

Adolescents' Perceived Social Support: An Analysis of Current Status and Influencing Factors Based on Weibo Big Data

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Date: 2025-07-10T00:00:00+00:00

Abstract

[Objective] To explore assessment methods for perceived social support among adolescents based on Weibo text and analyze their demographic differences. [Methods] Python was used to crawl Weibo texts (approximately 300,000) from adolescents aged 12-18 nationwide. A perceived social support dictionary containing four dimensions was constructed, word frequency analysis was conducted through the “Wenxin” system, and statistical analysis was performed incorporating variables such as gender, age, and region. [Results] The constructed dictionary included 1,312 words and demonstrated good validity. Analysis revealed significant differences in perceived social support levels among adolescents of different genders, ages, and regions, with lower levels in western and northeastern regions and higher levels in eastern and central regions. [Limitations] The data source was public Weibo texts, which may exhibit population representation bias. Although the dictionary possesses validity, its capacity to capture deep psychological semantics is limited. [Conclusion] Social media text can be effectively utilized to evaluate adolescents'perceived social support levels, demonstrating practical value and early warning potential. Keywords: perceived social support, Weibo text analysis, dictionary construction, adolescents

Full Text

An Analysis of the Status and Influencing Factors of Perceived Social Support Among Adolescents: Based on Weibo Big Data

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Abstract:

[Objective] This study aimed to explore a Weibo-based approach to assessing adolescents' perceived social support and to examine its demographic variations. [Methods] Approximately 300,000 Weibo posts from adolescents aged 12–18 across 31 provinces in China were collected via Python. A perceived social support lexicon was developed encompassing four dimensions—emotional, informational, instrumental, and appraisal support. Word frequency analysis was conducted using the validated Chinese text analysis software Wenxin System, followed by multidimensional statistical analyses based on gender, age, and region. [Results] The constructed lexicon consisted of 1,312 validated entries. Significant differences in perceived social support were found across demographic groups: adolescents in western and northeastern regions showed lower levels than those in eastern and central regions, and males scored slightly higher than females. [Limitations] Data were limited to publicly available Weibo texts, potentially affecting sample representativeness. In addition, the lexicon method may not fully capture deeper psychological semantics. [Conclusions] Social media text analysis provides an effective tool for evaluating perceived social support among adolescents and offers practical value for early psychological risk detection.

Keywords: Perceived social support, Weibo text analysis, Lexicon construction, Adolescent

This research was supported by the National Social Science Fund of China Major Project “Networked Social Support and Mental Health Research Under Major Public Health Emergencies” (Project No.: 22ZD187).

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In the contemporary era of highly developed digital social media, language—as a crucial external manifestation of individual psychological states—has garnered increasing attention in psychological research. Early psycholinguistics primarily relied on expressive writing analysis [?], but over recent decades, advances in computational linguistics and natural language processing have enabled researchers to recognize that quantitative analysis of word categories can reveal underlying psychological mechanisms in texts [?],[?]. In particular, the Linguistic Inquiry and Word Count (LIWC) tool developed by Pennebaker and colleagues has played a significant role in research on the relationship between language use and psychological states, facilitating the expansion of psycholinguistics into real-world contexts [?],[?]. In the Chinese context, the development of dictionaries such as CLIWC [?] and SCLIWC [?] has adapted LIWC for analyzing

Chinese social media corpora, advancing Chinese psychological text analysis.

Simultaneously, social media platforms like Weibo provide unprecedented ecological data resources for studying individual psychology. As an open social platform with over 500 million monthly active users, Weibo enables users to continuously express emotions, viewpoints, and social interaction needs through text, comments, and reposts, offering researchers high-frequency, low-threshold samples of natural behavior [?],[?]. Based on this, predictive models of psychological states from big data language behavior have been established and widely applied in personality, emotion, and mental health research [?]-[?].

In psychological research, “perceived social support” represents a key variable for understanding how individuals cope with stress and maintain mental health [?],[?]. It refers to the subjective experience of receiving care, help, and understanding from others [?]. While traditional measurement tools such as the PSSS [?] and SSRS [?] are widely used, they rely on self-report questionnaires that cannot capture real-time support perceptions in daily social interactions. Therefore, combining social media text analysis with computational dictionary techniques to construct a Weibo-based “perceived social support dictionary” not only addresses the limitations of traditional methods but also provides a novel pathway for detecting dynamic social support among adolescents.

Adolescents, as a group undergoing rapid physical and psychological development, face complex interpersonal adaptation and social identity construction challenges, often accompanied by academic pressure and interpersonal conflicts [?]. Social media has become an important platform for them to express emotions and seek identity, potentially carrying rich social support signals. Existing research has found that perceived social support significantly influences adolescents’ mental health, academic performance, and suicide risk [?],[?]. However, these studies predominantly rely on questionnaire data, which cannot cover broader adolescent populations or monitor changing trends in real time.

This study attempts to construct an adolescent-oriented perceived social support dictionary based on social media text and conduct quantitative analysis of social support levels in Weibo posts. Dictionary construction integrates manual annotation, expert rating, and computational model screening of key vocabulary, classified according to four dimensions of social support theory (emotional, appraisal, instrumental, and informational support) [?]. Technically, the study combines LIWC’s closed-vocabulary analysis with open-corpus mining strategies to capture characteristics of networked social support expression in the Weibo context [?],[?]. For data collection, Weibo crawler technology obtains publicly available text data from adolescent users, which undergoes cleaning and pre-processing to extract high-quality samples for modeling. Ultimately, the study examines differences in perceived social support across regions, genders, and age groups, providing data support and strategic recommendations for adolescent social support interventions and mental health promotion.

Through this research, we aim not only to enrich the existing measurement

toolkit for perceived social support but also to advance a paradigm shift in psychological research methods from “questionnaire-driven” to “data-driven,” expanding the application depth of language behavior research in educational and social psychology.

Study 1: Development and Validation of the Perceived Social Support Dictionary

In Study 1, we constructed a perceived social support dictionary to measure Weibo users’ perceived social support levels. We extracted support-related words from authoritative questionnaires and dictionaries including the Modern Chinese Dictionary, Modern Chinese Content Word Collocation Dictionary, Public Welfare and Development English-Chinese Bilingual Dictionary, and *Dictionary of Social Welfare*. All words were rated and filtered to exclude duplicates and low-frequency terms, resulting in a final dictionary comprising 1,312 words.

Since perceived social support is derived from the broader concept of social support, we begin with the latter’ s definition. Researchers define social support as assistance provided by others or social networks when individuals encounter challenges exceeding their personal coping capacities [?]. As research has progressed, scholars have reached consensus that social support is a multi-faceted concept primarily divisible into two categories: actually received support and perceived support [?].

This study operationally defines perceived social support as the support individuals feel from family, friends, teachers, and others—support that engenders a satisfying emotional state and forms a relatively stable trait through long-term exposure [?].

Dictionary Construction Process We constructed the perceived social support dictionary through the following steps:

Initial Word Selection. Following standard dictionary compilation methods, we selected words related to perceived social support from authoritative questionnaires and dictionaries [?],[?]. We utilized established social support measures including the Perceived Social Support Scale (PSSS) [?], Network of Relationships Inventory (NRI) [?], Multidimensional Scale of Perceived Social Support (MSPSS) [?], Social Support Rating Scale (SSRS) [?], Adolescent Social Support Rating Scale [?], Adolescent Online Social Support Questionnaire [?], Simplified Version of the Two-Way Social Support Scale [?], and Social Support Scale [?]. Combined with the Modern Chinese Dictionary, Modern Chinese Content Word Collocation Dictionary, Public Welfare and Development English-Chinese Bilingual Dictionary, and *Dictionary of Social Welfare* [?], we obtained 1,808 initial words related to perceived social support.

Filtering Irrelevant Words. Five psychology graduate students participated

in dictionary construction. The initially selected words were rated by these five raters who received detailed training beforehand. After understanding the definition and manifestations of perceived social support, participants independently evaluated all initial words. Words conveying perceived social support received a “pass” rating, while others received a “fail” rating. Words passing three rounds of selection were retained. After deleting 496 irrelevant words, 1,312 words remained.

Expanding Remaining Words. We manually added as many synonyms as possible based on existing dictionaries. Newly added words were evaluated by the same five psychology graduate students, with words passing three rounds of selection retained in the list.

Deleting Low-Frequency and Duplicate Words. Dictionary validity assessment involved calculating each word’s frequency in a Weibo database. We constructed this database using posts from active Weibo users across China’s 31 provinces/municipalities/autonomous regions from January 2010 to May 2022 via public API. Filtering conditions ensured content validity: we selected active users registered for at least one year with a minimum of 500 posts, then narrowed the sample to accounts with fewer than 3,000 followers to focus on ordinary users rather than celebrities, professional bloggers, or organizations. Retweets were excluded as they do not represent users’ own expressions. We randomly collected 1/10,000 of the database content and calculated dictionary word frequencies. After deleting irrelevant and duplicate words, the final dictionary contained 1,312 words.

Validity Analysis Perceived Social Support Measurement. We employed word frequency analysis to obtain perceived social support data from the Weibo database containing posts from active users across 31 provinces/municipalities/autonomous regions from January 2010 to May 2024. First, we used the “TextMind” system developed by the Computational Cyberpsychology Laboratory of the Institute of Psychology, Chinese Academy of Sciences, to segment Weibo posts and calculate word frequencies. This system segments text into independent words with linguistic features according to Chinese grammatical rules. Next, we used the perceived social support dictionary to calculate the frequency of support-related words in each region, expressed as the ratio of dictionary words to total post words. Word frequency described regional perceived social support levels across different periods, yielding perceived social support data for 31 provinces/municipalities/autonomous regions from January 2010 to May 2022.

Validity Analysis Procedure. We examined whether word frequency genuinely reflected public perceived social support levels by assessing consistency between word frequency and manual ratings. First, we recruited five additional psychology graduate students to evaluate Weibo texts, testing inter-rater consistency on 50 Weibo posts. After professional training ensuring understanding of perceived social support definitions, raters independently scored these 50 posts

using a five-point Likert scale (1 = strongly disagree, 3 = neutral, 5 = strongly agree) to assess the degree of perceived social support conveyed. For further validity assessment, we randomly selected another 500 Weibo texts from the database. Each of the five graduate students scored 100 texts, yielding 500 scored posts total. We then conducted word frequency analysis using the perceived social support dictionary and calculated Pearson correlations between manual scores and word frequencies for each text.

2.2 Results [Figure 1: see original paper] Dictionary Compilation Flowchart

Results showed high inter-rater consistency among the five psychology graduate students when evaluating the 50 Weibo texts ($r = 0.897$, $p < 0.001$), indicating valid ratings. For the 500 Weibo texts, we observed a significant positive relationship between manual scores and word frequency ($r = 0.266$, $p < 0.001$), meeting general criteria for moderate correlation [?] and demonstrating dictionary reliability.

Examples from Perceived Social Support Dictionary: trust, consolation, guidance, instruction, bonus, allowance, praise, commendation

Study 2: Current Status and Influencing Factors of Adolescent Perceived Social Support

Using the perceived social support dictionary developed in Study 1, we measured perceived social support levels among 12-18-year-old adolescents nationwide based on Weibo big data, establishing the first social media-based support level database covering 31 provinces and municipalities.

3.1 Data Collection This study employed Python-based web crawling to collect Weibo data, mining original posts from adolescent users born between 2006 and 2013 based on registration information. The system automatically identified social support-related vocabulary using 598 word items from the perceived social support dictionary compiled in Study 1. We then used the TextMind segmentation system for word frequency statistics to derive social support scores from adolescent Weibo texts.

Data Cleaning. The raw data excluded non-original posts and removed content containing misspellings, empty texts, non-Chinese characters, numbers, punctuation, and internet emoticons. We also deleted content unrelated to perceived social support such as gossip, hypotheses, food, celebrities, and voting. Simultaneously, we filtered users based on account activity (registered for at least one year with over 100 original posts) and user type (fewer than 3,000 followers). The final dataset comprised 300,000 valid Weibo posts.

Data Grouping and Stratification. Based on age information, we selected adolescent users aged 12-18 and divided them into three subgroups: 12-14 years,

15–16 years, and 17–18 years. Regional information was used to calculate social support scores for each prefecture-level city. We also analyzed gender differences and temporal trends in adolescent social support based on gender and monthly data.

3.2 Provincial-Level Social Support Perception Analysis Based on cleaned data extracting post location information, we analyzed adolescent perceived social support levels across 31 provinces, autonomous regions, and municipalities in mainland China (note: data did not cover Hong Kong SAR, Macau SAR, or Taiwan Province). As shown in Table 2, provinces such as Sichuan, Hubei, and Fujian scored higher, while Tibet, Qinghai, and Liaoning scored lower. Provincial score differences relate to regional economic development, psychological aid resource allocation, and cultural expression patterns. For example, Sichuan’s “Tianfu Youth Psychological Escort Program” enhances support experiences through cultural adaptation, whereas regions like Tibet face significant “support blind spots” due to weak digital resources and lack of support channels. Additionally, in Shandong and Henan, frequent discussions of “family honor” influenced by clan culture may mask genuine support needs.

Adolescent Perceived Social Support Levels by Province, Autonomous Region, and Municipality in Mainland China

3.3 Age Difference Analysis Analysis of different age groups among 12–18-year-old adolescents revealed fluctuating support perception trends: a significant increase from ages 12 to 13, likely due to enhanced dependence on external support after middle school entry; relative stability from ages 13–16; a peak at age 17, followed by a slight decline possibly resulting from role transitions and strengthened independence. Minimum values of 0 across all ages indicate some adolescents did not explicitly express or perceive social support on social platforms. As shown in Table 3 :

Perceived Social Support Levels Among 12–18-Year-Old Adolescents

[Figure 4: see original paper] Trend Chart of Adolescent Perceived Social Support Level Changes

3.4 Regional Difference Analysis Based on National Bureau of Statistics regional classification standards, we analyzed adolescent perceived support levels across eastern, central, western, and northeastern regions. Results showed the central region scored highest and the northeast lowest, while the western region exhibited the largest standard deviation, reflecting uneven internal development. The central region’s strong social support networks result from parallel clan support and policy promotion, whereas the northeast suffers severe social capital loss and weakened social networks. Although the western region’s overall score was relatively high, distribution was extremely uneven with obvious urban-rural differences, as shown in Tables 4, 5, and 6. Notably, all regions contained samples with perceived support values of 0, indicating marginalized adolescents

remain in a state of social support disconnection, necessitating precise early warning and intervention strategies.

Adolescent Perceived Social Support Levels by Eastern, Western, Central, and Northeastern Regions

Difference Tests of Adolescent Perceived Social Support Levels Across Regions (\$±\$0.02579, \$±\$0.02848, \$±\$0.02918, \$±\$0.03098)

Post-Hoc Tests of Adolescent Perceived Social Support Levels Across Regions (95% Confidence Interval)

(I) Region	(J) Region	Mean Difference (I-J)	Significance
			0.000***
			0.000***
			0.000***
			0.000***

$p < 0.05$, $p < 0.01$, $p < 0.001^*$

3.5 Gender Difference Analysis As shown in Table 7, independent samples t-test results indicated that male adolescents scored significantly higher than females on perceived social support ($t = 115.393$, $p < 0.001$, $d = 0.115$). This may relate to males' greater participation in social activities and greater tendency to publicly express needs. However, this finding also suggests female adolescents' support needs may be more implicit, requiring enhanced identification mechanisms in intervention design.

Gender Differences in Adolescent Perceived Social Support Scores

Discussion

This study systematically investigated adolescent perceived social support measurement and current status using Weibo big data, aiming to enhance understanding and intervention capabilities through developing a dictionary tool applicable to social media contexts.

4.1 Value and Significance of Perceived Social Support Dictionary Construction Traditional perceived social support research predominantly relies on questionnaire measures that, while possessing certain reliability and validity guarantees, exhibit limitations in dynamic monitoring and ecological validity. Particularly in digital contexts, adolescents' psychological states are often expressed through social media, which traditional tools cannot capture semantically. This study constructed a four-dimensional Weibo perceived social support dictionary (1,312 entries) for the Chinese context based on systematic

review of perceived social support theory and measurement tools, achieving relatively comprehensive coverage of social support semantics across emotional, informational, instrumental, and appraisal dimensions.

The construction process emphasized rigorous data source integration and expert evaluation, with internal consistency and external validity indicators demonstrating high reliability and validity. Compared with previous emotion dictionaries or general text analysis tools, this dictionary possesses greater thematic specificity, providing a generalizable technical pathway for digital measurement of perceived social support and offering a feasible model for subsequent natural language processing applications in mental health assessment.

4.2 Differential Characteristics and Explanations of Adolescent Perceived Social Support Using Weibo text data and dictionary analysis, the study revealed significant differences in adolescent perceived social support levels across multiple dimensions including province, region, age, and gender:

(1) Provincial and Regional Differences: Adolescents in economically developed eastern provinces (e.g., Jiangsu, Guangdong) showed higher perceived social support levels than those in less developed western provinces (e.g., Tibet, Qinghai). From Bronfenbrenner's social ecological systems theory perspective, macro-system resource endowment differences lead to micro-system functional variations [?]. Regions with abundant educational resources and well-developed social service systems construct positive social support ecologies, whereas resource-scarce regions face "ecological system nesting fractures" that weaken adolescents' support perception integrity.

(2) Age Differences: Developmental stage characteristics were evident. Adolescents aged 12–15 scored higher due to intense peer relationship construction needs, while the 16–18 age group showed relatively lower levels under institutional pressures (college entrance examinations, employment). Consistent with Erikson's developmental stage theory, social support "supply-demand imbalances" become potential risk factors for psychological distress in middle-to-late adolescence [?].

(3) Gender Differences: Female adolescents generally showed higher perceived social support levels than males but exhibited more significant mental health problems. This relates to females' greater emphasis on emotional expression and social connection [?], suggesting interventions require gender-stratified design, such as strengthening emotional expression channels for females while focusing on emotional regulation and psychological resilience cultivation for males.

In summary, this study reveals the social structural attributes and developmental sensitivity characteristics of perceived social support through multidimensional differences, providing data support and theoretical foundations for targeted psychological interventions.

4.3 Study Limitations Despite methodological innovations, this study has several limitations. First, constrained by the linguistic environment and openness of Weibo text corpora, the dictionary’s timeliness and coverage require continuous updating and optimization; internet slang, unstructured expressions, and emoticons remain insufficiently incorporated. Second, Weibo data collection was limited by platform interfaces and historical data deletion, creating sample coverage bias that cannot fully represent all adolescent populations. Additionally, due to anonymity characteristics, controlling for individual difference variables such as personality traits and family background that may influence text expression is difficult. Furthermore, perceived social support expression is culturally embedded, and the current dictionary primarily based on Chinese contexts lacks multi-language and multi-cultural adaptation, with cross-cultural applicability requiring further expansion and validation.

4.4 Future Directions Future research can expand in several directions. First, cross-platform multimodal data fusion could compare Weibo data with other social platforms (e.g., WeChat, Douyin) and incorporate images, emoticons, and interactive behaviors to enhance contextual awareness of social support. Second, longitudinal monitoring and event response mechanisms could dynamically track changes in adolescent perceived social support across different contexts, combined with public events such as natural disasters, pandemics, and campus safety incidents. Third, cultural adaptation and international comparative studies could develop multi-language versions based on the dictionary to explore cross-cultural applicability and conduct comparative studies of adolescent perceived social support between China and other countries. Fourth, intervention strategy linkage applications could use dictionary measurement results to deliver personalized social support resources for individuals or groups, exploring a “digital identification–psychological intervention” closed-loop mechanism to assist adolescent mental health system construction.

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Author Contributions

Gulimire Isak and Xiayu Du proposed the research proposition and designed the study protocol. Gulimire Isak, Xiayu Du, Binyu Wang, Jiaojiao Jia, Jiao Li, Menglu Dou, Tieyu Duan, and Qian Xiong participated in research imple-

mentation, including data collection and organization. Gulimire Isak, Xiayu Du, Binyu Wang, and Jiaojiao Jia were responsible for data cleaning and analysis. Gulimire Isak and Xiayu Du drafted the initial manuscript. Gulimire Isak revised and finalized the manuscript. Zhihong Ren provided research guidance and supervision throughout the entire process and reviewed and approved the overall structure and logic of the paper.

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