

The Psychological Impact of Adolescent Sexual Assault on Female Victims: A Weibo Big Data Analysis

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Abstract

[Background] The adverse effects of childhood sexual experiences on an individual's physical and mental well-being are enduring. However, scant research has attended to the mental health status of this population.

[Objective] This study aims to investigate the differences in psychological characteristics—including social attitudes, subjective well-being, and mental health—between adults with childhood sexual abuse experiences (CSA group) and adult females without such experiences (control group) using a Weibo big data psychological computing model.

[Method] We collected data from 46 victims (all female) and 46 non-victims (gender-matched with the CSA group) on Sina Weibo, crawled all microblog posts of the selected users, and employed a Weibo big data computing model to compute their scores on various psychological characteristics.

[Results] Independent samples t-tests revealed significant differences between the two groups in social attitudes, subjective well-being, and particularly mental health. Concurrently, we observed differences in Weibo behavioral characteristics between the groups. Compared to non-victims, victims exhibited higher scores on health indicators such as depression and stress, and lower scores on psychological characteristics such as life satisfaction and self-acceptance; however, none reached the threshold critical values for mental illness diagnosis.

[Limitations] The levels of social attitudes, well-being, and mental health assessed via the Weibo big data model cannot be completely equated with those measured by psychological assessment scales, and cannot fully replace rigorous psychological measurement.

[Conclusion] Childhood sexual experiences exert negative effects on the psychological characteristics of adult women, though these effects are insufficient to meet the threshold criteria for mental illness.

Full Text

Using Social Media to Explore the Psychological Features of Female Adults with Childhood Sexual Abuse

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Abstract

[Background] The adverse effects of childhood sexual abuse on physical and psychological health are enduring. However, few studies have focused on the psychological characteristics of this population in adulthood. **[Objective]** This study aimed to explore differences in psychological characteristics—including social attitudes, well-being, and mental health—between females with childhood sexual abuse experiences (CSA group) and those without such experiences (control group) using a microblogging data computational model. **[Methods]** We collected data from 46 victims (all female) and 46 non-victims (gender-matched with the CSA group) on Sina Weibo, crawling all microblogs from selected users and calculating their scores across various psychological dimensions using a microblogging data computational model. **[Results]** Independent samples t-tests revealed significant differences between the groups in social attitudes, well-being, and particularly mental health. Additionally, we observed differences in microblogging behavior characteristics. Compared to non-victims, victims exhibited higher scores on health indicators such as depression and stress, and lower scores on psychological characteristics including life satisfaction and self-acceptance. However, these scores did not reach the critical thresholds for clinical diagnosis of mental disorders. **[Limitations]** Psychological features derived from microblogging data computational models cannot be considered completely equivalent to those obtained from psychological scales and cannot replace rigorous psychological measurement. **[Conclusion]** Childhood sexual abuse experiences negatively affect adult female psychological characteristics, though this impact is insufficient to meet diagnostic criteria for mental illness.

Keywords: Childhood sexual abuse, Social media, Psychological characteristics, Big data

1 Introduction

Childhood sexual abuse represents a global issue. A study across 21 countries (mostly developed nations) reported that 7%-36% of women and 3%-29% of men experienced sexual abuse during childhood [1]. The most widely used classification of sexual abuse includes sexual penetration, sexual contact, and non-contact sexual abuse [2]. The impacts on victims are multifaceted, encompassing psychological problems such as anger, anxiety, depression, fear, loneliness, low self-esteem, post-traumatic stress disorder (PTSD), and suicidal ideation; social difficulties including interpersonal problems, poor academic performance, and trust issues; and sexual problems such as precocious sexuality and sexual aggression [2].

The physical and psychological harm inflicted on victimized children is severe and persistent, often extending into adulthood. With the advent of the Web 2.0 era, online social media has experienced unprecedented growth due to its openness, interactivity, and real-time nature. As one of China's most representative social media platforms, Sina Weibo surpassed Twitter in May 2017 with over 340 million monthly active users, becoming the world's largest microblogging service. Through Weibo, individuals can interact online and freely express their opinions and emotions about current events. These rich psychological processes become visible through public expression on the platform, making Weibo an excellent tool for psychological and social science research [3]. Concurrently, the flourishing development of big data research methodologies provides methodological support for online text analysis.

During the second half of 2017, numerous news reports about sexual abuse emerged: the "Red-Yellow-Blue" kindergarten alleged child sexual abuse case, the Beihang University professor accused of sexually assaulting female students, the Jiangxi Nanchang University teacher-student sexual assault incident, and the Beihang doctoral graduate Luo Qianqian's public accusation of sexual harassment against prominent scholar Chen Xiaowu. These incidents brought the persistent social scourge of sexual abuse back into public view, with each case generating intense discussion on Weibo. Due to the privacy afforded to Weibo users, an increasing number of former sexual abuse victims have commented on news posts, mustering the courage to share their experiences, and even posting original microblogs to raise societal awareness that sexual abuse occurs around us and that victims are becoming younger. These comments and original posts provide a rich data source for this research, enabling investigation of the psychological impact of childhood sexual abuse on female victims through Weibo big data psychological models.

China's Ministry of Education issued the "Guidelines for Public Safety Education in Primary and Secondary Schools" in February 2007, which states that minor students should understand general methods and skills for responding to sexual abuse [4]. Research on childhood sexual abuse can inform targeted education. However, domestic research on this topic remains scarce, and most

studies have used homogeneous samples such as university students from the same major, leaving significant gaps in the literature [5-7]. Participant recruitment through social networks overcomes the limitation of single-sample selection and can provide richer data for national education and health initiatives.

Early research on the mental health impacts of sexual abuse experiences predominantly used questionnaire methods. While these approaches can precisely capture victims' emotional and behavioral characteristics, several limitations exist. First, China currently lacks a standardized childhood sexual abuse questionnaire, with most previous studies using self-developed instruments that may contain omissions. Second, although most questionnaire studies emphasize privacy protection, participants may still fear exposure and choose not to participate or avoid providing truthful responses. Moreover, the explicit nature of questionnaire items can easily trigger painful memories, potentially causing secondary harm to victims. Additionally, questionnaire methods are time-consuming and labor-intensive, and the collected data volume often fails to meet research requirements. In contrast, our data source consists of original microblogs from female Weibo users who have mentioned their sexual abuse victimization. This approach ensures adequate sample size; maintains privacy since users are anonymous and unaware of data extraction; and employs established microblogging big data psychological models to analyze users' original posts, guaranteeing objectivity and standardization in the analysis.

Based on the above considerations, this study analyzes victims' original microblogs using psychological models to understand the relationship between childhood sexual abuse and adult mental health in women, examining whether female victims differ from the control group across social attitudes, well-being, and mental health dimensions.

2.1 Participant Selection

This study selected adult female Weibo users who experienced sexual abuse during childhood (experimental group) and those without such experiences (control group). Experimental group participants had to meet four criteria: (1) registered as female users; (2) currently adults; (3) explicitly mentioned "being sexually abused as a child" in comments on others' posts or in original microblogs; and (4) be private individual users, excluding public figures, official accounts, marketing accounts, and zombie accounts. Control group participants had to meet criteria (1), (2), and (4), with the additional requirement of having no microblogs or comments describing sexual abuse experiences. The final sample consisted of 46 participants in the experimental group and 46 in the control group.

2.2 Data Collection and Processing

We manually screened comments on popular sexual abuse-related microblogs according to the above criteria, recorded user IDs, and crawled basic user in-

formation (gender, VIP status, follower count, following count, etc.) and all microblogs through the Sina Weibo API (Application Programming Interface). Since forwarded content does not represent users' self-expression, we excluded forwarded microblogs and retained only original posts and original portions of forwarded content. This study employed a microblogging data-based psychological model to calculate users' scores across social attitude dimensions (life satisfaction, income satisfaction, social status, national government satisfaction, local government satisfaction, national government confidence, local government confidence, national economic satisfaction, local economic satisfaction, social risk judgment, social fairness satisfaction, anger, collective efficacy, collective behavior intention), well-being dimensions (environmental mastery, positive relations with others, negative emotions, Oxford Happiness, autonomy, personal growth, self-acceptance, life satisfaction, purpose in life), and mental health dimensions (anxiety, depression, stress). For mental health assessment, we utilized the Depression Anxiety Stress Scales (DASS, with subscale scores for anxiety, depression, and stress) and the Symptom Checklist-90 (SCL-90, with subscales for somatization, anxiety, obsessive-compulsive symptoms, depression, interpersonal sensitivity, psychoticism, paranoia, hostility, and phobic anxiety). We then conducted independent samples t-tests to examine differences between the experimental and control groups across social attitudes, well-being, and mental health.

3 Results

presents an independent samples t-test analysis ($df=90$) of basic Weibo characteristics between victims and the control group. Results indicated significant differences in mutual follower count and total microblog count ($t_{\text{mutual_followers}} = -4.220$, $p_{\text{mutual_followers}} < 0.001$, $d = 0.880$; $t_{\text{microblog_count}} = -3.775$, $p_{\text{microblog_count}} < 0.001$, $d = 0.787$). Victims had significantly fewer mutual followers and posted significantly fewer microblogs than the control group.

shows the independent samples t-test results for social attitudes ($df=90$). The analysis revealed that victims reported significantly higher satisfaction with their social status than the control group ($t_{\text{social_status_satisfaction}} = 2.551$, $p_{\text{social_status_satisfaction}} = 0.012 < 0.05$, $d = 0.532$). No significant differences emerged on other social attitude dimensions.

presents DASS scale score comparisons. Independent samples t-tests ($df=90$) showed that victims scored significantly higher than controls on depression and stress ($t_{\text{depression}} = 2.087$, $p_{\text{depression}} = 0.040 < 0.05$, $d = 0.435$; $t_{\text{stress}} = 2.671$, $p_{\text{stress}} = 0.011 < 0.05$, $d = 0.546$), while anxiety levels did not differ significantly.

displays well-being score comparisons. Independent samples t-tests ($df=90$) revealed that victims scored significantly lower than controls on positive relations with others, self-acceptance, and life satisfaction ($t_{\text{positive_relations}} = -2.217$,

$p_{\text{positive_relations}} = 0.029 < 0.05$, $d = 0.461$; $t_{\text{self_acceptance}} = -2.176$, $p_{\text{self_acceptance}} = 0.034 < 0.05$, $d = 0.454$; $t_{\text{life_satisfaction}} = -2.196$, $p_{\text{life_satisfaction}} = 0.032 < 0.05$, $d = 0.458$). Additionally, victims' Oxford Happiness scores were significantly lower than controls ($t_{\text{Oxford_Happiness}} = -2.720$, $p_{\text{Oxford_Happiness}} = 0.008 < 0.01$, $d = 0.567$).

presents SCL-90 scale score comparisons. Independent samples t-tests ($df=90$) showed that, except for anxiety, victims scored significantly higher than controls on somatization and hostility ($t_{\text{somatization}} = 2.394$, $p_{\text{somatization}} = 0.020 < 0.05$, $d = 0.498$; $t_{\text{hostility}} = 2.227$, $p_{\text{hostility}} = 0.029 < 0.05$, $d = 0.461$). Victims also scored significantly higher on phobic anxiety and psychoticism ($t_{\text{phobic_anxiety}} = 3.564$, $p_{\text{phobic_anxiety}} = 0.001 < 0.01$, $d = 0.746$; $t_{\text{psychoticism}} = 2.906$, $p_{\text{psychoticism}} = 0.005 < 0.01$, $d = 0.604$). Differences reached highly significant levels for obsessive-compulsive symptoms, interpersonal sensitivity, depression, and paranoia ($t_{\text{obsessive_compulsive}} = 4.742$, $p_{\text{obsessive_compulsive}} < 0.000$, $d = 0.987$; $t_{\text{interpersonal_sensitivity}} = 4.638$, $p_{\text{interpersonal_sensitivity}} < 0.000$, $d = 0.967$; $t_{\text{depression}} = 3.914$, $p_{\text{depression}} < 0.000$, $d = 0.613$; $t_{\text{paranoia}} = 3.814$, $p_{\text{paranoia}} < 0.000$, $d = 0.790$).

4 Discussion

This study employed a microblogging big data computational model to investigate psychological differences between adults with childhood sexual abuse experiences and those without, focusing on social attitudes, well-being, and mental health. Results revealed significant differences across these domains, particularly in mental health, alongside distinct microblogging behavior patterns.

Regarding social attitudes, we examined 14 dimensions including life satisfaction, income satisfaction, and social status satisfaction. Significant differences emerged only for income satisfaction and social status satisfaction, with the experimental group scoring higher than controls. This finding may reflect two possibilities. First, individuals with trauma histories may work and study more diligently to achieve higher income and social status, thereby mitigating adverse effects of their experiences. Second, those with sexual abuse trauma may have lower expectations regarding income and social status, making them more easily satisfied with their current circumstances.

In terms of well-being, we investigated 10 dimensions including environmental mastery, positive relations with others, and negative emotions. Significant differences emerged for positive relations with others, positive emotions, Oxford Happiness, self-acceptance, and life satisfaction, with the experimental group scoring lower than controls, consistent with our hypotheses. Sexual abuse constitutes a trauma that, particularly within traditional Chinese cultural contexts, carries significant stigma. Many victims, constrained by traditional values held by themselves and their families, hesitate to report incidents, allowing perpetrators to escape justice and inflicting additional harm. This damage is en-

during and lifelong, affecting interpersonal relationships, self-acceptance, and well-being. Notably, life satisfaction under the well-being dimension showed significant group differences, whereas life satisfaction under social attitudes did not, possibly due to differential text feature extraction sensitivity across computational models requiring further validation with optimized algorithms.

For mental health, we aimed to understand how the experimental group compared to controls on depression, anxiety, and other psychological disorders using DASS and SCL-90 computational models. DASS includes anxiety, depression, and stress subscales, while SCL-90 comprises nine dimensions including somatization, anxiety, obsessive-compulsive symptoms, depression, interpersonal sensitivity, psychoticism, paranoia, hostility, and phobic anxiety. Results showed that on DASS, the experimental group scored significantly higher on depression and stress but not anxiety. On SCL-90, the experimental group scored higher across all nine dimensions. Both instruments overlap in assessing depression and anxiety, and findings were consistent: significant differences in depression but not anxiety. Importantly, although experimental group scores were significantly elevated, they remained below clinical thresholds, indicating participants were not clinically disordered. However, these findings signal that individuals with sexual abuse histories show elevated scores in depression, stress, and paranoia, suggesting a need for psychological counseling and interventions to improve mental health in this population.

This study has several limitations. First, sample selection may deviate from the general population, representing only adult female Weibo users who disclosed childhood sexual abuse experiences rather than all adult female survivors. Those who explicitly state their experiences on Weibo may differ substantially from those without social media accounts or who choose not to disclose. Second, methodological limitations include the brevity of microblog texts and limited keyword features, which may hinder feature computation and compromise accuracy.

Despite these limitations, this study pioneers the use of microblogging big data models to analyze textual expressions from two groups, identifying linguistic differences and overcoming challenges of secondary harm and participant recruitment difficulties. Research indicates that individuals with childhood sexual abuse histories exhibit higher risks for suicidal ideation and mental illnesses such as depression and anxiety [8-10], with these tendencies manifesting in psychological characteristics. A recent study demonstrated suicide intervention by monitoring individuals' linguistic expressions on social media [11], providing valuable insights. As a high-risk population for suicide, individuals with childhood sexual abuse experiences warrant close monitoring of their posted content for timely intervention. Furthermore, our methodology offers an effective approach for evaluating intervention outcomes in this population.

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Note: Figure translations are in progress. See original paper for figures.

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