

From Isolation to Inclusion: Building Integrated Mental Health Services through Social Network-based Interventions in Chinese Universities

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Abstract

Since the outbreak of the COVID-19 pandemic, Chinese university students' mental health has been affected more severely compared with other groups of people, negatively influencing their academic performance, social engagement, and social functioning. The ramifications last even in the post-pandemic era. Current mental health services in Chinese universities are insufficient to meet the ever-increasing psychological needs of the students. To improve Chinese university students' mental health, this research proposes to carry out social network-based mental health intervention, including the establishment of a dual-layer virtual-physical students' social network, selection of the most influential students in this dual-layer social network, and implementation of the Acceptance, Commitment to Empowerment (ACE) therapy to the selected influential students. The study seeks to maximize the impact of ACE and the reach scope of a targeted group of people with the power of social network given the resource and time limits. The ultimate goal is to establish an integrated mental health service system that provides timely intervention and long-term support for Chinese university students. Results yielded by this project will inform on the development of social network-based mental health intervention and inclusion of digital elements for mental health promotion.

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Original Manuscript

From Isolation to Inclusion: Building Integrated Mental Health Services through Social Network-based Interventions in Chinese Universities

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Abstract

Since the outbreak of the COVID-19 pandemic, Chinese university students' mental health has been affected more severely compared with other groups of people, negatively influencing their academic performance, social engagement, and social functioning. The ramifications last even in the post-pandemic era. Current mental health services in Chinese universities are insufficient to meet the ever-increasing psychological needs of the students. To improve Chinese university students' mental health, this research proposes to carry out social network-based mental health intervention, including the establishment of a dual-layer virtual-physical students' social network, selection of the most influential students in this dual-layer social network, and implementation of the Acceptance, Commitment to Empowerment (ACE) therapy to the selected influential students. The study seeks to maximize the impact of ACE and the reach scope of a targeted group of people with the power of social network given the resource and time limits. The ultimate goal is to establish an integrated mental health service system that provides timely intervention and long-term support for Chinese university students. Results yielded by this project will inform on the development of social network-based mental health intervention and inclusion of digital elements for mental health promotion.

Keywords: Chinese University Students, Mental Health, Social Network-based Mental Health Intervention

Contributions to the Literature

- This study advances the literature by pioneering a social network-based approach to a novel mental health intervention in Chinese universities, which extends beyond traditional campus counselor-based services.
- The research uniquely proposes a dual-layer virtual-physical social network, allowing for the identification of influential individuals to maximize intervention impact within resource limitations, providing a new perspective for efficient knowledge dissemination and psychological well-being improvement in university settings.
- By employing the RE-AIM framework, this study contributes valuable insights into the adaptability and sustainability of social network-based mental health interventions, which can inform the design and scaling up of similar interventions in diverse contexts.

3. Introduction

1.1 Background

In 2019, the State Council of People's Republic of China issued a series of documents to promote the overall health of the Chinese, and it accentuated the critical role that mental health played for people's overall health. To echo the initiative made by the central government on promoting Chinese' mental health, relevant government departments should guide the public to alleviate psychological stress through scientific methods, such as mental health education, crisis intervention, and destigmatization of mental disorders and psychological problems. The aim is to increase the public's mental health literacy by 20%-30% from 2022 to 2030 and to slow down the rising trend of the number of Chinese diagnosed with mental illness (State Council, 2019).

Across different population groups in China, Chinese university students are more susceptible to mental illness, such as anxiety and depression compared with other populations due to their unique developmental characteristics at this stage (Lei et al., 2016). In China, the prevalence of depression among university students is as high as 23.8% (Luo et al., 2021). In recent years, there has been a growing trend of deteriorating mental health issues among university students, with a younger age of onset and increasingly severe symptoms (Yang et al., 2025). Due to their low levels of mental health literacy, this group tends to stigmatize mental illness, making it difficult for early recognition, detection, and timely intervention (Tang et al., 2020). Moreover, university students are less likely to seek help from professional mental health service providers, which further exacerbates their mental health (Han et al., 2018). Since the outbreak of the COVID-19 pandemic, Chinese university students have faced more severe depression and anxiety issues compared with other groups, significantly affecting their academic performance, daily life, and personal planning (Luo et al., 2021).

The university mental health service system is the backbone for helping students cope with these challenges and addressing mental health issues. However, the current mental health service system in Chinese universities is still primarily dependent on campus counselors as the main service providers, but the staffing ratio is far from sufficient to meet students' growing demands for mental health services. More to the public concern is that when university students in China experience mental health problems, they do not always seek help from on-campus counselors. They worry about the possibility of privacy leakage and thus social ostracization by their peers. Additionally, they remain doubts about the professional competence of on-campus counselors, believing that even if they seek help, their problems may not be effectively resolved. Therefore, Chinese university students prefer self-reliance and informal support more for dealing with mental health problems (Ning et al., 2022). This is closely related with students' low level of mental health literacy, which explains that most Chinese university students are reluctant to seek professional mental health services and are more inclined to solve problems on their own or seek help from family and friends when facing mental health challenges (Han et al., 2018). Although the field of mental health literacy has developed rapidly in China in recent years, there is still a lack of research on developing intervention methods aimed at improving the mental health literacy of the general public (Lu et al., 2019).

1.2 Applying an Innovative Evidence-based Intervention among Chinese University Students

Acceptance and Commitment Therapy (ACT) was proposed by Hayes and his colleagues (Hayes, 1999) and is based on the philosophy of functional contextualism. It is one of the representative methods of third-wave behavioral interventions. This therapy aims to alleviate people's negative psychological experiences by changing the context rather than attempting to alter the psychological experiences themselves. At the same time, it encourages individuals to take actions that align more closely with their values. Most studies on the effectiveness of ACT interventions have shown that, compared with other interventions, such as Cognitive Behavioral Therapy (CBT), ACT has better intervention outcomes for depression, anxiety, substance abuse, and other issues (Bai et al., 2020; Coto-Lesmes et al., 2020). ACT has also been shown to be effective in improving the mental well-being of university students. In a 2018 study, Gregoire and his colleagues found that after 144 university students underwent a four-week ACT intervention, their psychological well-being, including mindfulness, acceptance, values, and school engagement—improved significantly compared to the control group (Gregoire et al., 2018). At the same time, their levels of depression, anxiety, and stress decreased. Räsänen and colleagues (2016) conducted a seven-week mixed online and offline ACT intervention for university students and found that ACT significantly improved the mental health of the participants while reducing depression, anxiety, and stress levels.

Multiple studies have confirmed that Group Empowerment Psychoeducation (GEP) can effectively reduce the stigma associated with mental illness (Lucksted et al., 2017). Currently, there is a lack of GEP interventions targeting the general public, and there is no research specifically targeting Chinese university students.

Through multiple practical trials, research has found that an innovative implementation model Acceptance and Commitment to Empowerment (ACE) combining ACT and GEP can effectively enhance the psychological flexibility of the target population, reduce the stigma associated with mental illness, and promote a sense of empowerment and human rights, thereby strengthening the promotion of mental health (Fung et al., 2021b).

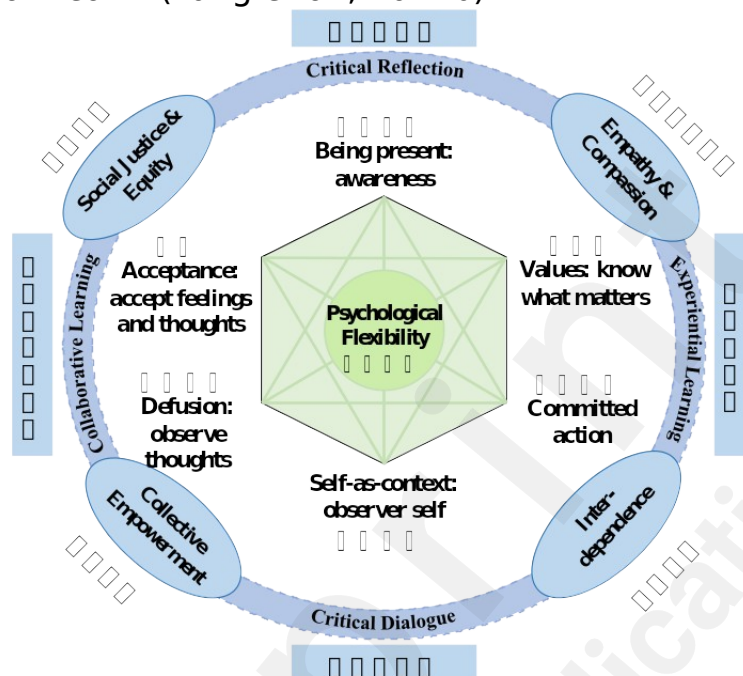


Figure 1 Acceptance and Commitment to Empowerment Model

As shown in **Figure 1** (Wong et al., 2018), the inner circle corresponding to the ACT model can help individuals receiving the intervention effectively improve their mental health and enhance their resilience. As shown in **Figures 2 and 3** (Wong et al., 2018), the six processes of ACT can be visually represented through six gestures, demonstrating how each process helps participants reduce psychological inflexibility and thus increase their flexibility.

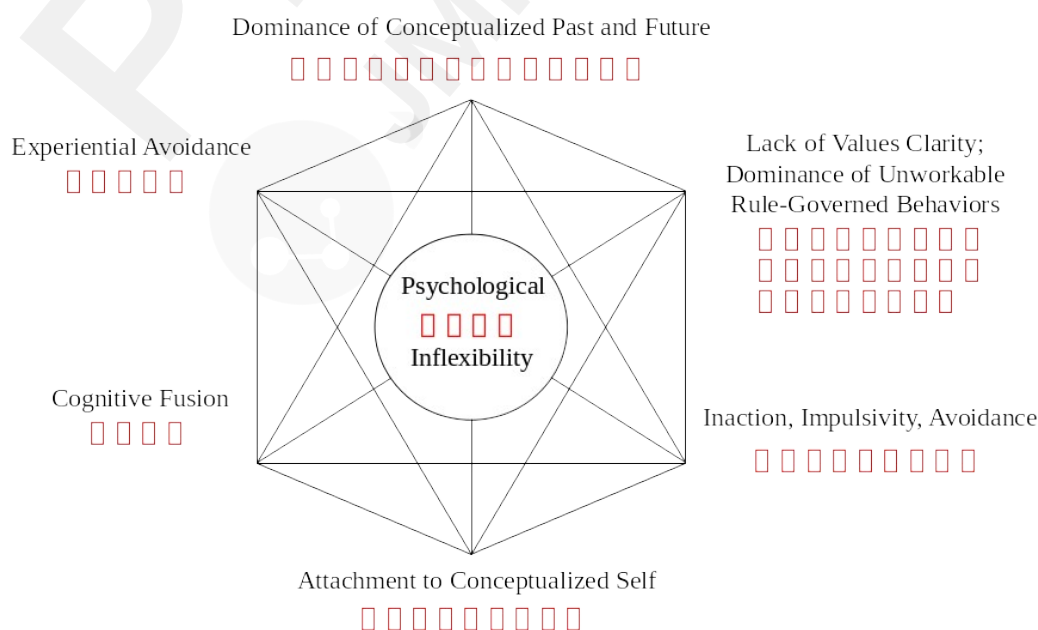


Figure 2 Six Aspects of Psychological Inflexibility

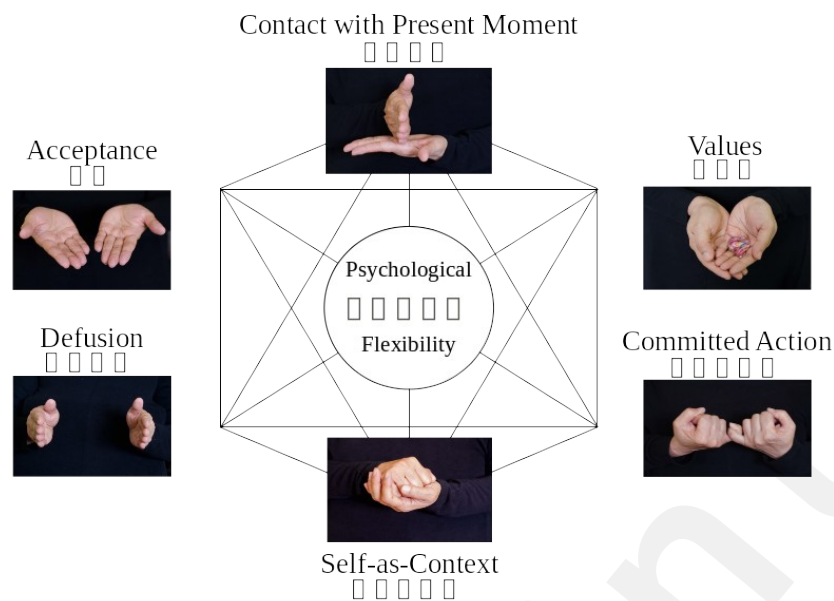


Figure 3 Six Processes of ACT

However, without a supportive environment, the improvement and maintenance of an individual's mental health level are limited. Therefore, through the outer circle of Group Empowerment Psychoeducation (GEP), individuals' sense of empowerment and mutual support behaviors can be enhanced, thus promoting the dissemination of mental health awareness. This, in turn, fosters an environment conducive to mental health development, enabling individuals to maintain a good level of mental health for a longer period of time. Previous research has demonstrated the effectiveness of this innovative intervention method. In projects focused on women's overall health, this intervention has, in the short term, improved participants' mental health literacy, self-care, and stress-coping abilities. Mid-term outcomes include participants actively promoting mental health within their communities. Long-term outcomes include participants applying this intervention method in projects at mental health organizations serving Asian communities in Toronto (Sato et al., 2022; Wong et al., 2010). Another project conducted in Canada after the pandemic aimed at reducing the psychological stress of frontline healthcare workers and enhancing their resilience. This intervention method effectively motivated participants to actively engage in and organize activities to support communities severely affected by the pandemic after the intervention ended (Sheehan et al., 2022). However, in the post-pandemic era, this innovative combined intervention method has not yet been applied to any groups within China.

2. About This Project - Social Network-based Mental Health Promotion

To address the aforementioned issues of insufficient and limited mental health resources in universities, and considering the help-seeking behaviors of students when facing mental health challenges, this project will implement social network-based mental health intervention by firstly collecting university students and staff's physical and virtual social network data and then building a dual-layer social network, and we will identify the most influential individuals (seed nodes) within this dual-layer social network for ACE mental health

intervention training, mobilizing them to disseminate mental health fundamentals, self-care strategies, and cultivate collective resilience within this network. As we live in an era of information connectivity, where interactions within universities have shifted from purely offline to a hybrid of online and offline interactions, therein, to identify the most influential students and staff on campus, we will use data from both online and offline interactions to establish two interconnected social networks in virtual and real spaces. This approach aims to maximize the use of comprehensive interaction data within the university to improve intervention effectiveness and, consequently, enhance the mental health of university students.

By establishing a dual-layer social network in virtual and real spaces and employing social network analysis, this project will explore the characteristics of mental health-related information dissemination and design effective algorithms to identify the most influential individuals within the university. By implementing ACE for these influential individuals, the project aims to improve participants' mental health literacy, reduce mental health stigma, raise their awareness of helping others, promote mental health knowledge and self-care techniques on campus and effectively influence other students in the university to adopt positive coping behaviors using social network. Ultimately, in addition to seeking help from on-campus counselors, university students can also seek assistance from peers, faculties, and staff who have undergone intervention and possess a certain level of mental health literacy, thus enabling them to receive timely and high-quality mental health services. By achieving the aforementioned efforts, we expect to establish a sustainable and collaborative university mental health service system that enhances student mental well-being, which will contribute to the improvement of the national social psychological service system and provide valuable insights for relevant institutions (Li & Zhang, 2022). This project has been funded by China's Guangdong Basic and Applied Basic Research Foundation in 2023 as a general project.

3. Research Design

3.1 Establishment of a Social Network Incorporating Data from Virtual and Real Spaces

This project will establish a dual-layer social network based on the social data of faculty and students in both virtual and real world. We propose the model of this dual-layer social network as a directed graph with weight on each edge between two nodes, as shown in **Figure 4**. This dual-layer directed graph consists of two subgraphs with the same set of nodes, representing participants' social networks in virtual and real spaces respectively. Each node represents a university faculty member or student. Each subgraph has an independent set of directed edges. If there is a directed edge from node i to node j in the subgraph corresponding to the virtual or real space, it indicates that the related influence (e.g., the mental health knowledge disseminated during the online intervention) can be transmitted from the faculty member or student represented by node i to the faculty member or student represented by node j in the corresponding virtual or real space. Moreover, each directed edge has a weight, which represents the probability of successful transmission of the information along

that directed edge.

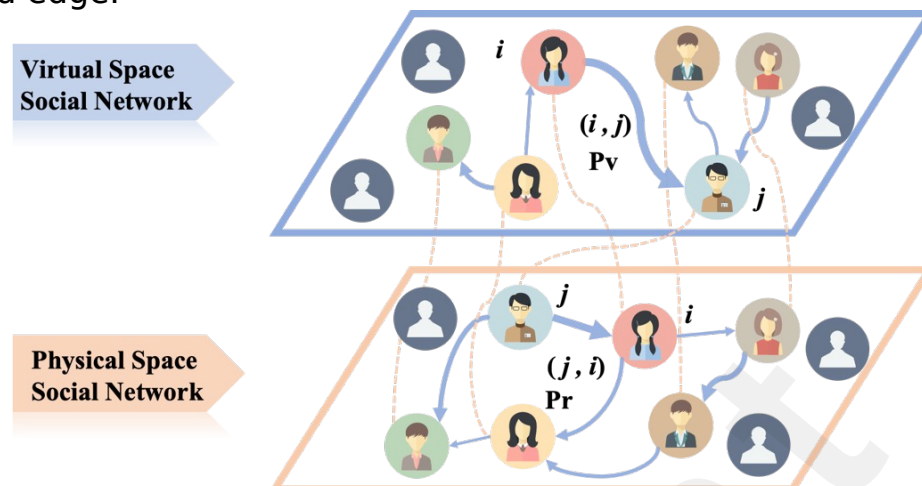


Figure 4 Dual-layer Social Network

3.2 Analyzing the Social Network to Identify Seed Nodes and Implement Interventions

After mapping out participants' social network, we will first analyze the various characteristics of the dual-layer directed graph corresponding to the social network in virtual and real spaces. This analysis will help us gain insights into the network and provide inspiration for subsequent research. We will examine key global statistical metrics of the graph, such as the number of nodes, the number of edges, average node degree, graph diameter, and clustering coefficient. Additionally, we will observe centrality indicators, which are used to measure the importance of each node, including in-degree centrality, out-degree centrality, eigenvector centrality, closeness centrality, betweenness centrality, and subgraph centrality.

Based on the dual-layer directed graph corresponding to the social network, this study will define the problem of influence maximization in social networks and design an algorithm with theoretical performance guarantees to solve this problem. The algorithm will identify a set of highly influential seed nodes within the directed graph, enabling the dissemination and diffusion of mental health interventions among faculty and students to be maximized within budget constraints.

Finally, we will conduct online interventions. We will contact the top 30 most influential individuals in the social network to receive the intervention. The intervention will include two components: six 1.5-hour self-learning modules on an online learning platform and six sessions of 1.5-hour online group meetings, allowing participants to learn and interact online. This online learning modules include video lectures on the basic knowledge of ACE, guided mindfulness audio exercises, reflection exercises, and interactive activities. These modules have been applied in other projects conducted by the project leader. After completing these six weekly online self-study modules, participants will join online group sharing and discussion meetings. These group meetings will be led by scholars and psychiatrists who researched and developed ACE intervention. During these meetings, the group facilitators will discuss the key points and challenges of the weekly intervention methods based on participants' sharing and explain how to apply the weekly key concepts to real-life situations to improve psychological flexibility and enhance resilience of the participants.

After completing all online modules and group meetings, participants will begin to play a vital role in the university mental health service system by disseminating the mental health knowledge and self-care skills they have learned, providing basic support and advice to students in need of mental health assistance. For three months following the intervention, participants will regularly fill out activity logs and reflective summaries in the online learning system, recording and summarizing how they apply the intervention methods in their daily lives and its impact on them. As mental health-related information spreads within the social network, the number of people influenced indirectly by the participants will continue to increase, thereby expanding the project's impact. During this process, we encourage participants to create WeChat groups, as this method's convenience can attract more students to join and receive informal mental health support, find suitable mutual support partners, organize online or offline activities, and share mental health knowledge and information.

3.3 Evaluating Intervention Effectiveness Using the RE-AIM Framework

This project will use the RE-AIM framework (Fung et al., 2021a) to evaluate the implementation and effectiveness of the ACE intervention, with specific details as follows (**Table 1**):

Table 1: Evaluation of the Acceptance, Commitment, and Empowerment Intervention Therapy Using the RE-AIM Framework	
Reach (a)	
1.	What proportion of eligible students received the intervention, and what proportion expressed a willingness to receive it?
2.	Compare the number of students who completed the intervention with the number who dropped out mid-way; compare the number who completed the intervention with the number of eligible students.
Effectiveness (b)	
Track the effects before, after, and three months following the intervention:	
1.	Attitudes: CAMI (Community Attitudes Toward the Mentally Ill)
2.	Mental Health Literacy: MHKQ (Mental Health Knowledge Questionnaire)
3.	Empowerment & Mental Health Status: DASS-21 (Depression, Anxiety, and Stress Scale), AAQ-II (Acceptance and Action Questionnaire), Bullseye, activity logs, and reflections.
Adoption (c)	
1.	Practicality of the intervention method, acceptance by the target population, and suitability of the environment.
2.	Other campus and community organizations that did not participate in this project but expressed interest and intention to participate.
Implementation (d)	
1.	Use implementation criteria and fidelity assessment forms to evaluate the intervention implementers' adherence to the intervention process.

2. Post-intervention forms.
3. Reflection forms to be filled out by students who implemented the intervention.
Maintenance (e)
1. Dissemination of influence by participants after receiving the intervention.
2. Complete an online qualitative questionnaire three months after the intervention.
3. Whether this intervention model can be applied by other relevant institutions.

Table 1**a) Reach**

The reach of the ACE Intervention refers to the ratio of students who completed the intervention to the total number of eligible students. Since the recruitment target number has already been set in advance for this project, we will continuously record the number of faculty and students expressing interest in participating in this intervention and use this as an estimate of the maximum reach of this project.

b) Effectiveness

The effectiveness of the ACE Intervention Therapy will be analyzed through quantitative scales and activity logs before, after, and three months following the intervention.

1. Stigmatization of Mental Illness (Attitude)

We will use the Community Attitudes Toward the Mentally Ill (CAMI) scale to measure students' stigmatizing attitudes toward mental illness. This scale has good reliability and validity and includes four subscales:

- o **Authoritarianism:** Belief that people with mental illness are inferior and need to be controlled and taken care of.
- o **Benevolence:** Empathy based on humanistic concern.
- o **Social Restrictiveness:** Belief that people with mental illness pose a threat to society.
- o **Community Mental Health Ideology:** Recognition that people with mental illness should take on responsibilities and roles in society and be helped in their recovery.

2. Mental Health Literacy

We will use the Mental Health Knowledge Questionnaire (MHKQ) to measure the mental health literacy level of university students, exploring their knowledge of mental health.

3. Individual and Collective Empowerment (Mental Health Outcomes and Actions)

Mental health can be assessed by measuring depression, anxiety, stress, and psychological flexibility. Behavioral outcomes will be reflected in the students' efforts to destigmatize mental illness and contribute to the collective well-being. We will use the following tools and methods:

- o **DASS-21:** This scale includes three subscales that measure depression, anxiety, and stress. It has been validated among Chinese university students.
- o **Acceptance and Action Questionnaire-II (AAQ-II):** This scale measures the psychological flexibility of participants, i.e., their ability to take action when faced with negative emotions or unpleasant experiences.
- o **Bullseye Chart:** This chart measures the gap between values and actions. The bullseye chart is a visual scale, originally divided into four quadrants starting from the center, representing four areas of the participant's life (e.g., work, relationships, self-care, personal health). Participants place an X in each quadrant based on their actual actions and the values they hold in that area. The closer the X is to the bullseye, the higher the alignment between their values and corresponding actions in that area, and vice versa.
- o **Actions:** After completing the intervention, participants will fill out an online activity log every week, recording how they promote mental health among university students and reduce public stigmatization of mental illness. This activity log will be filled out until three months after the intervention ends.

c) Adoption by Institutions

In the first phase, we will collect data from stakeholders and service providers during focus group interviews to understand whether the Acceptance, Commitment, and Empowerment Intervention Therapy is supported by stakeholders, and its applicability and feasibility in relevant institutions. Additionally, we will record which related institutions express interest in participating in the project and the possibility of implementing the Acceptance, Commitment, and Empowerment Intervention Therapy during and after the project.

d) Implementation Evaluation

We will evaluate the implementation of the intervention to explore whether it has been disseminated to the desired extent with high fidelity. We will use the following tools for assessment:

(1) Intervention Guidelines and Fidelity Checklist

In the first phase, this project will develop intervention guidelines, which participants must strictly follow when disseminating this intervention

method to other students after receiving the intervention. The fidelity checklist is used to evaluate whether participants accurately replicate the Acceptance, Commitment, and Empowerment Therapy while providing mental health support to students. The intervention's originators will act as supervisors, evaluating participants' adherence by analyzing their activity logs.

(2) Post-Intervention Form

This form, to be completed by participants after the intervention, will assess their knowledge acquisition and absorption, satisfaction with the intervention implementation, and their confidence in using this intervention method in the future.

(3) Reflection Form

The intervention originators will complete a reflection form after leading six online group sessions, recording the smooth and challenging aspects of the intervention implementation, as well as group dynamics.

e) Project Maintenance and Sustainability

To evaluate the maintenance and sustainability of the project, we will analyze the ongoing development and impact of the project through participants' monthly activity logs and data from WeChat groups. Additionally, we will distribute an online qualitative questionnaire to all participants three months after the intervention to assess the impact of the intervention on individuals and schools, and the acceptance, applicability, and practicality of the intervention method.

4. Discussion

This study faces several challenges. First, privacy concerns may make participants reluctant to provide complete and accurate information, especially regarding mental health and social network interactions. Repeated training on data confidentiality and anonymity is needed to alleviate these concerns.

Secondly, the integration of virtual and physical social network data is complicated. Virtual interaction data, such as from social media, is vast and unstructured, requiring extensive data cleaning and preprocessing. Meanwhile, physical interaction data is difficult to quantify and may be subject to recall bias. Combining these two types of data and establishing a unified social network model is a complex task.

External factors such as university policies, campus climate, and access to mental health resources can influence participants' experiences and responses. These contextual factors should be accounted for in the data collection process to provide a more comprehensive understanding of the intervention's effectiveness.

Addressing these challenges requires careful planning, the use of mixed-methods approaches to triangulate data, and ongoing monitoring of data

collection processes. By acknowledging and mitigating these issues, the study can enhance the reliability and validity of its findings, thereby contributing more meaningfully to the field of implementation science.



Declarations

Ethics approval and consent to participate:

This study was approved by the Ethics Committee of Beijing Normal-Hong Kong Baptist University.

Consent for publication:

All authors have reviewed and approved the final manuscript for publication.

Availability of data and material:

The datasets generated and/or analysed during the current study are available from the corresponding author on reasonable request.

Competing interests:

The authors declare no competing interests.

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Authors' contributions:

XN contributed to the conceptualisation of the study and writing of the original draft. YL contributed to the writing of the original draft. DW and YL contributed to the essential idea-drafting, which laid the foundation of the interdisciplinary components. All authors contributed to writing, reviewing, and editing the manuscript and approved the final version.

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Supplementary Files

Figures

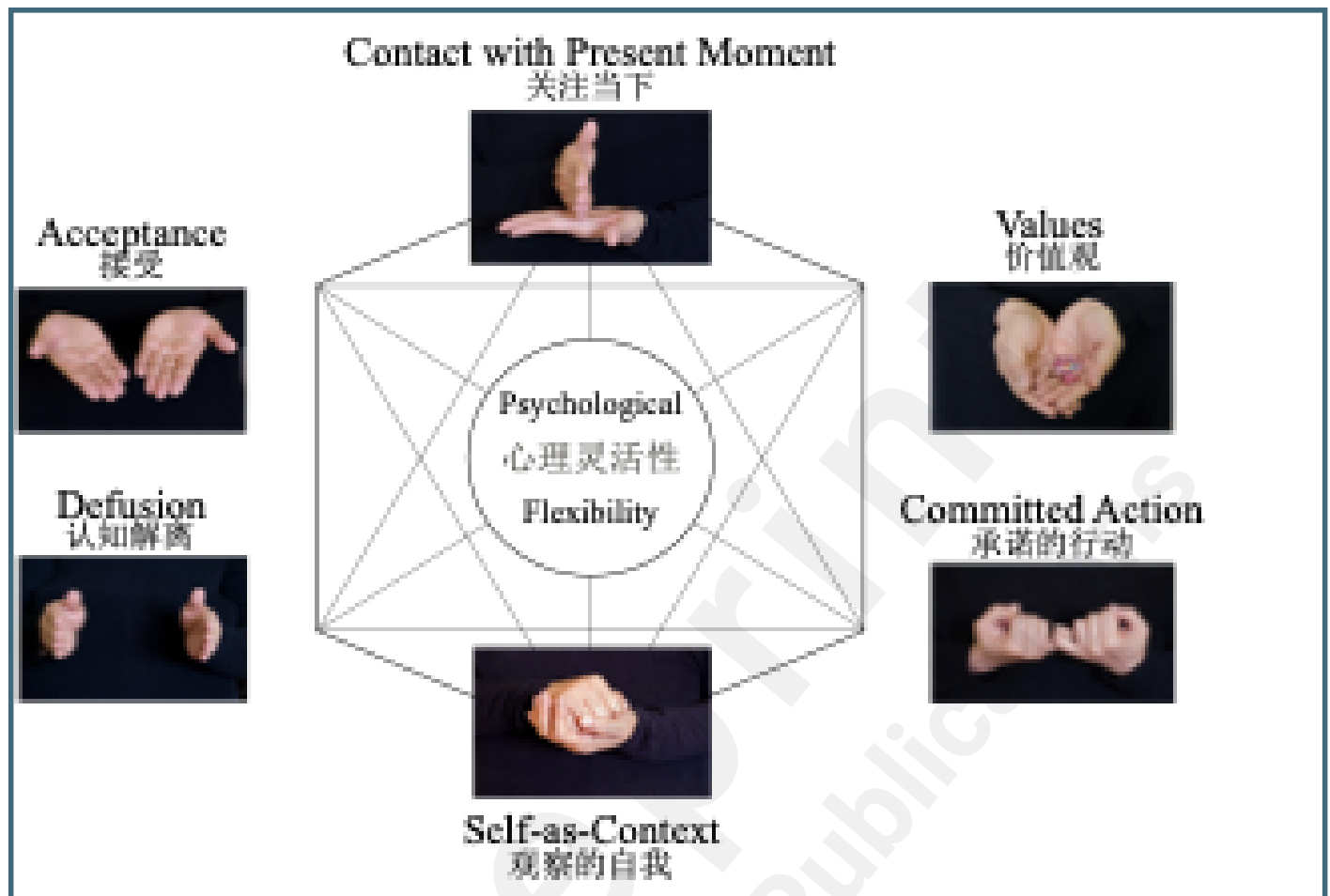
Acceptance and Commitment to Empowerment Model.



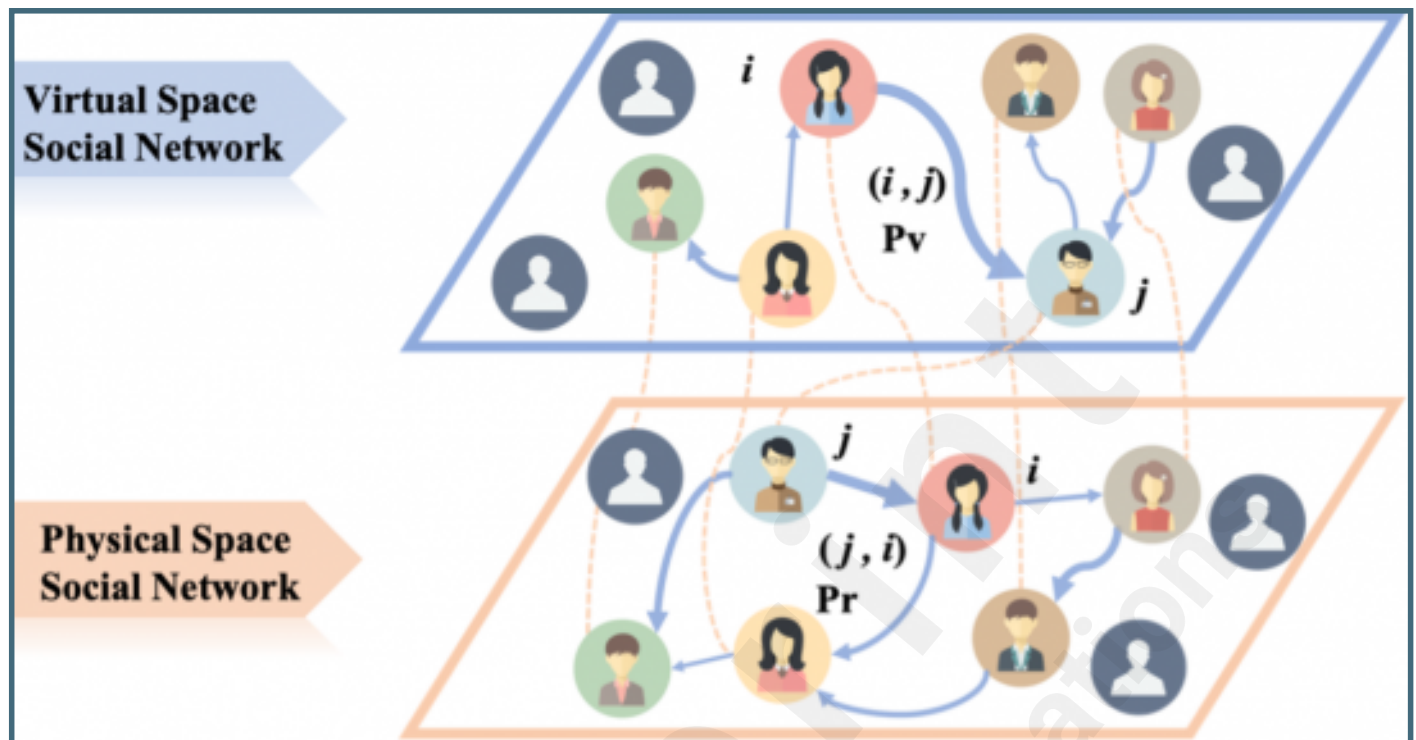
Six Aspects of Psychological Inflexibility.



Six Processes of ACT.



Dual-layer Social Network.



Multimedia Appendixes

Grant Peer Reviews.

URL: <http://asset.jmir.pub/assets/a8ae753c8b86d2e580003b4a00d974d1.pdf>

