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The Processing of Facial Expressions in Social Anxiety Disorder: A Research

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Abstract. Social Anxiety Disorder (SAD) is widely recognized as a common and debilitating mental health condition, particularly among young adults navigating complex social environments. A substantial body of prior research has thoroughly investigated how individuals with SAD process facial expressions, given that these non-verbal cues serve as a core channel for emotional exchange and social signaling in daily interactions. However, the vast majority of laboratory studies in this area rely on static and isolated facial pictures as experimental stimuli. These simplified materials, while controlled, cannot adequately simulate the dynamic, multi-modal, and context-rich nature of authentic social encounters. This significant methodological gap may inadvertently restrict our full understanding of the cognitive and behavioral symptoms of social anxiety, potentially introducing uncertainties into clinical intervention practices. Consequently, the field urgently requires more ecologically valid experimental paradigms, such as immersive virtual reality environments. By conducting research within realistic social contexts, researchers can more effectively reveal the nuanced cognitive characteristics of SAD and subsequently promote the development of more targeted.

Keywords: Social Anxiety Disorder, facial expression processing, attentional bias, ecological validity

1. Introduction

Social Anxiety Disorder (SAD), also known as social phobia, is a widespread mental health condition worldwide. According to DSM-5-TR, SAD is defined by persistent intense fear of social situations where individuals may be judged and evaluated by others [1]. People with SAD constantly worry about inappropriate performances, visible anxiety symptoms and embarrassing expressions, which may result in social rejection and negative assessments.

Previous studies have explored facial expression processing among people with SAD, yet most laboratory studies adopt static isolated facial stimuli, failing to reflect authentic social interactions. For instance, a systematic review noted that using only static expressions in eye-tracking research is an important limitation that reduces the ecological validity of findings [2]. In response, recent studies have begun employing dynamic facial stimuli, as they are considered to have higher ecological validity and can provide a better understanding of emotional face processing in individuals with high social anxiety [3].

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This paper adopts a literature review approach to summarize relevant research findings and analyse inherent limitations of traditional research paradigms. It highlights that exploring ecologically valid experimental designs can deepen our understanding of cognitive mechanisms behind SAD. Such findings can offer scientific references for clinical psychological assessment, and support the development of more effective intervention strategies to relieve social anxiety distress among young groups.

2. Literature review

2.1. Causes and risk factors of SAD

2.1.1. Causes

The development of SAD is influenced by multiple factors, including genetics, brain function, thinking patterns, and life experiences.

Genetic and Biological Factors. Research has shown that SAD tends to run in families. First-degree relatives of people with SAD are 2 to 6 times more likely to develop the disorder compared to the general population [4]. This suggests that genetics play a significant role.

At the brain level, studies using neuroimaging have found that individuals with SAD show heightened activity in brain regions associated with fear and threat detection, such as the amygdala and insula [5]. This overactivation may explain why people with SAD experience intense fear even in mildly threatening social situations. Their brains are essentially "over-responding" to social cues that others might find neutral or only slightly concerning.

From the perspective of cognitive psychology. From a psychological perspective, certain thought patterns are central to SAD. Two key concepts are Fear of Negative Evaluation (FNE) and Fear of Positive Evaluation (FPE) [6]. FNE refers to the fear that others will judge one negatively, while FPE involves discomfort with positive feedback because it might raise others' expectations. People with SAD tend to pay excessive attention to their own behavior, overestimate how noticeable their anxiety is to others, and assume the worst about how they are being perceived.

With regard to avoidance behavior, when a person with SAD avoids a feared social situation, their anxiety decreases in the short term, which makes avoidance feel rewarding. However, in the long run, avoidance prevents them from learning that the situation might not be as dangerous as they fear. This creates a cycle where fear is maintained and strengthened over time [7]. For example, a student who avoids giving a class presentation never has the chance to discover that their classmates are not actually judging them harshly.

2.1.2. Risk factors

Additionally, certain temperamental traits present from early childhood, such as behavioral inhibition—which refers to a tendency to withdraw from unfamiliar people or situations—have been identified as early risk factors. Children who display high levels of behavioral inhibition are more likely to develop social anxiety during adolescence [5].

From the perspective of environmental factors, Early life experiences also contribute to the development of SAD. Experiences such as being bullied, being rejected by peers, or growing up in a family with low emotional warmth are associated with a higher risk of SAD. Overprotective parenting, where parents excessively shield children from challenges, may also increase vulnerability because children do not learn how to cope with social difficulties on their own [5].

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2.2. Facial expression processing in SAD

A substantial body of research has investigated how individuals with SAD process facial expressions. The general finding is that people with SAD show differences in attention to and interpretation of emotional faces, particularly those that signal threat or negative evaluation.

One such cognitive bias is attentional bias. Studies have found that individuals with SAD tend to pay more attention to negative facial expressions, especially angry faces, compared to neutral or positive expressions. This hypervigilance to threat cues is thought to be a key feature of SAD [6]. However, findings are not entirely consistent. Some research suggests that after the initial hypervigilance, individuals with SAD may actually avoid looking at threatening faces, a pattern called "vigilance-avoidance." This mixed pattern may reflect different stages of information processing.

The other type is interpretation biases. Beyond just paying more attention to negative faces, people with SAD also tend to interpret ambiguous or neutral expressions more negatively. For example, they may interpret a neutral facial expression as indicating disapproval or anger, even when no such emotion is present. This interpretive bias can lead to misunderstandings in social interactions and reinforce fears of negative evaluation. Research has shown that when asked to rate the emotional intensity of faces, individuals with SAD often rate neutral faces as more negative than non-anxious individuals do [6].

Despite the valuable findings from existing studies, there is a major limitation: most research has used static, isolated face images presented on computer screens. Participants are typically asked to view these images and perform tasks such as identifying the emotion or pressing a button to indicate whether the face is male or female. While this approach allows for precise experimental control, it may not capture how individuals process facial expressions in real-life social interactions.

In real social situations, facial expressions occur in context—they are part of dynamic, ongoing interactions where other cues (tone of voice, body language, and the situation itself) also matter. Furthermore, social situations inherently involve the possibility of being evaluated, which is exactly what individuals with SAD fear most. When participants view isolated faces in a lab, they may process them as "pictures" rather than as "people," potentially reducing the anxiety and interpretative biases that would occur in a real encounter. This raises an important question: It remains unclear whether the facial expression processing differences observed in laboratory studies can truly represent how people with SAD process expressions in their everyday lives.

2.3. Recent advances and the need for more ecologically valid research

Some recent studies have begun to address this limitation by using more realistic experimental paradigms. For example, researchers have used video clips instead of static images, incorporated social context into stimuli, or used immersive technologies such as virtual reality [8]. These approaches have shown that contextual factors can significantly influence how individuals with social anxiety process social information [8]. For instance, found that individuals with social anxiety responded differently when they believed they were interacting in a real social scenario compared to when they were simply viewing pre-recorded materials.

These findings suggest that the contextual deprivation of traditional laboratory tasks may be hiding the full extent of facial expression processing difficulties in SAD. If processing biases are amplified in realistic social situations—which is precisely where they cause the most harm—then current understanding of SAD may be incomplete. This is an important knowledge gap because treatments and interventions are often based on theoretical models derived from laboratory studies.

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If these models do not fully capture the reality of SAD, interventions may be less effective than they could be.

Therefore, more research is needed that uses ecologically valid experimental paradigms to examine facial expression processing in SAD. Such research would provide a more accurate picture of the cognitive biases that characterize the disorder and could inform the development of more effective assessment tools and interventions. Virtual reality, in particular, offers a promising avenue because it can simulate realistic social situations while still maintaining experimental control [9] .

3. Discussion and theoretical implications

A variety of treatment approaches have been developed in clinical psychology for social anxiety disorder, including cognitive behavioral therapy, medication, ecological assessment and virtual-reality-assisted intervention.

Cognitive behavioral therapy (CBT) serves as the mainstream treatment for SAD at present. It helps patients adjust negative automatic thoughts and reduce avoidance behaviours. Exposure therapy, as a core component of CBT, assists individuals in gradually adapting to feared social scenes. In addition, medication can be adopted as auxiliary treatment for severe symptoms. For future intervention development, ecological assessment and virtual reality-based social exposure programmes are promising approaches.

Ecological assessment breaks the limitations of traditional laboratory testing. It collects emotional processing data in natural daily social scenarios rather than isolated static facial pictures. It can objectively capture how individuals with SAD process facial expressions in real interpersonal interactions, which helps clinicians obtain more authentic cognitive features and formulate targeted intervention plans.

Virtual reality (VR) social exposure programmes construct immersive, controllable social scenes. Therapists can create various social situations such as class presentations and group conversations. Individuals with SAD can gradually complete social tasks in the virtual environment and practice recognizing and interpreting facial expressions. This technology reduces the extreme anxiety caused by real social interactions, and the trained social skills can be transferred into real-life contexts

4. Limitation and future direction

4.1. Limitation

One core limitation of existing research lies in the inconsistent transformation from laboratory findings to real-world support services. Although an increasing number of scholars have recognized the low ecological validity of static face stimuli and proposed dynamic experimental designs, most studies remain confined to mechanism exploration [10]. Limited attempts have been made to translate laboratory discoveries of attentional and interpretation biases into operable clinical intervention services. There remains a clear disconnect between basic cognitive research and practical psychological support for young adults with SAD.

Besides, current research rarely explores long-term developmental trajectories of facial expression processing biases. Most existing investigations adopt cross-sectional designs, which cannot clarify how such cognitive biases change alongside adolescent social experience and life pressure [11].

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4.2. Future direction

From a clinical psychology perspective, future research is supposed to narrow the gap between basic research and clinical practice. Researchers may combine ecological assessment and VR social exposure resources to build standardized treatment procedures, which can be continuously refined according to real-world clinical feedback and systematically validated among young-adult participants prior to large-scale application [12].

Besides these two approaches, experience-sampling surveys that collect participants' in-the-moment social-emotional data and naturalistic field observation in daily settings can also be applied to obtain real-world evidence. Meanwhile, longitudinal studies can be carried out to track developmental features of social anxiety symptoms. This long-term repeated-measurement design enables researchers to record dynamic shifts in cognitive biases over time, overcoming the limitation of cross-sectional studies that only capture temporary mental states at one testing point. In addition, more efforts should be devoted to exploring home-school-community integrated support modes, so that scientific research achievements can provide practical guidance for multi-system social intervention. This collaborative mechanism delivers consistent psychological support from family guidance, school counselling and community mental health services, constructing a long-term supportive network for young individuals suffering from social anxiety in their daily live.

5. Conclusion

This study aimed to investigate facial expression processing characteristics among individuals with SAD and existing research gaps in this research domain. The findings indicate that people with SAD demonstrate two core cognitive biases during social interactions, including attentional bias and interpretation bias towards emotional facial expressions. The analysis revealed that traditional laboratory paradigms mainly rely on static isolated facial stimuli, which are insufficient to reflect individuals' real-life facial expression processing patterns. This supports the initial hypothesis that traditional experimental designs lack ecological validity, and dynamic social contexts should be integrated into relevant research.

This research contributes to the existing body of knowledge by systematically sorting out the cognitive processing mechanisms of facial expressions in SAD. The findings extend previous theories by providing evidence that laboratory cognitive results cannot be directly applied to real social scenes. It offers references for constructing ecological assessment tools and targeted intervention programmes.

One potential limitation is that this paper adopts a literature review approach without empirical data collection, which may affect the generalisability of the findings. This issue could be addressed in future research.

Future study could focus on carrying out dynamic social simulation experiments to verify the processing characteristics of facial expressions in authentic social interactions. In the future, researchers will further explore the long-term developmental trajectories of social anxiety-related cognitive biases.

Overall, this study provides new insights into social cognitive mechanisms of SAD and highlights the importance of developing ecologically valid research designs. By shedding light on the practical transformation of laboratory findings, this research paves the way for home-school-community integrated psychological support services for young people with social anxiety.

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References

[1] American Psychiatric Association. (2022). *Diagnostic and statistical manual of mental disorders* (5th ed., text rev.). American Psychiatric Association Publishing.

[2] De Oliveira, L. A. B., & De Sousa, M. B. C. (2019). Facial expressions and eye tracking in individuals with social anxiety disorder: A systematic review. *Psicologia: Reflexão e Crítica, 32*(1), Article 16. https://doi.org/10.1186/s41155-019-0133-8

[3] Zhang, X., & Wang, Y. (2022). The recognition of dynamic-emotional faces in individuals with high and low social anxiety: An ERP study. *Neuroscience Letters, 787*, Article 136916. https://doi.org/10.1016/j.neulet.2022.136916

[4] National Institutes of Health. (2022). Social anxiety disorder. In *StatPearls*. StatPearls Publishing. https://www.ncbi.nlm.nih.gov/books/

[5] Institute of Psychology, Chinese Academy of Sciences. (2015). Abnormal facial expression processing in individuals with social anxiety and its cognitive mechanisms. *Advances in Psychological Science, 23*(12), 2078–2091.

[6] Weeks, J. W., & De Los Reyes, A. (2025). The bivalent fear of evaluation model of social anxiety: The state of the science and future directions. *Journal of Anxiety Disorders, 110*, Article 102945. https://doi.org/10.1016/j.janxdis.2025.102945

[7] Centre for Addiction and Mental Health. (2017). Social anxiety disorder. *Centre for Addiction and Mental Health*.

[8] Jiang, X. L., & Ku, Y. (2025). Digital healing and scenario adaptation: A case study based on the Douban social skills rehabilitation group. *Journalism & Communication Review, 78*(6), 88–99.

[9] Mayo Clinic. (n.d.). Social anxiety disorder (social phobia): Diagnosis and treatment. Retrieved June 11, 2026, from https://www.mayoclinic.org/

[10] Peschard, V., & Philippot, P. (2016). Social anxiety and interpretation biases of facial expressions: A meta-analytic review. *Clinical Psychology Review, 47*, 1–14.

[11] Chen, B. Z., Huang, X., Niu, G. F., Sun, X. J., & Cai, Z. H. (2023). Developmental trajectories and stability of social anxiety from toddler hood to young adulthood: A three-level meta-analysis of longitudinal studies. *Acta Psychologist Sinica, 55*(10), 1621–1636.

[12] Morina, N., Kampmann, I. L., & Emmelkamp, P. M. G. (2023). Virtual reality exposure therapy for social anxiety disorder: A systematic review and meta-analysis. *Journal of Anxiety Disorders, 94*, 102681.