

Analysis of the impact of urban-rural background and campus environment perception on psychological distress of college students from the perspective of social space

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Abstract. The urban-rural disparity in college students' mental health is a significant issue in health sociology, yet existing research often focuses on individual deficiencies while overlooking the role of campus material environments. Based on social space theory, this study integrates perspectives from environmental psychology and social stratification to construct an analytical framework of "urban-rural origin-environmental perception-psychological distress," aiming to reveal the social spatial mechanisms behind mental health disparities. First, it critiques the environmental homogeneity assumption in mainstream research, arguing that it obscures structural differences in campus spatial resource allocation. Second, from the perspective of spatial capital, it analyzes how urban-rural differences in spatial habitus affect students' environmental perception and adaptation. Third, introducing the restorative environment theory, it explores the heterogeneous distribution of physical environmental stress effects in campuses and identifies the psychological distress mechanism of "dual estrangement" faced by rural students—resulting from cultural and spatial unfamiliarity. Finally, it proposes a spatial justice-oriented approach to mental health intervention, expanding from individualized psychological counseling to examining the fairness of spatial resource allocation. The theoretical contribution of this study lies in integrating the temporality and spatiality of social stratification, thereby uncovering the spatiotemporal embedding mechanisms of mental health inequalities.

Keywords: urban-rural background, campus environment perception, mental health, social spatial analysis, space justice

1. Introduction

As a vital force for the development of human civilization, college students' mental health issues have increasingly become a core concern in global higher education. Data from the Higher Education Policy Institute of the United Kingdom shows that the reporting rate of mental health problems among college students has increased nearly fivefold over the past decade [1]. The *Report on the Development of Chinese*

National Mental Health (2021–2022) released by the Chinese Academy of Sciences indicates that the detection rate of anxiety risk among college students is approximately 45.28% [2]. Studies have found that the number of college students with mental health problems increases by 1–2% annually, and one out of every five students suffers from mental health problems of varying degrees [3]. This "college student mental health crisis" has triggered extensive academic discussions and urgent policy responses.

A noteworthy question is whether the distribution of psychological distress is homogeneous within the college student population. Studies have found that rural college students are more likely to report psychological distress such as anxiety and depression than their urban counterparts, and this difference remains significant after controlling for individual factors such as academic performance [4]. Faced with this empirical fact, how can we explain the urban-rural disparity in college students' mental health? At present, the mainstream explanatory approaches in academia can be roughly classified into three categories. The resource scarcity theory holds that rural students are in a disadvantaged position in resource competition after entering university [5]. The cultural conflict theory focuses on the urban-rural cultural conflicts and identity dilemmas faced by rural students in urban campuses [6]. The social support theory emphasizes that the lack of social support networks exacerbates rural students' psychological distress [7]. These explanations share a common presupposition: the campus environment is a homogeneous, background existence for all students. Under this presupposition, the impact of the physical attributes of the campus environment itself—such as architectural layout, green space distribution, learning space design, and dormitory density—on mental health is neglected or marginalized.

This study attempts to challenge this environmental homogeneity assumption and advocates for re-incorporating the campus physical environment into the analytical scope of college students' mental health research. Accordingly, it puts forward the following core questions: How does urban-rural origin affect students' mental health by shaping their perception and experience of the campus environment? Do the physical attributes of the campus environment produce differential psychological effects on students from different backgrounds? These questions further point to a theoretical issue: Is the urban-rural disparity in mental health, to some extent, a product of inequitable spatial resource allocation? To answer these questions, this study draws on the analytical framework of social space theory, integrates the dual perspectives of environmental psychology and social stratification theory, and attempts to construct a theoretical model of "urban-rural origin – campus environment perception – psychological distress" for college students.

2. Theoretical resources

2.1. Insights from social space theory

Social space theory provides important theoretical resources for understanding the relationship between space and psychology. Lefebvre proposed that space is not a neutral physical container, but a product and producer of social relations [8]. This theoretical framework carries dual implications. It reveals that campus space is not a mere physical environment, but a living space bearing specific power relations, cultural meanings, and emotional projections. Due to differences in their spatial experience histories, students of urban and rural origins may have systematic differences in their perception and ascription of meaning to the same campus space. Second, it emphasizes that space is both a product of social structure and a site for the reproduction of social structure. Differences in spatial habitus brought about by urban-rural origin are activated and reinforced on campus, an urban space, forming the spatial mechanism of mental health inequality. Giddens' structuration theory provides a new perspective for understanding this transformation. "Time-space distancing" makes it possible for "social relations to be disembedded from local contexts and recombined across broader time-

space" [9]. This provides a conceptual tool for understanding the spatial rupture experience of rural students when entering urban universities. Moving from familiar rural spaces to unfamiliar urban campus spaces is not only a geographical relocation, but also an ontological spatiotemporal reorganization. College students need to reconstruct their self-identity and the sense of order in daily life within a new spatiotemporal coordinate system.

2.2. Core concepts of environmental psychology

Environmental psychology provides systematic theoretical tools for understanding the relationship between physical environments and psychological states. Attention Restoration Theory and Stress Reduction Theory focus on the positive effects of natural environments on mental health. Adverse physical environmental characteristics can trigger individual stress responses, and long-term exposure to high environmental stress may lead to chronic psychological distress [10]. "Soft fascination" in natural environments can restore directed attention capacity [11]. Natural landscapes can automatically trigger the relaxation response of the parasympathetic nervous system and reduce physiological arousal levels [12]. These theories have been applied in campus environment research. A survey by Asim et al. found that environmental elements such as vegetation and open views are positively correlated with college students' positive approach behaviors and standardized mean alpha brain waves, while high-density buildings are associated with avoidance behaviors [13]. The concept of place attachment further complements the above analysis. Place attachment refers to the emotional bond established between an individual and a specific place, including place identity (the place as part of one's self-identity) and place dependence (the uniqueness of the place in meeting functional needs). Studies have confirmed that high levels of place attachment are associated with lower psychological distress [14, 15]. However, the formation of place attachment requires time and continuous spatial practice, which are precisely the conditions lacked by rural students who have just entered the campus. Feistner comprehensively applied Attention Restoration Theory, Stress Reduction Theory, and place attachment theory, and found that college students prefer campus green spaces close to the main teaching building and rich in natural elements [16].

2.3. Expansion of the social stratification perspective

Extending social stratification theory to the spatial domain helps build a theoretical bridge between urban-rural origin and campus environment perception. Bourdieu's concepts of cultural capital and habitus lay the foundation for this extension. Habitus is defined as a durable, transposable system of dispositions, an outcome of the internalization of social structure in the body, which shapes individuals' perception, evaluation, and behavioral tendencies [17]. Extending this logic, the concept of spatial habitus can be proposed: the unconscious schemas and skills regarding space use, movement, and perception that individuals internalize in their growing environment. Urban and rural adolescents grow up in vastly different spatial environments, thus forming differentiated spatial habitus. Urban children are familiar with modern urban spaces such as high-rise buildings, shopping malls, subways, and parks from an early age, and their spatial skills—such as using public transportation, understanding architectural signs, and navigating in complex spaces—are naturally cultivated in daily life practices. In contrast, rural children grow up in spatial environments with low density, high naturalness, and relatively simple structures, and their spatial experiences are more local and homogeneous. When these two groups of students enter university, an urban-type space with high complexity, clear functional zoning, and emphasis on autonomous navigation, there is a significant difference in the "compatibility" between their spatial habitus and the logic of campus space. This difference constitutes the spatial basis for the differentiation of urban and rural students' campus experiences. Related to this is the

concept of spatial capital. Spatial capital refers to the resources and opportunities individuals obtain by occupying specific spatial positions, including the accessibility of spatial resources, the freedom of spatial movement, and the control over spatial meaning. The spatial capital advantages of the dominant class are reflected in better residential locations, higher-quality public spaces, and stronger spatial selection capabilities. In the university context, the differential distribution of spatial capital is manifested in which students can more easily find quiet study corners, which students are more familiar with the resource layout of the library, and which students can better transform campus space into a "psychological shelter".

3. Spatial effects of urban-rural origin

3.1. Limitations of cultural adaptation research

The adaptation of rural college students to urban campuses has attracted extensive academic attention. Based on a survey of 1,528 rural college students, Yang et al. identified four types of cultural adaptation: dual-identity, rural-oriented, ambivalent, and marginalized. The study found that dual-identity students perform best in ability development but have hidden concerns in mental health; rural-oriented students perform best in mental health and have a slight advantage in academic performance; while ambivalent and marginalized students have a relatively low overall development level at university [18]. This finding reveals the complex relationship between cultural adaptation types and mental health, challenging the simple assertion that "integration is optimal". However, cultural adaptation research has certain blind spots. It mainly focuses on adaptation at the cultural and psychological levels, such as values, identity, and social interaction, while paying insufficient attention to adaptation in the physical spatial dimension. Yet the campus is not only a cultural field but also a physical space. Students need to adapt to the cultural norms and value systems of the university, as well as to the organizational logic and usage patterns of its physical environment. Cultural adaptation and spatial adaptation are intertwined, jointly shaping college students' campus experiences. Yao and Chen found that rural college students gain more benefits from peer trust and teacher trust in the school climate [19]. However, the concept of school climate mainly refers to social dimensions such as interpersonal relationships, with limited focus on the physical environment dimension.

3.2. Theoretical construction of spatial adaptation

Spatial adaptation refers to the cognitive, emotional, and behavioral adaptation process of individuals to a specific physical environment, including spatial cognition (the ability to navigate and locate effectively) [20], spatial behavior (the ability to use spatial facilities freely) [21], and spatial affect (the ability to form positive emotional bonds with space) [22]. For rural college students, the core challenge of spatial adaptation lies in the significant structural mismatch between the spatial experiences accumulated in their childhood and adolescence and the spatial organization logic of the university campus. In terms of scale, rural spaces are low-density, informal, and functionally ambiguous; university campuses are high-density with highly functional zoning. The "getting lost anxiety" of rural students when first entering the campus is not only a cognitive challenge, but also an ontological experience of disorder—when individuals cannot locate themselves in space, the stability of their self-identity is also eroded. In terms of symbols, urban spaces are filled with spatial texts such as signposts and signage systems, constituting a symbolic language. Rural students have low familiarity with this and need to exert extra cognitive effort to decode spatial information; this continuous cognitive load is itself a form of environmental stress. In terms of rules, urban public spaces have a set of explicit but usually unwritten rules (such as noise levels in libraries, queuing order in canteens, and seat reservation norms in study rooms). Urban students internalize these as bodily skills through "tacit learning",

while rural students need to consciously learn and abide by them, a process accompanied by uncertainty and anxiety.

3.3. The proposal of "dual unfamiliarity"

Based on the above analysis, the concept of "dual unfamiliarity" can be proposed to describe the psychological dilemmas faced by rural college students on campus. The first layer of unfamiliarity is cultural unfamiliarity. Campus culture, teacher-student interaction patterns, and peer communication rules differ from the cultural patterns in the growing environment of rural students, and this difference triggers identity confusion and a lack of sense of belonging. Yang et al. found that compared with urban students, rural college students often lack the cultural capital matching the urban campus, making them often feel "out of place and isolated" in this environment [18]. The second layer of unfamiliarity is spatial unfamiliarity. The physical environment of the campus—such as the scale of buildings, spatial layout, and facility configuration—exceeds students' existing spatial experience, requiring additional cognitive resources to adapt. Nie et al. revealed the direct mechanism of spatial field transition on students' psychological adaptation, and found that students' adaptation quality after moving to cities follows a U-shaped development, indicating that adaptation difficulties in the initial stage of spatial transition are universal [23]. These two layers of unfamiliarity reinforce each other. Cultural unfamiliarity exacerbates the difficulty of spatial adaptation: when students are unfamiliar with the overall operational logic of the university, their ability to interpret spatial symbols and understand spatial rules is also inhibited. Conversely, spatial unfamiliarity also intensifies cultural unfamiliarity: when students repeatedly encounter spatial setbacks such as "getting lost" or "being unable to find a quiet place to study", their sense of belonging and self-efficacy are eroded, which in turn strengthens their alienation from university culture.

Studies from the perspective of field transition confirm this analytical framework. Research has found that the intense sense of rupture and gap experienced by rural female college students when moving from rural areas to cities for study and life makes them more prone to feelings of inferiority and confusion [4].

4. The mediating role of campus environment perception

4.1. Pathways of campus physical environment's impact on mental health

The impact of the campus environment on college students' mental health has attracted researchers' attention. Based on a case study of Yuelu Mountain National University Science and Technology City, researchers found that campus greening and diversity have a negative effect on disappointment and depression, while sky visibility has a positive effect on happiness and sense of security [24]. Other studies have found that college students' environmental perception of campus healing gardens echoes the four characteristics of restorative environments: being away, extent, fascination, and compatibility [25].

Previous environmental psychology studies have explained the psychological mechanism of physical environment affecting mental health through three pathways: stress, restoration, and identity. According to environmental stress theories, perceived environmental stressors are direct predictors of psychological distress [26]. Rural students have lower familiarity with urban spaces, are more sensitive to perceived environmental stress, and have more limited coping resources. Attention Restoration Theory emphasizes that the "soft fascination" of natural environments can restore directed attention, and Berto's study provides direct experimental evidence for this [27]. Campus green spaces with restorative characteristics (such as quiet gardens and shaded lawns) can alleviate attention fatigue and replenish psychological resources. Studies have shown that there is a significant correlation between the spatial perceptual attributes of campus green spaces and psychological restoration experiences [4]. However, students differ in their accessibility to such spaces;

students more familiar with the environment are more likely to discover and use these hidden restorative resources. Place attachment theory holds that individuals' emotional bonds with places are an important part of their self-identity [28]. When students "appropriate" campus space—endowing it with personal meaning and projecting emotions—these spaces become psychological shelters. Due to differences in spatial experience, rural students have more difficulty establishing emotional bonds in a short period of time, and the experience of "having no fixed place to belong" intensifies their sense of drift and alienation.

4.2. Urban-rural differences in campus environment perception

Campus environment perception is not a purely individual psychological phenomenon, but a spatial projection of social position. Due to differences in spatial habitus, students of urban and rural origins may have systematic differences in their perception of the same campus environment. First, there are differences in spatial cognitive efficiency. Urban students grow up in complex environments, and their spatial cognitive abilities such as mental map construction and environmental cue utilization are fully exercised. As an implicit cognitive capital, spatial cognitive ability enables them to "scan" the campus, locate resources, and plan routes more efficiently. Rural students, by contrast, need to invest more cognitive resources to complete the same spatial tasks. Second, there are differences in spatial usage patterns. Urban students are more agentic in their use of public spaces, tending to actively transform and customize spaces to meet their own needs (such as finding exclusive study corners, planning usage time, and rearranging tables and chairs). Rural students are more passive and compliant, tending to accept the existing definitions and official allocation of spaces. This difference affects the efficiency with which the two groups of students capture campus spatial resources. Third, there are differences in the ascription of spatial meaning. Urban students can more naturally decode the cultural meanings of campus space (the value orientation of architectural styles, the educational philosophy of landscape design, and the power relations of spatial zoning). Rural students, by contrast, are more inclined to understand space as a functional container and are less sensitive to cultural symbolic meanings. This difference makes it more difficult for them to internalize the cultural spirit of the university through spatial experience, thus affecting their sense of identity and belonging.

4.3. Differential distribution and cumulative effect of environmental stress

The cumulative effect of the above differences ultimately translates into urban-rural differentiation in the distribution of environmental stress. Rural students face higher levels of environmental stress on campus, which manifests in three dimensions. The first is navigation stress. Due to low spatial cognitive efficiency, rural students find it more strenuous to move around the campus, needing to invest more attention and time to complete spatial positioning. This continuous "cognitive tax" is itself a source of stress. The second is uncertainty stress. Unfamiliarity with spatial rules leads to higher experiences of uncertainty, such as not knowing what time the library closes, being unsure which canteen serves palatable food, and being uncertain about the location of emergency exits in teaching buildings. Uncertainty is one of the core triggers of anxiety. The third is belonging stress. Due to the difficulty of establishing emotional bonds with space, rural students are more likely to experience "rootlessness"—the feeling of being alienated despite being physically present. This existential state of "being present yet absent" is an important source of psychological distress. More critically, there is a spillover effect between environmental stress and other forms of stress (academic stress, economic stress, social stress), forming cumulative disadvantage. When students' cognitive resources are continuously consumed by spatial navigation, their energy for study and social interaction decreases. When students feel anxious due to spatial unfamiliarity, their willingness and ability to build new interpersonal

relationships are also affected. Difficulties in spatial adaptation thus become an amplifier of adaptation problems in other domains.

5. College student mental health intervention from the perspective of spatial justice

5.1. Paradigm shift in mental health services

The above theoretical analysis has important implications for the practice of mental health services in colleges and universities. The current mental health intervention model in colleges and universities mainly follows the logic of individual pathology, locating psychological distress within the individual (cognitive bias, emotional dysregulation, personality traits, etc.), and "fixing" students through individualized psychological counseling, medication, or group counseling. This model undoubtedly has its value, but its limitations are increasingly apparent. When a large number of students fall into psychological distress due to structural reasons, "fixing individuals one by one" is both inefficient and unjust.

Based on socio-spatial analysis, this study proposes an environmental turn in mental health services, shifting from repairing individuals to reconstructing space. First, promote the equity of spatial accessibility. Colleges and universities should examine whether there is implicit discrimination in the distribution of campus spatial resources, whether quiet study spaces are concentrated in certain areas, whether the opening hours and spatial layout of canteens, libraries, and teaching buildings take into account the usage habits of different students, and whether sufficient transitional spaces such as quiet rest areas and bookable study rooms are provided to meet the needs of students with different spatial requirements. Second, improve spatial legibility. In response to the spatial cognitive difficulties that rural students may face, colleges and universities can reduce the cognitive threshold of spatial adaptation by improving spatial signage systems, providing navigation aids, and organizing campus space exploration activities. These measures can not only directly reduce environmental stress, but also convey the important symbolic message that "this university welcomes students from all backgrounds". Third, foster a sense of spatial belonging. By encouraging students to participate in space renovation projects, supporting student associations' claims to the right to use specific spaces, and organizing space-sharing activities at the dormitory and college levels, students can be helped to establish emotional bonds with campus space. When space is transformed from a *place* to a *home*, its psychological shelter function is activated.

5.2. Inclusive reconstruction of campus space design

Restorative environment theory provides specific guiding principles for campus space design. To respond to students' diverse spatial needs, campus design should consider the following principles. First, the principle of diversity. Different types of spaces should be provided to meet the needs of students with different spatial habitus. For example, there should be not only highly structured, quiet and orderly ritual spaces such as library reading rooms, but also relatively flexible transitional spaces that allow low-intensity social interaction, such as open study areas with partitions. Second, the principle of explorability. Space design should encourage students to explore independently, rather than being "transparent" at a glance. Some studies have shown that moderate spatial complexity and mystery can stimulate exploratory behavior, which itself contributes to the formation of place attachment. Overly simplified and homogenized space design may deprive students of the sense of achievement from discovering and mastering space. Third, the principle of participation. Students should be included in the decision-making process of space design and renovation. When students have a

voice in space, their spatial identity and sense of belonging will be significantly enhanced. This approach also brings the spatial experiences of students from different backgrounds into design discussions, making the final design scheme more inclusive.

5.3. The "space-friendly" path for supporting rural students

For the group of rural college students, colleges and universities can add a space-friendly dimension on the basis of the existing support system. Specific measures may include the following. First, orientation navigation support. Add campus spatial cognition training to freshman orientation education, and help rural students quickly build a mental map of the campus through forms such as orienteering and space exploration groups. Second, a spatial mentor system. Arrange senior students to serve as spatial mentors, leading junior rural students to explore hidden spaces on campus—such as practical study corners not located at the center of the map, facilities only accessible at specific times, and space usage tips only known by senior students. Third, spatial adaptation workshops. Incorporate spatial adaptation topics into mental health education activities to help rural students realize the universality of spatial unfamiliarity (rather than a defect in personal ability), share spatial adaptation strategies, and reduce the sense of shame and self-doubt caused by spatial difficulties. Fourth, a spatial resource information platform. Adopt digital and intelligent technology to develop a real-time query platform for campus spatial resources (such as study room occupancy, canteen crowding, and bookable space information), so as to reduce the uncertainty of spatial information acquisition and alleviate navigation stress.

6. Conclusion

Starting from social space theory, this study integrates perspectives from environmental psychology and social stratification, and systematically explores the mechanism of the relationship between urban-rural origin, campus environment perception, and college students' mental health. The core theoretical propositions can be summarized as follows. First, the urban-rural disparity in college students' mental health is not only a product of differences in cultural and economic capital, but also a result of the unequal distribution of spatial capital. Urban and rural students enter university with differentiated spatial habitus, leading to systematic differences in their adaptation difficulty and perception patterns of the campus environment. Second, campus environment perception plays a mediating role between urban-rural origin and psychological distress. Rural students face "dual unfamiliarity"—the superimposition of cultural unfamiliarity and spatial unfamiliarity—resulting in higher levels of environmental stress, lower accessibility to restorative spaces, and greater difficulty in forming place attachment. Third, the environmental stress effect of the campus physical environment is heterogeneously distributed among groups of different origins. Rural students are more sensitive to environmental stress and have more limited coping resources, so the effect of environmental quality on mental health is stronger. Fourth, the individualized paradigm of current college mental health services obscures the spatial roots of mental health inequality. Realizing the spatial justice turn of mental health promotion, from repairing individuals to reconstructing space, is not only a matter of efficiency, but also a matter of equity.

The urban-rural disparity in college students' mental health is a complex issue integrating multiple dimensions of culture, economy, society, and space. Reducing it to individual dilemmas or cultural conflicts is insufficient. This study attempts to introduce the spatial dimension, not to deny the importance of other dimensions, but to advocate a more integrated analytical framework. Only by positioning mental health issues within the "totality of social space" can we truly understand their causes and design effective coping strategies. When universities strive to become "a home for all", spatial justice should be an unavoidable commitment.

This study is carried out from a theoretical speculative perspective, and its core contribution lies in conceptual construction and theoretical integration, rather than empirical verification. Future research can be advanced in the following directions. First, conduct empirical research. Systematic empirical studies are needed to test the "spatial habitus – environmental perception – psychological distress" path proposed in this study, and to quantify the contribution rate of spatial adaptation difficulties to the urban-rural disparity in mental health. Second, conduct comparative research. The patterns of spatial adaptation differences between urban and rural students may vary across universities in different regions (eastern vs. western), of different types (research universities vs. application-oriented universities), and with different campus planning concepts. Comparative research helps identify generalizable intervention strategies. Third, conduct longitudinal research. Spatial adaptation is a process that unfolds over time. A longitudinal tracking design can reveal the spatial adaptation trajectory of rural students: which students can achieve spatial transcendence? Which students continue to face spatial dilemmas? Which time points are the key windows for intervention? Fourth, conduct action research. Combine theoretical research with space renovation practice, test the actual effects of space-friendly strategies through participatory design, spatial intervention evaluation, and other methods, and accumulate the knowledge base of evidence-based practice.

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