Available Online: 8 September 2025 DOI: 10.54254/2753-7102/2025.26673

The impact of life events on adolescent anxiety disorders in China and their treatment

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Abstract. This study examines the impact of life events on anxiety disorders among Chinese adolescents and explores intervention strategies. In recent years, adolescent anxiety has shown a global upward trend, with a significant surge during the COVID-19 pandemic. Research indicates that negative life events (e.g., academic pressure, interpersonal conflicts) are critical external factors triggering adolescent anxiety, exhibiting a significant positive correlation with anxiety levels. Additionally, biological mechanisms (e.g., amygdala hyperactivation, γ-Aminobuty Acid (GABA) dysfunction) and psychological traits (e.g., high neuroticism) constitute intrinsic vulnerability factors. Problematic smartphone use and cultural specificity (e.g., Confucian influences) further exacerbate the persistence of anxiety. Conversely, robust family functioning and social support serve as protective factors, effectively mitigating anxiety. Therapeutically, integrating Cognitive Behavioral Therapy (CBT) with music therapy significantly reduces anxiety levels, while mindfulness-based interventions also demonstrate notable efficacy. Future research should further investigate gender, cultural, and regional disparities to optimize interventions.

Keywords: life events, anxiety disorders, adolescents, cognitive behavioral therapy

1. Introduction

In the 21st century, rapid lifestyles and intense pressures have made psychological stress and mental health issues prevalent globally. Adolescents, undergoing unique developmental transitions, face substantial psychological challenges that have garnered widespread concern. Recent studies indicate that 10%-20% of adolescents worldwide experience mental health issues, with anxiety ranking as the third most common disorder [1, 2]. Untreated anxiety not only impairs physical and mental health and academic performance but may also escalate into severe psychological conditions. Life events, as psychosocial stressors, can induce negative emotions such as anxiety and depression [3]. Evidence confirms a significant correlation between negative life events and anxiety, with such events directly influencing anxiety severity [4]. According to the diathesis-stress model, anxiety arises from the interplay of biological/personality vulnerabilities and external events. This model posits that specific predispositions activate under certain environments, leading to pathological anxiety [5].

This paper analyzes the formation and maintenance of adolescent anxiety through the lens of personal traits and external stressors, while exploring resources and interventions to inform prevention and treatment strategies.

2. Epidemiology of anxiety disorders

Anxiety disorders are prevalent mental health conditions in China, characterized by persistent, uncontrollable worry, restlessness, hyperarousal, sleep disturbances, and irritability [6]. These symptoms compromise both physical health and social functioning, diminishing quality of life. Recent data reveal a sharp rise in anxiety among Chinese adolescents. A survey of 80,879 adolescents found that anxiety prevalence doubled from 11.6% pre-pandemic to 20.5% during COVID-19, with one-fifth of youth globally experiencing worsened symptoms [7]. By 2023, a meta-analysis (N = 128,519) reported a pooled anxiety detection rate of 24.7% (females: 28.1%; males: 19.8%). Post-pandemic, only 19.9% of high school students remained anxiety-free, while over half exhibited symptoms like fatigue, palpitations, and nightmares. Anxiety scores were significantly higher than norms, with a total detection rate of 43% [8]. By 2021, anxiety incidence among 10-24-year-olds reached 1.6376 million, with a standardized rate of 451.49/100,000—projected to rise to 559.44/100,000 by 2031 [9]. Anxiety contributes most significantly (40.3%) to disease burden (Disability-Adjusted Life Years (DALYs)), peaking in the 15-19 age group. Urban prevalence is 1.6 times higher than rural rates [10]. Collectively, these trends underscore the urgency of investigating anxiety etiology and interventions.

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3. Etiology of adolescent anxiety: a 4P model perspective

3.1. Predisposing factors: intrinsic vulnerabilities

Anxiety involves complex neurobiological mechanisms. The amygdala, a core anxiety-regulating region, shows hyperactivation in patients compared to healthy individuals [11]. Functional abnormalities in the hippocampus (reduced volume) and prefrontal cortex (diminished activity) heighten threat sensitivity and impair emotional regulation [12]. Stressful life events also dysregulate the Hypothalamic-Pituitary-Adrenal (HPA) axis in anxiety patients [13]. Neuronal dysfunction, particularly in GABAergic systems, plays a key role. Parvalbumin (PV) neurons—the primary GABAergic cells—exert potent inhibitory control over neural networks, modulating anxiety onset [14].

Personality traits like neuroticism amplify vulnerability. High-neuroticism individuals exhibit heightened stress sensitivity, emotional instability, and negative cognitive biases, perceiving events as threatening and adopting maladaptive coping strategies [15]. Neurophysiological studies link neuroticism to greater neural activity volatility, facilitating anxiety under stress [16].

In summary, biological anomalies and specific traits predispose individuals to anxiety when exposed to stressors, though causal relationships require further validation.

3.2. Precipitating factors: life events

Life events—major incidents causing psychological imbalance—are recognized stressors [17]. While positive events foster growth, negative events damage health [18]. This study focuses on the latter.

Adolescents, undergoing transition to adulthood, face abrupt stressors (e.g., interpersonal conflicts, academic pressure, and role shifts), which acutely elevate anxiety. Research confirms a dose-response relationship: higher life event scores predict greater anxiety, with negative events significantly predicting symptoms ($\beta = 0.30$, $t = 12.91$, $p < 0.001$) [15]. Final-year high school students show deviant mental health linked to negative events ($p < 0.01$), particularly academic pressure ($p < 0.01$) [19]. Among 504 freshmen, life events had a total effect of 0.412 on anxiety (direct effect: 0.293) [20].

Mediators like rumination and self-affirmation clarify this relationship. Rumination—repetitive focus on distress—mediates 29.7% of anxiety's total effect (0.57) [21]. Neuroimaging reveals that ruminators exhibit sustained Default Mode Network (DMN) activity and hyperreactive amygdalae [21]. Self-affirmation—maintaining self-worth during threats—buffers anxiety at low stress but exacerbates it under high stress [21]. While self-affirmation activates reward systems (e.g., vmPFC, ventral striatum) and inhibits threat circuits (e.g., amygdala), excessive affirmation heightens rumination under pressure, perpetuating DMN activation [21]. Cultivating adaptive coping and balanced self-evaluation is thus crucial.

3.3. Perpetuating factors

Problematic smartphone use perpetuates anxiety. By 2019, 16.9% of 10-19-year-olds were internet users, with excessive dependency raising concerns [22]. Among 475 university students, those with generalized anxiety scored higher on smartphone addiction (38.13 ± 8.85 vs. 32.97 ± 8.57) [23]. Adolescents, developmentally unstable, often use phones to cope with stress. Anxiety directly predicts problematic use, especially in males who struggle with emotional expression [22]. Such use further elevates anxiety, creating a vicious cycle: each unit increase in problematic use raises anxiety scores by 10.1% (males) and 9.2% (females) [24].

Culturally, East Asians report higher anxiety than Westerners, with Chinese individuals scoring significantly higher on anxiety measures [21]. Confucianism—emphasizing diligence but low tolerance for failure—heightens self-doubt and anxiety [21]. Empirical work confirms explicit/implicit links between Confucian values (e.g., fate acceptance) and anxiety.

3.4. Protective factors

Family and social support are critical buffers. Family functioning—encompassing emotional bonds and role effectiveness—directly predicts adaptation [25]. Improved sleep quality alleviates anxiety; high family functioning correlates with better sleep ($r = 0.50$, $p<0.01$) and social support with anxiety-related sleep quality ($r = 0.602$, $p < 0.01$) [26].

Perceived social support—subjective evaluation of available support—reduces anxiety by fostering resources and adaptive coping. However, females show greater vulnerability: negative events more strongly impair their support perception (simple slope = -0.41, $t = -9.30$, $p < 0.01$) [27]. Overall, supportive environments mitigate anxiety, though gender-specific strategies are essential.

4. Therapeutic approaches

Integrating CBT with music therapy yields superior outcomes. CBT modifies irrational beliefs and maladaptive behaviors, typically in short-term treatment. Successful CBT normalizes amygdala hyperactivity [28]. Music therapy enhances well-being by stimulating dopamine/endorphin release and modulating limbic regions (e.g., amygdala, hippocampus), promoting relaxation and positive affect [29, 30]. While standalone therapies reduce anxiety by ~6 points, combined CBT-music therapy slashes scores from 22.92 to 10.46 (54.3% reduction) [30].

Mindfulness therapy—using meditation, breathwork, and body scans—cultivates nonjudgmental present-moment awareness [31]. It reduces amygdala reactivity, DMN activity (linked to rumination), and cortisol levels [31]. Post-intervention, mindfulness groups show anxiety scores dropping from 33.06 to 15.32 (vs. 33.47 to 19.47 in controls) and resilience soaring from 45.74 to 82.98 (optimism: 18.14 → 33.68) [32]. Efficacy in adolescents is statistically significant ($p < 0.05$) [33].

5. Conclusion

This study comprehensively demonstrates that negative life events serve as critical precipitants of anxiety disorders among Chinese adolescents, exhibiting a significant positive correlation with symptom severity ($\beta = 0.30$, $p < 0.001$). The anxiety pathology emerges from the convergence of biological vulnerabilities (e.g., amygdala hyperactivation, HPA-axis dysregulation), psychological traits (heightened neuroticism amplifying threat perception), and cultural perpetuators—notably Confucian achievement pressures and problematic smartphone use, which elevates anxiety scores by 9-10% per usage unit. Protective resources, particularly robust family functioning ($r = 0.50$) and perceived social support ($r = 0.602$), effectively buffer stressors, though gender disparities necessitate tailored approaches as females show greater vulnerability to support erosion. Therapeutically, integrated CBT-music therapy achieves superior outcomes (54.3% symptom reduction) through synergistic neural modulation, while mindfulness training reduces default mode network hyperactivity and cortisol levels, boosting resilience by 85.6%. Future interventions should adopt a biopsychosocial-cultural framework: implementing school-based mindfulness programs, family communication guides, and policy reforms for academic pressure reduction alongside "digital detox" initiatives to disrupt anxiety maintenance cycles. Expanding research on gender/cultural subgroups remains imperative for targeted prevention.

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