A Study on the Correlation between College Students' Social Anxiety and Mental Health Education Intervention

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Abstract: *The maintenance mechanism of social anxiety in college students involves the attentional vigilance for threat cues, the recursive reinforcement of negative self-representation and fear of evaluation, and the catalytic effect of social comparison tendencies. These three elements collectively constitute the systematic operation of cognitive processing biases. Based on this, mental health education intervention corrects maladaptive beliefs through cognitive restructuring training, regulates the extinction gradient of avoidance behaviors via exposure hierarchy design, and activates the conditional effectiveness of acceptance and commitment techniques within group interaction contexts. Further analysis reveals a dynamic adaptive relationship between the severity of social anxiety and the intensity of the intervention. Metacognitive monitoring deficits can serve as a predictive indicator of intervention sensitivity, and the timing of the educational intervention exerts a blocking effect on the chronic progression of symptoms. The elucidation of these three sets of correlative mechanisms provides a theoretical basis for constructing stratified and temporally sensitive intervention strategies.*

Keywords: *College Students' Social Anxiety; Mental Health Education Intervention; Cognitive Processing Bias; Metacognitive Monitoring; Intervention Timing*

Introduction

The core features of college students' social anxiety manifest as attentional vigilance for social threat cues, the recursive reinforcement of negative self-representation, and the catalytic maintenance of anxiety states through social comparison. Existing intervention studies mostly focus on the validation of single-technique effects, and they rarely elucidate the structural correlation between the cognitive characteristics of social anxiety and the educational intervention pathways at the mechanistic level. This study incorporates attentional bias, metacognitive monitoring, exposure gradient modulation, and the activation conditions of acceptance and commitment techniques into a unified analytical framework, and it reveals three interrelated mechanisms: intervention intensity adaptation, sensitivity prediction, and timing blockade. Understanding the above micro-level cognitive operations can help avoid the disconnect between intervention methods and the variables that maintain anxiety, thereby enhancing the targeted efficiency of educational interventions. Based on this, the present study starts from cognitive processing biases, constructs a theoretical framework for mental health education intervention, and proposes an analysis of the correlative mechanisms, in order to provide a theoretical reference for precise educational interventions for college students' social anxiety.

1. Cognitive Processing Biases of Social Anxiety and the Susceptibility of College Student Population

1.1 The Attentional Vigilance Mechanism for Threat Cues in Social Situations

College students tend to produce preferential attentional capture for potential negative signals such as others' facial expressions, tonal changes, and body movements in social scenes. This attentional vigilance manifests as a rapid orienting response to ambiguous social stimuli, and its cognitive basis lies in the processing advantage of threat-related stimuli in visual search. Eye-tracking studies show that highly socially anxious individuals exhibit a reduced difference in gaze duration between neutral faces and angry faces when they face group scrutiny, which indicates a lowered threshold for potential evaluative cues. This mechanism is associated with the automatic activation of the amygdala in

response to social threat signals. Even at a non-conscious level, threatening faces can evoke stronger late positive potentials in electroencephalography.

The sustained operation of attentional vigilance consumes limited cognitive resources, and it consequently impairs the efficiency of information integration among college students during social interactions. When individuals repeatedly allocate attentional resources to irrelevant threat cues, their encoding capacity for task-relevant social information (such as conversation content and situational rules) becomes inhibited. This mismatched pattern of attentional resource allocation creates an operational condition: vigilance itself does not generate anxiety, but the attentional fixation that cannot disengage from threat cues leads to an increase in subjective discomfort. Furthermore, attentional vigilance exhibits a negative correlation with inhibitory control within executive functions. College students with low inhibitory control capacity have greater difficulty in disengaging from threat cues, thereby amplifying the subjective threat level of social situations[1].

1.2 The Recursive Reinforcement Pathway of Negative Self-Representation and Fear of Evaluation

Negative self-representation refers to an individual's stable negative cognitive structure regarding his or her own social competence, attractiveness, and acceptability, and it usually exists in the form of conditioned self-schemas. The college student stage involves the reconstruction of role identity, and the weight of peer evaluation increases significantly. This makes negative self-representation more easily activated by micro-feedback in social situations. Once activated, this representation guides the individual toward a negative interpretation bias of others' reactions, such as interpreting a polite smile as mockery. This interpretive process directly generates fear of evaluation, which is an anticipatory anxiety about the possibility of negative judgments from others. The fear of evaluation, in turn, prompts the individual to engage in safety behaviors (such as avoiding eye contact and shortening speech), and these behaviors are often perceived by others as aloofness or lack of confidence, thereby inducing actual negative feedback.

The receipt of negative feedback further reinforces the original negative self-representation, and this forms a self-fulfilling recursive cycle. Within this recursive pathway, college students begin to internalize social failure as a confirmation of their own traits, while they ignore the possibility of situational attributions. Neuroimaging evidence indicates that when highly socially anxious individuals anticipate negative evaluation, the activation levels of the anterior cingulate cortex and the insula increase, and these brain regions are associated with emotional pain and error monitoring. The recursive reinforcement is not only manifested at the cognitive level, but it also appears as an excessive sensitivity of the behavioral inhibition system, which reduces individuals' motivation to explore social situations. Ultimately, negative self-representation evolves from a state-dependent pattern to a cross-situational habitual thinking pattern, and it becomes a cognitive trigger for the spontaneous activation of fear of evaluation.

1.3 The Catalytic Effect of College Students' Social Comparison Tendency on the Maintenance of Anxiety

College students are in a stage characterized by dense social networks and the lack of solidified role norms, and their upward social comparison tendency is particularly prominent. In dimensions such as academic ability, physical attractiveness, and social popularity, college students frequently compare themselves with their peers. Compared with the general population, the reference groups that college students encounter are more homogeneous and visible in daily life, which makes the comparison results more likely to trigger self-deprecation. Individuals with social anxiety tend to selectively focus on the dimensions in which they are at a disadvantage in the comparison, and they overestimate the positive degree of others' performance. This asymmetrical comparative processing amplifies the doubt about their own social performance, and it prolongs the initially transient anxiety reaction to a duration of several hours or even days after the comparison.

The catalytic effect of social comparison tendency on anxiety does not directly generate anxiety; instead, it achieves this effect by disrupting the natural extinction process of existing cognitive interventions. When an individual gains a temporary enhancement of self-efficacy through a successful social interaction, a subsequent upward comparison can completely offset this psychological gain. The relative deprivation triggered by the comparison prompts the individual to reactivate the negative memory network, and it superimposes past social failure experiences with the current comparison results to form a compound chain of evidence. In the context of social media use, the selectively edited

display of others' lives further distorts the baseline of comparison, and it shifts the evaluation criteria that college students apply to their own real social performance. This catalytic effect ultimately manifests as an abnormal phenomenon in which the anxiety level does not decrease with an increase in the number of exposures, meaning that the expected effect of exposure therapy is blocked by the self-evaluation update driven by social comparison[2].

2. The Theoretical Framework and Action Pathways of Mental Health Education Intervention

2.1 The Logic of Correcting Maladaptive Beliefs through Cognitive Restructuring Training

Maladaptive beliefs in college students' social anxiety manifest as catastrophic expectations of social consequences and an underestimation of their own coping abilities. Cognitive restructuring training prompts individuals to re-calibrate their original cognitive appraisals by guiding them to examine the strength of the evidence supporting their negative beliefs. The core mechanism of this process lies in the search for counterevidence during belief updating: individuals are required to systematically seek social feedback information that contradicts their existing negative expectations. For example, when a student holds the belief that "I will definitely be laughed at when I speak," the restructuring training prompts him or her to recall the proportion of instances in past speeches in which he or she was not laughed at, thereby exposing the mismatch between the belief and the objective frequency. This corrective logic relies on the enhancement of metacognitive awareness, that is, shifting from "being immersed in the content of the belief" to "observing the formation process of the belief"[3].

The sustained operation of the corrective logic requires the establishment of a system for generating and evaluating alternative explanations. During the training process, college students gradually learn to propose multiple possible attributions for the same social event, and they compare these attributions along the probability dimension. This process weakens the dominant position of a single catastrophic explanation, and it simultaneously activates contextual compensatory information that had previously been ignored. The correction of maladaptive beliefs through cognitive restructuring does not eliminate the belief; rather, it changes the belief's confidence weight and its behavioral guidance function. When an individual can hold both the original belief and an alternative explanation, and can retrieve the more adaptive version in different situations, the cognitive triggering basis of anxiety undergoes a structural reorganization. This corrective logic does not rely on exposure to real social threats; instead, it accomplishes cognitive immunization through linguistic and logical operations, and it is suitable for educational situations in which direct exposure cannot be implemented.

2.2 The Modulation of the Extinction Gradient of Avoidance Behavior through Exposure Hierarchy Design

Avoidance behavior is the core operant variable that maintains college students' social anxiety, and its extinction depends on the hierarchical design of gradual exposure. The exposure hierarchy uses subjective units of discomfort as a quantitative index, and it arranges social situations in a stepwise manner from low threat (such as a brief greeting with an acquaintance) to high threat (such as impromptu speaking in a group). Each level of exposure requires the individual to remain in the situation after the urge to avoid is triggered until the discomfort naturally decreases. The modulation of the extinction gradient in this process is reflected in two dimensions: the optimization of step size between levels and the control of dwell time within a level. A step size that is too large induces escape behavior, while a step size that is too small fails to activate the anxiety response, and both conditions weaken the extinction effect. Research indicates that an individually adjusted gradient step size can increase the speed of extinction of avoidance behavior, and the extinction effect shows cross-situational generalizability.

Another key mechanism of extinction gradient modulation is the accumulation of inhibitory learning across the exposure hierarchy. When college students complete an exposure at a given level and the expected catastrophic consequence does not occur, the originally conditioned fear association linked to the social situation is inhibited by a new safety memory. This inhibition does not erase the original fear association; rather, it establishes a competing memory trace across different hierarchy levels. As the exposure hierarchy ascends, the retrieval advantage of the safety memory gradually strengthens, and this enables individuals to preferentially activate non-fear responses even in high-threat situations. The exposure hierarchy design also needs to consider the prevention of relapse of extinction, that is, through variable-level review training to block spontaneous recovery. The essence of

gradient modulation is to transform the operant condition of avoidance behavior into a reinforcement condition for approach behavior, and it shifts college students from "avoiding discomfort" to "tolerating discomfort and then obtaining social feedback information"[4].

2.3 The Activation Conditions of Acceptance and Commitment Techniques in Group Interaction Contexts

The effectiveness of acceptance and commitment techniques in the intervention of college students' social anxiety depends on specific activation conditions within group interactions. The primary condition is the symmetry of self-disclosure among group members. That is, when an individual perceives that others also report experiences related to social anxiety, the cognitive defusion function of acceptance and commitment techniques is more easily initiated. In a symmetrical disclosure atmosphere, college students are more likely to view their negative self-evaluations as "observable content" rather than "undeniable facts." The multiple perspectives provided by the group context enable individuals to simultaneously receive diverse interpretations of the same social event from different members, and this enhancement of psychological flexibility serves as the foundation for the effectiveness of acceptance techniques. In the absence of symmetrical disclosure, acceptance instructions may be experienced as ineffective cognitive preaching.

The second activation condition is the value clarification conflict generated within group interactions. Acceptance and commitment techniques require individuals to distinguish between "avoidance goals" and "value-driven goals," and the immediate feedback from others in a group context can create the cognitive dissonance necessary for this distinction. For example, when a college student claims to want to make friends but consistently avoids group discussions, the non-judgmental feedback from group members prompts the individual to perceive the discrepancy between his or her behavior and values. This awareness is difficult to generate spontaneously in individual intervention, and it requires the mirroring function provided by group interactions to be realized. Furthermore, the predictable structure of the group (such as fixed interaction rounds and clear turn-taking rules) reduces situational uncertainty, and it provides a safe foundational stimulus field for expansion exercises within acceptance techniques. When the above activation conditions are met, the core mechanisms of acceptance and commitment techniques — namely, the dissolution of cognitive fusion and the establishment of committed action — can then form an effective association with the maintenance variables of college students' social anxiety.

3. Analysis of Correlative Mechanisms and the Positioning of Educational Intervention Targets

3.1 The Dynamic Adaptive Relationship between the Severity of Social Anxiety and the Intensity of Intervention

The severity of social anxiety in college students presents a continuous distribution characteristic ranging from subclinical symptoms to meeting the clinical threshold, and this distribution difference directly determines the individual's differentiated need for intervention intensity. Individuals with mild social anxiety primarily exhibit situational selective avoidance, and their cognitive schemas are not yet fully solidified. Lower-frequency metacognitive guidance or simplified cognitive restructuring can produce measurable symptom relief in these individuals. Moderate to severe individuals show cross-situational functional impairment, accompanied by the automatic activation of negative self-representation and the widespread use of safety behaviors. Such individuals require higher-frequency intervention contacts and the coordinated application of multiple technical modules. Research indicates that when the intervention intensity falls below the adaptive threshold for the symptom severity, individuals may experience a therapeutic deterioration effect, which manifests as an enhanced negative belief about the intervention itself. Conversely, when the intensity is too high, it may induce defensive resistance and inhibit the depth of information processing[5].

The establishment of a dynamic adaptive relationship requires the real-time monitoring of the fluctuation trajectory of anxiety severity rather than relying on a single baseline assessment. College students' social anxiety is influenced by academic cycles, social density, and changes in living environments, and its severity exhibits significant temporal variation. An adaptive intervention system should adjust subsequent intensity parameters based on prior intervention feedback. For example, when an individual shows no symptom change after completing low-intensity cognitive training, the system should automatically switch to exposure hierarchy training instead of repeating the original protocol.

The core logic of this adaptive relationship lies in treating intervention intensity as a function of symptoms rather than as a fixed prescription, while simultaneously regarding symptom change as a feedback signal for intervention intensity, thereby forming a bidirectional regulatory loop. This mechanism challenges the traditional fixed-dose intervention model, and it indicates that educational interventions for social anxiety need to construct individualized intensity algorithms.

3.2 Metacognitive Monitoring Deficit as a Predictive Indicator of Intervention Sensitivity

Metacognitive monitoring deficit manifests as a bias in the judgment of the accuracy of one's own cognitive activities, including overestimation or underestimation of memory reliability, interpretational fairness, and attentional allocation efficiency. Highly socially anxious individuals tend to underestimate their own actual performance while overestimating the visibility of their anxiety reactions, and this prevents them from updating their negative self-beliefs even after actual successful experiences. This deficit emerges prior to the onset of symptoms and exhibits cross-situational stability. Research indicates that individuals with lower monitoring accuracy show significantly weaker responses to standardized cognitive restructuring training compared to the normal monitoring group, and this suggests that the monitoring deficit serves as a moderating variable for intervention effects.

Incorporating the metacognitive monitoring deficit into the assessment system of intervention sensitivity enables stratified matching for different individuals. For individuals whose primary deficit is an overestimation bias in monitoring (that is, an excessive certainty in the accuracy of their own negative judgments), they preferentially require metacognitive awareness training rather than belief modification at the content level. For individuals whose primary deficit is an underestimation bias in monitoring (that is, an inability to recognize the abnormality of their own anxiety signals), they require explicit feedback to calibrate their monitoring scale. During the intervention process, the degree of improvement in the monitoring deficit can serve as a surrogate indicator for early efficacy prediction, and it appears earlier than changes in symptom scale scores. Furthermore, a positive association exists between the enhancement of monitoring accuracy and the long-term maintenance effect of the intervention, indicating that the metacognitive monitoring deficit not only predicts initial response but also predicts the susceptibility to symptom relapse. The application of this predictive indicator can avoid the equal distribution of intervention resources, and it can instead focus these resources on the subgroups with the most significant impairment in monitoring function.

3.3 The Blocking Effect of Educational Intervention Timing on the Chronicity Process of Symptoms

College students' social anxiety has an identifiable turning window for evolving from an episodic state to a chronic stable state, and this window roughly corresponds to the six to twelve months following the first appearance of symptoms. Implementing an educational intervention within this window can take advantage of the neuroplasticity condition in which cognitive schemas have not yet become solidified, and it can interfere with the consolidation process of negative memories. The blocking effect of early intervention manifests as preventing the expansion of situational avoidance into generalized avoidance and inhibiting the penetration of anticipatory anxiety into daily activities. After intervention is delayed to the chronic stage, social anxiety has already developed into an independent maintenance system, including automatic attentional bias, a solidified safety behavior repertoire, and cumulative functional impairment. At this stage, intervention requires the mobilization of more resources but yields diminishing effects[6].

The mechanism of the timing effect involves memory reconsolidation and habituation learning. In the early stage of symptom formation, negative reinforcement after each anxiety episode strengthens the operant conditioning link of avoidance behavior, and early intervention can prevent this process through exposure. After symptom chronicity, anxiety and avoidance form an excessive association, and simple exposure blocking is difficult to reach the deep anticipatory processing network. The timing of educational intervention also needs to consider natural developmental nodes such as the school adjustment period, the internship transition period, and the graduation job-seeking period, as the environmental transitions during these periods can serve as opportunities for change. For the chronicity group, although the timing blocking effect is weakened, it does not disappear. Extending the intervention window and implementing higher-density consolidation training can still achieve partial symptom reversal, but the cost is significantly higher than that of early intervention.

Conclusion

The correlation between college students' social anxiety and mental health education intervention can be integrated from three levels: cognitive susceptibility, intervention action pathways, and dynamic regulatory mechanisms. At the level of cognitive susceptibility, attentional vigilance, negative self-representation, and social comparison tendency are nested within one another, and they form an anxiety maintenance system that transcends simple fear conditions. This requires educational intervention to restructure cognitive schemas rather than merely alleviate symptoms. At the level of action pathways, cognitive restructuring, exposure hierarchy design, and group-based acceptance and commitment techniques provide operational tools for belief correction, behavioral extinction, and psychological flexibility respectively, and their common feature lies in achieving cognitive immunization through linguistic and situational simulation. At the level of dynamic regulation, intervention intensity needs to be adapted in real time to symptom severity, the metacognitive monitoring deficit can serve as a stratified predictive indicator, and a timing blocking effect exists within the window of symptom chronicity. Future research may explore the development of adaptive intervention algorithms, the construction of behavioral marker systems for metacognitive monitoring deficits, the cumulative blocking effects of different timing combinations of intervention on the chronicity process, and the dose effects of activation conditions for acceptance and commitment techniques in group contexts. In-depth investigation of these directions will help promote a paradigm shift in educational intervention from generic protocols to individualized timing strategies.

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