanding of facial features and social perception, and promote the development of this field through multidisciplinary cooperation and innovation, contributing to the harmony and progress of human society.

References

- [1] Wang, Y., Wang, L., Liu, J., & Zhou, X. (2023). Exploring the mechanism of the effect of facial social perception on occupational matching: Experimental evidence based on the mediating role of personality inference from facial features. *Journal of Central University of Finance and Economics*, (06), 121-128. <https://doi.org/10.19681/j.cnki.jcufe.2023.06.006>
- [2] Zhou, Y., Liu, X., Feng, X., & Zhou, G. (2021). The constancy of the holistic processing of unfamiliar faces: Evidence from the study-test consistency effect and the within-person motion and viewpoint invariance. *Attention, Perception, & Psychophysics*, 83, 2174-2188.
- [3] Li, Z., & Jiang, C. (2023). Research on the effect of facial gender binarity on trait impression evaluation. *Journal of Liaoning Normal University (Social Science Edition)*, (04), 86-91. <https://doi.org/10.16216/j.cnki.lsxbwk.202304086>
- [4] Rostovtseva, V. V., Butovskaya, M. L., Mezentseva, A. A., & Weissing, F. J. (2023). Effects of sex and sex-related facial traits on trust and trustworthiness: An experimental study. *Frontiers in Psychology*, 13, 925601.
- [5] Van Den Akker, O. R., van Assen, M. A., Van Vugt, M., & Wicherts, J. M. (2020). Sex differences in trust and trustworthiness: A meta-analysis of the trust game and the gift-exchange game. *Journal of Economic Psychology*, 81, 102329.
- [6] Wang, X., Liu, S., Han, S., Gan, Y., Li, W., Xu, Q., & Zhang, L. (2020). Roles of social knowledge and sexual dimorphism in the evaluation of facial attractiveness. *Journal of Experimental Social Psychology*, 88, 103963.
- [7] McDonald, K. P., & Ma, L. (2016). Preschoolers' credulity toward misinformation from ingroup versus outgroup speakers. *Journal of Experimental Child Psychology*, 148, 87-100.
- [8] Li, Y., Chen, Z., Liu, X., & Qi, Y. (2022). Perceiving the facial trustworthiness: Facial age, emotional expression, and attractiveness. *Quarterly journal of experimental psychology*, 75(5), 818-829.
- [9] He, D., Workman, C. I., Kenett, Y. N., He, X., & Chatterjee, A. (2021). The effect of aging on facial attractiveness: An empirical and computational investigation. *Acta Psychologica*, 219, 103385.

- [10] Ryali, C. K., Goffin, S., Winkielman, P., & Yu, A. J. (2020). From likely to likable: The role of statistical typicality in human social assessment of faces. *Proceedings of the National Academy of Sciences*, 117(47), 29371-29380.