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An Exploration of the Extension Evaluation of Intervention Capacity in Higher Education Psychological Crisis Events

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Abstract

Building a comprehensive system to intervene in psychological crisis events in universities is one of the critical tasks in current higher education. To address issues such as high coupling among various indicators within this system and the optimization difficulty, the theory of extension evaluation models is introduced to establish evaluation indicators for the design, reflecting a comprehensive set of information with a reduced number of hands. By applying the Analytic Hierarchy Process (AHP), the total weights of the system's indicators are determined. Through the correlation function of the extensible evaluation model, the evaluation levels of different universities are determined, thereby establishing a preliminary extension evaluation model for the capability system to intervene in psychological crisis events in universities. The extension evaluation model of the capability system for intervening in psychological crisis events in universities demonstrates a certain level of accuracy and practical value in real-world applications, providing theoretical support for constructing the capability system in universities to intervene in psychological crisis events.

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1. Introduction

In the 1950s, the United States and the Netherlands were the pioneers in researching psychological crises. Notable figures in this field include American psychologists Lindemann and Caplan. Lindemann first proposed the basic theory of crises. In contrast, Caplan, the founder of psychological crisis intervention, first defined the concept of

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psychological crisis in 1954, which sparked the attention and research of Western scholars in this field. In the 1970s, the World Health Organization (WHO) designated psychological crises as a specialized research topic [1]. Western research on psychological crises has been quite systematic, focusing on psychological crises, psychological crisis intervention theories, and psychological crisis intervention models.

Research on psychological crisis intervention in China started only in recent years. One representative case is Fan Fumin's "Crisis Response and Psychological Intervention during the SARS Crisis." From a psychological perspective, it explores the potential impact of psychological crises on individuals during the SARS crisis, proposes corresponding crisis intervention methods and processes, and preliminarily constructs a model for crisis intervention [2].

Overall, the field of psychological crisis intervention in China started relatively late and has yet to form a unified crisis intervention model that adapts to local characteristics. There are imperfections in theoretical research, system construction, and practical operations. Regarding evaluation method selection, the current evaluation of the status of psychological crisis intervention in China still needs to be mature. The extension comprehensive evaluation method has been applied in various areas, such as total product quality evaluation, ecological environmental vulnerability assessment, and construction of theoretical models for early warning of public emergencies. Its feasibility has been demonstrated in constructing multiple models[3].

Therefore, this paper utilizes extension evaluation and transformation methods to determine the current status of campus psychological crisis intervention. It comprehensively and objectively evaluates existing models, providing targeted references and guidance for the strategies of campus psychological crisis intervention[4].

2. Establishing an Extension Evaluation Model for Assessing the Intervention Capability of Psychological Crises in Universities.

Extenics is an original discipline proposed by Chinese scholars. It primarily focuses on the extensibility of objects and the laws and methods of innovation and exploration to solve contradictory problems. In this paper, the fundamental theory of extenics used is extension analysis. Extension analysis provides multiple pathways for the parallel extension of objects or phenomena[5]. This analysis aims to provide a formalized approach for a more comprehensive understanding of the interrelationships and mechanisms of interaction between phenomena.

2.1. Establishing a Classical Field Matter-element Matrix

According to the classification standards for the intervention capability levels of psychological crises in universities, the evaluation system can be divided into x categories. Within each category, the range of values for the evaluation indicators c_{mi} is defined as $v_{mxi} = \langle a_{mxi}, b_{mxi} \rangle$.

$$M_x = \begin{bmatrix} 0_{mx}, & c_{m1}, & \langle a_{mx1}, b_{mx1} \rangle \\ & c_{m2}, & \langle a_{mx2}, b_{mx2} \rangle \\ & \vdots & \vdots \\ & c_{mn}, & \langle a_{mxn}, b_{mxn} \rangle \end{bmatrix} \quad (1)$$

2.2. Establishing the Field Matrix

The field element matrix of the evaluation system for the intervention capability of psychological crises in universities essentially represents the sequential range of values (from the lowest value to the highest value) corresponding to each evaluation indicator.

$$M_p = \begin{bmatrix} 0_{mp}, & c_{m1}, & \langle a_{mp1}, b_{mp1} \rangle \\ & c_{m2}, & \langle a_{mp2}, b_{mp2} \rangle \\ & \vdots & \vdots \\ & c_{mn}, & \langle a_{mpn}, b_{mpn} \rangle \end{bmatrix} \quad (2)$$

2.3. Establishing the Matrix of Matter-element to Be Bvaluated

Representing the corresponding data of evaluation factors for the matter-element to be evaluated using a matrix of matter-element:

$$M_i = (O, C_i, V_i) = \begin{bmatrix} O_{m0}, & c_{m1}, & v_{m1} \\ & c_{m2}, & v_{m2} \\ & \vdots & \vdots \\ & c_{mn}, & v_{mn} \end{bmatrix} \quad (3)$$

2.4. Constructing the Dependent Function of Evaluation Indicators

Based on the dependent function derived from the extensible learning set, we construct the comprehensive dependent function $k_j(V_i)$ for the element M_i about the evaluation system of the intervention capability of psychological crises in universities[6].

Distance to the classical field interval:

$$\rho(V_i, v_{mxi}) = \left| V_i - \frac{1}{2}(a_{mxi} + b_{mxi}) \right| - \frac{1}{2}(b_{mxi} - a_{mxi}) \quad (4)$$

Distance to the field interval:

$$\rho(V_i, v_{mpi}) = \left| V_i - \frac{1}{2}(a_{mpi} + b_{mpi}) \right| - \frac{1}{2}(b_{mpi} - a_{mpi}) \quad (5)$$

From the above formula, the dependent function $K_j(Y_i)$ can be obtained. In equation (6), $K_j(Y_i)$ represents the dependent coefficient, which indicates the degree of correlation between the index V_i and the level j .

$$k_j(V_i) = \begin{cases} -\rho(V_i, v_{mxi}) - 1, & \rho(V_i, v_{mpi}) - \rho(V_i, v_{mxi}) = 0 \\ \frac{\rho(V_i, v_{mxi})}{\rho(V_i, v_{mpi}) - \rho(V_i, v_{mxi})}, & \rho(V_i, v_{mpi}) - \rho(V_i, v_{mxi}) \neq 0 \end{cases} \quad (6)$$

2.5. Calculating the Comprehensive Correlation Degree of Each Evaluation Indicator

The comprehensive correlation degree of each evaluation indicator, which can be referred to as the comprehensive correlation degree of multiple factors, can be obtained using the comprehensive evaluation model. This allows us to determine the degree of attribution to each evaluation level, which can be expressed as:

$$k_j(O_m) = \sum_{i=1}^n \omega_i k_j(V_i) \quad (7)$$

In the above equation, ω_i represents the weight of each evaluation indicator, and it satisfies the condition $\sum_{i=1}^n \omega_i = 1$.

3. Establishing the Evaluation Indicator System for the Intervention Capability of Psychological Crises in Universities

Many factors influence the intervention capability of psychological crisis events in universities, and there may be uncertainties and fuzziness among the various influencing factors. Therefore, when determining the evaluation indicators, establishing the indicator system should be considered simplicity, effectiveness, and comprehensiveness, striving to reflect the most core and perfect system information with a few indicators[7].

Therefore, AHP hierarchical analysis theory was used to analyze the intervention capability evaluation of this event, and a university psychological crisis event intervention capability evaluation indicator system was established[8]. Based on the establishment of the evaluation indicators for university emergency management capabilities using the improved matter-element extension model proposed by Liu Yang, Liu Xiaoyun, and others[9], this article suggests explicitly corresponding requirement standards in the indicator set of the university psychological crisis event intervention capability system in the same aspect. In addition, based on the design method of the campus psychological

crisis intervention system mentioned in Li Xianfeng, Liu Ming's "Design of Campus Psychological Crisis Warning and Assistance System"[10] and the case views mentioned by Professor Zhao Guoqiu, a psychological crisis intervention expert in Zhejiang Province, described in Dong Liyi's "Intervention and Experience of Campus Psychological Crisis Events"[11], the author refined and supplemented to determine the various evaluation indicators in the university psychological crisis event intervention capability system [12], as shown in Table 1.

Table 1: Evaluation indicator system for university psychological crisis event intervention capability

Objective	Criterion	Indicator
Evaluation indicator system for college psychological crisis intervention capability.	Prevention management mechanism (A).	<p>Promotion Intensity of Hiring Professional Organizations for Student Mental Health Training (A1).</p> <p>The effectiveness of the school's trained security department in handling campus psychological crisis events (A2).</p> <p>The availability of emergency facilities for schools to respond to psychological crisis events (A3).</p> <p>Evaluation of campus cultural construction (A4).</p> <p>The curriculum arrangement of schools regarding natural disasters, suicides, and other psychological crisis events (A5).</p> <p>The situation of mental health counselors specifically trained to handle psychological crisis events is as follows (A6).</p> <p>The situation of the specialized medical team in responding to sudden psychological crisis events is as follows (A7).</p> <p>The platform development situation for students seeking counseling for psychological issues is as follows (A8).</p> <p>The counseling capabilities of school mental health coordinators and their ability to conduct surveys on students' psychological well-being are as follows (A9).</p>
	Awareness and control mechanism (B).	<p>In a psychological crisis, the school can promptly identify potential hazards and risk factors (B1).</p> <p>During a psychological crisis, the school can conduct on-site assessments and maintenance and take necessary actions to prevent the situation from escalating (B2).</p> <p>During a psychological crisis event, the school can promptly monitor and respond to changes in the situation (B3).</p> <p>During a psychological crisis event, the school takes proactive measures to understand the psychological and emotional state of the students involved (B4).</p> <p>During a psychological crisis, the school can timely identify students' psychological issues and provide them with psychological assistance (B5).</p>
	Emergency response mechanism (C).	<p>During a psychological crisis event, the school has dedicated emergency response teams and contingency plans in place to handle the situation effectively (C1)</p> <p>During a psychological crisis event, the school can assist students in crisis to overcome the situation and recover their psychological well-being (C2)</p>
	Recovery and improvement mechanism (D).	<p>The crisis intervention system of the school ensures the accuracy of decision-making in handling psychological crisis events that occur on campus (D1)</p> <p>After a psychological crisis event occurs, the school can handle it properly and restore campus order (D2)</p> <p>After a psychological crisis event occurs, efforts are made to improve students' mental health levels (D3)</p> <p>After a psychological crisis event occurs, the school can adequately record and document the incident (D4)</p>

The classification of the intervention capabilities of higher education institutions in psychological crisis events is divided into four levels: excellent, good, passing, and needs improvement. Currently, evaluating the intervention capabilities of higher education institutions in psychological crisis events mostly remains qualitative. The analysis and feedback of such data are relatively abstract, and the results may vary due to different personal interpretations.

Therefore, the author adopts a statistical scoring method for mathematical data analysis, where all indicators are on a percentage scale and follow consistent criteria[13], as shown in Table 2.

Table 2: Levels of intervention capabilities for psychological crisis events in higher education institutions and their scoring criteria

Level	Excellent	Good	Passing	Needs Improvement
Scoring criteria	100~85	85~70	70~60	60~0

4. Calculating the Weights of Each Indicator

This study adopts the Analytic Hierarchy Process (AHP) to calculate the weights of each evaluation indicator. Based on the mathematical calculation method of AHP, the relative importance of each hand is determined using the expert opinion method proposed by the Delphi Method. Then, judgment matrices are constructed for each level of indicators to calculate the weights and the maximum eigenvalue of the judgment matrices. Additionally, consistency tests are conducted[14].

To determine the relative importance of the indicators in this study, a questionnaire survey was conducted among teachers with rich experience handling psychological events among university students.

4.1. Calculating the Overall Weights

Table 3: Overall Weights of Each Indicator

Criterion	Indicator		Overall weights	
Indicator	Weights	Indicator	Weights	
A	16.02%	A1	10.888%	1.744%
		A2	2.595%	0.416%
		A3	3.703%	0.593%
		A4	1.891%	0.303%
		A5	7.644%	1.225%
		A6	21.820%	3.496%
		A7	15.432%	2.472%
		A8	30.695%	4.917%
		A9	5.331%	0.854%
B	32.53%	B1	8.189%	2.664%
		B2	42.029%	13.672%
		B3	6.115%	1.989%
		B4	16.930%	5.507%
		B5	26.737%	8.698%
C	43.43%	C1	75.000%	32.573%
		C2	25.000%	10.858%
		D1	16.107%	1.292%
D	8.02%	D2	46.582%	3.736%
		D3	27.714%	2.223%
		D4	9.597%	0.769%

4.2. Data Organization and Analysis

In this section, the indicator data related to the intervention capacity of higher education institutions in psychological crisis events will be organized[15]. Data visualization techniques will be employed for analysis.

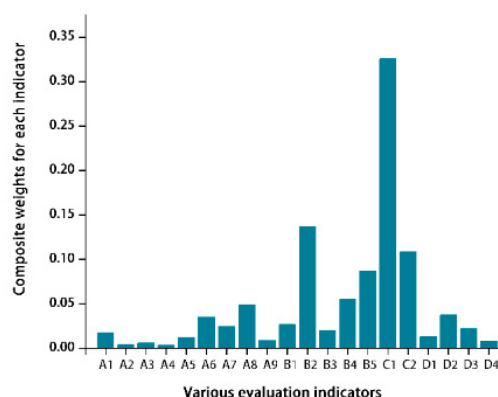


Fig. 1. Variation of Overall Weights of Evaluation Indicators for the Intervention Capacity of Higher Education Institutions in Psychological Crisis Events.

From Figure 1, we can observe that the total weights of the following evaluation indicators are relatively high in the intervention capacity of higher education institutions in psychological crisis events: The presence of a dedicated emergency rescue team and contingency plan (C1) when a psychological crisis event occurs. The ability to conduct on-site surveys and maintenance promptly to prevent the situation from worsening (B2) when a psychological crisis event occurs. The ability to assist students in overcoming crises (C2) during a psychological crisis event. The timely identification of students' psychological issues and provision of psychological assistance (B5) when a psychological problem occurs. We proactively understand students' emotional state regarding the event (B4).

Among these indicators, a dedicated emergency rescue team and contingency plan (C1) are essential in establishing the intervention capacity system in this study.

Considering the temporal progression of events, it is crucial to identify and handle crises timely and focus on pre-event awareness and post-event recovery and improvement mechanisms. Therefore, in the daily management of higher education institutions, administrators should strengthen the monitoring of psychological crisis events and ensure preparedness[16].

5. Conclusion

This study initially establishes the intervention capacity system for psychological crisis events in higher education institutions through extenics based physical element analysis, the construction of classical field and subdomain matrices, and the correlation degree calculation for the intervention capacity levels.

The evaluation levels of the intervention capacity for psychological crisis events in higher education institutions are determined based on the total weights of each evaluation indicator obtained through the AHP method. The correlation degree calculation based on the extensive evaluation model assesses the effectiveness of the intervention work. The areas for improvement in the psychological crisis work of higher education institutions can be identified by comparing the scores of various evaluation indicators across different institutions.

Overall, this research framework provides a systematic approach to evaluating and improving the intervention capacity of higher education institutions in psychological crisis events. The results can help assess the effectiveness of current intervention efforts and guide future improvements in psychological crisis management in higher education settings.

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