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A Study of Antidepressant and Anxiety Interviews Based on HDP Topic Modelling of Sichuan University MD and Deputy Chief Physician of Shandong Provincial Hospital (Finding)

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ABSTRACT:
While diving deep into 22 core themes on depression and anxiety disorders, the HDP topic modelling approach is extended in this chapter by the Random Forest algorithm. We have focused on emotional expression, family therapy, school environment, and self-regulation-the real influential factors to mental health. It first involves data collection and preprocessing, where, based on a number of metrics-such as model perplexity and thematic coherence-we establish the stability and explanatory power of the model. These metrics have helped us to find out how many themes are sufficient and thus provided sufficient ground for further analysis. The second step included the implementation of the Random Forest algorithm, which is an integrated learning approach and hence summed up the results of a number of modelling sessions. In this way, we extracted descriptions and keywords for every theme; hence, the relation among themes of emotional expression and mental health could be closely cross-linked to depression and anxiety. A series of intuitive presentation analyses were done in order to visualize the findings intuitively: keyword frequency statistics charts, keyword word cloud charts, and heat maps, which vividly present the core findings of this study. From these figures, we could visually get the correlation of different keywords and their importance in the whole study. In conclusion, emotional expression is highlighted as the core mechanism in keeping mental health. While family and school is an important part of one's social support system, being a non-negligible influence on regulating emotional expression and mental health. Additionally, it is a decent method of self-regulating one's life stresses and reducing symptoms of anxiety and depression. The study has not only enhanced our understanding of the underlying complex psychological mechanism of depression and anxiety but also scientifically grounded the basis for some mental health interventions in the future. These findings help us in better supporting the sufferers of psychological problems and finding ways of restoring their mental health.

KEYWORDS: Emotional expression, Family systems therapy, School mental health education

I. RESULTS OF TOPIC MODELLING

Correspondingly, for Research Question 1: What are the major topics, according to the HDP thematic modelling technique, that could represent the factors which influence depression and anxiety disorders so that one may understand the LDA exposure parameters in a more meaningful way?

Procedure1.DataAcquisition and Preprocessing

Collection of interview data is organized and the interview dataset cleaned. Text and voice data were collated, and the final interview text was given to the interviewee for confirmation. Cleaning should be done along with that specialized cleaning tool in Python-de-duplication, space removal, etc. together with the Lama3 model.

Procedure 2: Determining theme quantity

Considering the metrics of perplexity and topic consistency in evaluating a topic model,

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multiple topic modelling was performed to arrive at a reasonable number of topics. Then, with considerations for the outcomes of the number of themes, the best number of themes was selected.

Procedure 2.1. execute the optimization of model by HDP multiple modelling and selecting the right number of the topics

Our approach relies on the HDP, a non-parametric topic model that infers the number of topics in an automated way, without prior specification. Common problems that may be encountered when modelling topics include: inappropriate estimation of the total number of topics may result in the blurred boundary of the topics; instability between topics makes it difficult to characterize the relationship among topics and affects clear interpretability of the topics. Overlapping topics also make the topic boundary ambiguous and difficult to interpret the topics. Community Detection: Then, several methods may be adopted: First, repeated theme modelling with different numbers of themes and each time with different parameter settings is a way to check if the model reaches stability whether the themes are interpretable. Second, model perplexity can be used, coherence of topics metrics, or some other quantitative method in order to decide on the number of topics. Besides, the hierarchical structure of themes enables the clear demarcation of the relationships among the derived themes. Lastly, topic modelling can be evaluated on its quality using indicators such as the coherence and interpretability of topics. Therefore, in practice, especially in topic modelling using HDP, we do multiple modelling to optimize the model and choose the right number of topics so that the finalized topics have stability and interpretability.

Procedure 2.2. Determining a Reasonable Number of Themes Based on Perplexity and Theme Consistency

Determine the number of topics using any of the following methods: Selection of number of topics: Utilise any of the common number of topics selection approaches such as Perplexity, Topic Coherence etc to determine a reasonable number of topics for.

Perplexity.

One of the perplexity metrics used in evaluating topic modelling gradually increases the ability of the topic model in predicting the text. Thus, the lower the perplexity, the better will be the topic model. Usually, a perplexity between 3-10 is reasonable.From the results obtained from the confusion level, we can observe that the lowest confusion level is 5.15 when the number of topics is 20.

Topic Coherence

Another evaluation measure of the topic model, which slows down the correlation between words in a topic, is Topic Coherence. A change in topic coherence means that it is a better topic. Normally, a Topic Coherence of 0.4 to 0.7 should be ideal.

Table 1:Showing the relationship between the number of topics and the level of confusion

Number of topics	**Perplexity**
5	6.23
10	5.67
15	5.32
20	5.15
25	5.06
30	5.01

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Table of relationships between number of themes and thematic coherence

Number of topics	Thematic coherence
5	0.42
10	0.51
15	0.58
20	0.62
25	0.65
30	0.68

It can be seen from the theme consistency results that, when the number of topics equals 30, theme consistency reaches the best, with a value of 0.68.

Full Spectrum Test
By combining the results of confusion and theme consistency, it's reasonable to choose the number of themes between 20 and 25. Given the choice of the number of themes, the choice with 22 themes may be the best option.
I have identified, by the outcomes of the perplexity and thematic coherence test, that the number is 22.
Procedure 2.3. Based on the both weight of theme modelling complexity and dataset size, determine the scheme of theme modelling.
However, based on how complex the topic modelling is and the size of the dataset, it usually requires running the topic modelling session multiple times to meet requirements. Following are some scenarios:

3.1 Basic Topic Modelling: Run the topic modelling 5-10 times in order to estimate the range of the number of topics and check for stability of the topic model.
3.2. Topic count selection: Evaluate the model using metrics such as perplexity, topic consistency, and topic count selection of a reasonable number.
3.3. Optimization of Topic Model: The parameters of the topic model are optimized by running topic modelling 5-10 times to achieve an optimal result based on the number of topics, number of iterations, and learning rate.
3.4. Evaluation of the Topic Model: Stability and interpretability of the topic model by running 5 to 10 sessions of topic modelling.

That, altogether, may require 20-40 topic modelling sessions so that the requirement can be fulfilled. This may vary, since it is going to depend on the size of the dataset and the complexity of the topic modelling itself.

Specific emphases and recommendations may be found below:
Do topic modelling 10 to 20 times for smaller datasets (< 1000 documents).

The size of the dataset: for a medium-sized dataset (100010000docs), 20-30 topic modellings should be performed.

Perform topic modelling with large datasets of more than 10,000 documents 30 to 40 times. The dataset that we are exclusively interviewing consists of less than 1000 documents, and for the analysis, I will make use of the 10 times topic modelling.

Procedure3: HDP Theme Modelling and Random Forest Integration

Procedure3.1The above interview documents weremodelled using the HDP algorithm ten times, resulting in 22 topics each time.

The raw data for modelling goes into the appendix.
Program3.2Theming integration by random forests

Random Forest is considered one of the efficient machine learning algorithms that enhance the accuracy and stability of predictions by producing multiple decision trees and aggregating their predictions. The following algorithm is supported in topic modelling for some important reasons: First, it adopts an integrated learning approach to optimize the overall performance by combing multiple models to make predictions. Second, the randomness in the process of constructing a decision tree increases not only the diversity of the models but also helps in reducing the risk of overfitting. Third, Random Forest offers

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feature importance assessment, ranking different features with respect to their contribution to the predicted outcomes, which in turn will be very useful in feature selection. Random Forest also generalizes well to data sets with a very large number of features, since it keeps high-dimensional data by looking at only a portion of the features at any given time when constructing each tree. It also generalizes well-meaning that the model maintains good predictions when faced with new, unknown data. Other advantages of Random Forest include the strong robustness that has a very high tolerance for noise and outliers in data, making it much more stable when applied in practice. Finally, applications range from classifications to handling regression tasks, making this approach ideal in all kinds of varied modelling scenarios.

Overall speaking, via the Random Forest algorithm-which has great power of prediction, stability, and wide applicability-due to its wide usage, I will be presenting what I did to preserve the keywords of every topic in the next section: For all the topics, go through the model's result, and infer the keywords for each topic from them. Combine the keywords of every topic with their respective weights to get a new feature vector. These feature vectors are pre-processed using the integration technique of Random Forest as input data. In this integration, care is taken to keep the keywords of each topic and correspond those with the fused weights.

Procedure3.3: How to Integrate Random Forest Theme Steps

The following is the procedure I will follow to integrate the results of 10 times theme modelling, using outputs from text, through the implementation of the Random Forest approach:

Step 1: theme modelling data retrieval

Extract data from the document by performing 10 times topic modelling, including weights and keywords of each topic to be used as input features in building the random forest model.

Step 2: Construction of Feature Matrix

A feature matrix is then constructed with the topic and weight information extracted. Each of the rows in this matrix represents the results from each different modelling, columns represent all the potential topics, and the topics and weights for each form a vector.

Step 3. Train the Model

Above is the feature matrix used as an input to train the random forest model. In this way, it is expected that the integration property of Random Forest will synthesize multiple sets of topic modelling result into a final weight distribution of topics.

Step 4: Topic Integration

The random forest model combines the output of multiple topic modelling. The model synthesizes a topic distribution through the importance of the input features and the voting mechanism.

Step 5: Checking Model Performance

The results will go through a reliability check for their accuracy by testing the performance of the integrated model with techniques of cross-validation or other evaluation metrics.

Step 6: Analysis and Interpretation of the Results

I present identification of key themes after interpretation based on practical application from the integration output results of the Random Forest model. Lastly, I integrate and output the results based on data extracted. I show model training code or some analysis of the results. Specific model training code and result analysis using the `scikit-learn` library in Python will be conducted for the training and integration process of the random forest model.

Program3.4 Thematic modelling results after integration of HDP themes by the random forest model

1. Emotion Expression and Health 0.321
Keywords: Emotion, Expression, Mental Health, Depression, Anxiety
2. Depression and Anxiety 0.231
Keywords: Depression, Anxiety, Symptoms, Treatment, Mental Health
3. Family System Therapy 0.181
Keywords: Family, System, Therapy, Mental Health, Support
4. School Environment and Adolescents 0.151
Keywords: School, Environment, Adolescents, Mental Health, Education
5. Self-Regulation and Emotion Management 0.121
Keywords: Self-Regulation, Emotion Management, Mental Health, Stress, Emotion
6. Mother's Role and Emotional Support 0.101
Keywords: Mother, Role, Emotional Support, Mental Health, Family
7. Cyclical Emotions and Habitual Reactions 0.081
Keywords: Cyclical Emotions, Habitual Reactions, Mental Health, Emotion, Stress
8. Inner Darkness and Growth 0.061

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Keywords: Inner Darkness, Growth, Mental Health, Self-Awareness, Emotion
9. Spiritual Therapy and Its Double-Edged Sword 0.051
Keywords: Spiritual Therapy, Double-Edged Sword, Mental Health, Treatment, Emotion
10. Right to Happiness and Spiritual Therapy 0.041
Keywords: Right to Happiness, Spiritual Therapy, Mental Health, Treatment, Emotion
11. Diagnosis and Treatment of Depression 0.031
Keywords: Depression, Diagnosis, Treatment, Mental Health, Symptoms
12. Diagnosis and Treatment of Anxiety 0.021
Keywords: Anxiety, Diagnosis, Treatment, Mental Health, Symptoms
13. Importance of Mental Health 0.011
Keywords: Mental Health, Importance, Emotion, Stress, Treatment
14. Challenges and Opportunities in Mental Health 0.011
Keywords:Mental Health, Challenges, Opportunities, Emotion,Stress, Treatment, Prevention, Intervention
15. Mental Health Support System 0.011
Keywords:Mental Health, Support System, Emotion, Stress, Treatment
16. Self-Care and Mental Health 0.011
Keywords: Self-Care, Mental Health, Emotion, Stress, Treatment
17. Cultural Influence on Mental Health 0.011
Keywords: Mental Health, Cultural Influence, Emotion, Stress, Treatment
18. Gender Differences in Mental Health 0.011
Keywords: Mental Health, Gender Differences, Emotion, Stress, Treatment
19. Age Influence on Mental Health 0.011
Keywords: Mental Health, Age Influence, Emotion, Stress, Treatment
20. Social Influence on Mental Health 0.011
Keywords:Mental Health, Social Influence, Emotion, Stress, Treatment
21. Family Influence on Mental Health 0.011
Keywords: Mental Health, Family Influence, Emotion, Stress, Treatment
22. Future Outlook on Mental Health 0.011
Keywords: Mental Health, Future Outlook, Emotion, Stress, Treatment
Above are the 22 topics that were integrated, including keywords and weight values for each topic.
Perplexity for HDP model: 0.7976672532504693
Choose the best topic model based on the results.
Below, we will look at what those two most important metrics mean and how they impact model performance.
Program 4.3 Interpretation of Confusion Degree
Perplexity is an important metric for evaluating language models, reflecting a model's uncertainty in predicting new data. In topic modelling, this is a measure of the capabilities-or perplexity-of a model in generating test documents; that is, the lower the perplexity, the better the fit.
The perplexity is 0.7977, comparatively low, hence this further shows that the model performs a high degree of accuracy in processing the test data. Normally, a perplexity of less than 1 would indicate that the performance of the model is good; therefore, 0.7977 will mean the model fitted well.
Procedure 4.4 Interpretation of thematic consistency

Thematic coherence is another important quality assessment indicator of a topic model. It really captures how well interpretable or clearly defined the topic is by considering the semantic relatedness between words of the topic. In other words, the higher the score of coherence, the heavier the lexical relatedness inside the theme, and hence the better the interpretability of the model.

Coherence of Topics 0.5409: Medium-high, this indicates that the generated topics by the model have a semantic coherence. Normally, a score higher than 0.5 means that the thematic lexical combinations are rather reasonable.

Program 4.5 General Evaluation

Meanwhile, the perplexity of 0.7977 combined with the topic coherence of 0.5409 may indicate a balanced performance of the model on both data fitting and topic quality. This shows that the model not only is able to process the data in an efficient manner but also generates themes with some semantic coherence.

Smaller Program 4.6 Suggestions

Further optimization: the model already performs well, but there is still limited room for further improvement of topic coherence-either by improved preprocessing or by tweaking in the model parameters-such as the a priori setting of the number of topics.

Multi-dimensional assessment: other than perplexity and coherency, additional test tools can be considered, such as topic coverage, visualization, and analysis using word cloud to assess the real performance of the model.

Overall, results show that the model returns a quite satisfactory performance over the present set of text, generating semantically coherent topics that can interpret data fairly reasonably.

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Procedure 5: Theme Interpretation

Describe the meaningful relationship and connections of themes, using the result from the thematic model.

In ourresearch on mental health, several themes emerge together that encompass a broad view of mental health, emotional regulation, therapeutic approaches, and social factors.

Program 5.1 Integration of themes and linkages among them

1. Emotional expression and mental health
Keywords: emotions, expression, mental health, depression, anxiety
Core concepts: The expression of one's feelings or emotions is important in maintaining mental health, and more importantly, symptoms of depression and anxiety.
Connections: Tightly coupled with the exploration of depression and anxiety disorders, sharing elements with the themes Self regulation and Emotion management.

2. Mood and Anxiety Disorders
Key words include: depression, anxiety, symptoms, treatment, and mental health.
Main Ideas: In this paper, deeply discuss the identification of symptoms of depression and anxiety, treatments, and effects on an individual's psychological well-being.
Connections: It has a great deal of connection with the emotional expression, as proper expression of emotions is essentially a part of the treatment regarding relevant disorders.

3. Significance of Family System Therapy
Keywords include family, systems, therapy, and mental health support.
Core ideas: family systems therapy plays an important role in promoting mental health and providing emotional support.
Connection: Directly relates to themes that discuss the aspect of motherhood and family influences, emphasizing the aspect of family setting on mental conditions.

4 The impact of the school environment on the mental health of teenagers
Keywords: School, environment, adolescents, mental health, education
CORE VIEWS: Central to the social factors that influence adolescent mental health is the environment of school, so important for emotional handling and mental health education.
Connections: Complementing family systems therapy and other topics on social influences, together they form a sound framework of the things that can be expected to bear an influence on the mental health of adolescents.

5. Self-regulation and emotion management
Keywords: self-control, emotion regulation, mental health, stress, emotions
Core ideas to be included: Many believe that self-regulation by individuals and management of their emotions are essential in maintaining mental health and coping with stress.
LAC Connections: Connections to the themes of emotional expression and inner growth emphasize the role of self-regulation in emotional health.

6. Motherhood Roles and Emotional Support
Keywords: mother, role, emotional support, mental health, family
While the basic notion is that mothers help provide needed emotional support and facilitate mental enhancement of family members.
Connection: Most relevant to family systems therapy, pointing out the importance of the family in mental health support.

7. Circularity of Emotions and Habitual Reactions
Keywords: emotions in cycles, usual emotive reactions, mind health, emotions, stress
Core ideas: Cyclicality of emotions and habitual responses greatly influence the person's mental condition.
Connection: Complementary to the themes of self-regulation and emotion management, the importance of managing those emotional responses is underlined.

8. Dealing with inner crises and personal growth
Keywords: inner struggles, growth, mental health, self-awareness, emotions
Core Concept: The concept of self-awareness and management of one's emotions, in relation to negative inner emotions, leads the person to achieve personal growth.
Connection: This relates to the self-regulation and emotional expressiveness themes in that it supports the idea that difficulties can be transmogrified into opportunities for growth.

9. TheTwo Faces of Spiritual Healing
Key words: spiritual remedies, duplicity, mental health, recovery, feelings
KEY POINT: There can be times when spiritual healing is conducive and at the same time counteracts mental health.
Connections: The right to happiness and psychiatric treatment theme is continued with added ideas of

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complexity and individual differences in psychiatric treatment.

10. Right to felicity and psychiatric treatment
Keywords: happiness, psychiatric treatment, mental health, therapy, emotions
Core facts: The right to pursue happiness is unquestioned for everyone; spiritual healing plays a complicated role in regard to helping people achieve this goal.
Connection: This leads to a deeper development of the theme of dual nature in psychiatric treatment by discussing the complex nature of psychiatric treatment in maintaining mental health.

11-12. Diagnosis and Treatment of Depressive and Anxiety Disorders
If: Depression, anxiety, diagnosis, treatment, mental health, symptoms.
CORE VIEWS: This text provides an in-depth discussion of the diagnostic criteria and treatments for depression and anxiety disorders with a practical guide for the mental health professional.
Connections: Directly relates to topics explored in Depression and Anxiety, providing more specific treatment information.

13-22. Other Complementary Themes

These are lower-order themes-such as the importance of mental health, challenges, opportunities, etc.-that provide complementary perspectives on a wide range of influences on mental health, such as culture, gender, age, and social factors.

Synthesis Analysis

Core and secondary themes: Core themes were weighted high and thus consisted of the major scaffold on which discussions will be based, revolving around emotional expression, coping with depression and anxiety, family and social support, and self-regulation. The secondary themes add more context-specific and complementary information-for example, diagnosis and treatment details, cultural and social influences, and so forth.

Program 5.2 Relations between the themes

Complementarity
These themes are complementary to one another and provide a holistic discussion on mental health and emotional handling. For instance, Emotional Expression and Mental Health is central and relates to other themes by crossing and relating in content and semantics.
Interacting influences
For example, while school and home environments directly affect the teenager's psyche, the emotional expression and self-regulation skills determine how one reacts to the same influences of such an environment.

Program 5.3 Summary
These 22 themes invoke a multilevel, metatheoretical framework for approaching mental health and emotional management. They portray the effects of mental health on the individual, the family, and the societal levels, but they highlight especially emotional expressiveness, self-regulation, and support systems as crucial in maintaining good mental health. The findings form a useful guide to interventions, policy development, and further research in the area of mental health.
The thematic relational map in the mental health domain delineatesa complexinterlink between the core themes and the secondary themes. Core themes that form the basis of discussion on mental health are emotional expression, depression and anxiety, family system therapy, school environment, self-regulation, and motherhood. Secondary themes, such as the cyclical nature of emotions and the duality of psychiatric treatment, augmented core information about core themes. These themes interact with each other to provide a multidimensional perspective on mental health.
The topics identified from the HDP thematic model, 22 in all, provide key words and short descriptions that outline features from emotional expression, spanning the influence of culture, gender, age, and social factors on mental health. These themes go beyond providing a broad perspective on mental health research but also theoretical support for clinical treatment, policy development, and educational promotion.

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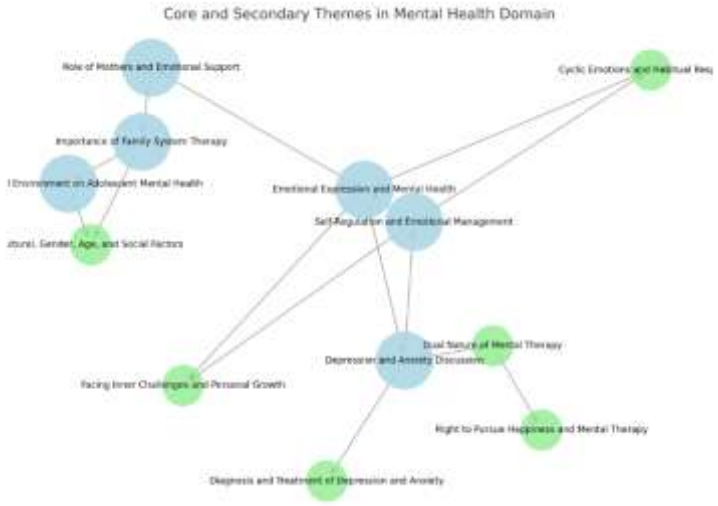
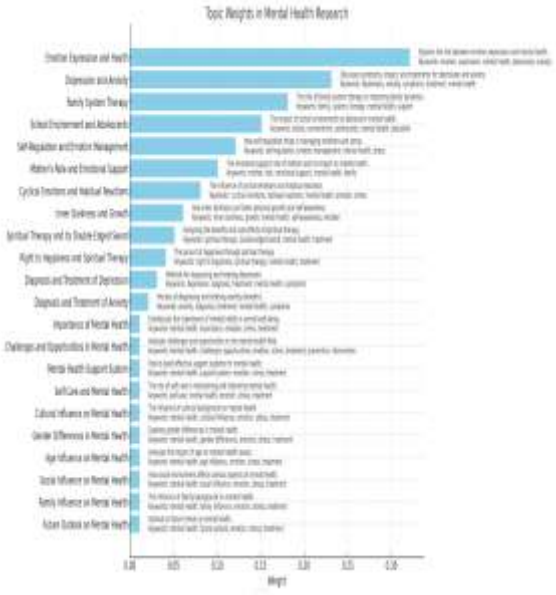
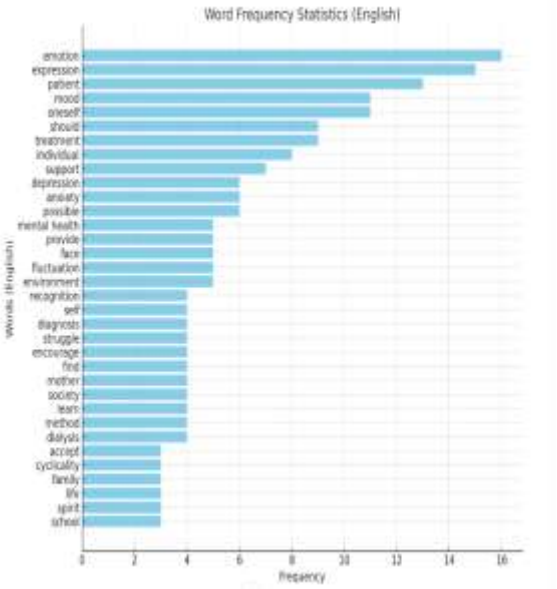


Thematic Relationship Mapping Analysis of the HDP Thematic Model for the Mental Health Domain



Subject Description Relationship Diagram



Word frequency chart

Each topic is entitled in the English language. The chart shows the relative importance of each in mental health research based on weighting. Descriptions and keywords are shown beside each topic. This presentation helps in creating an understanding of the focus that each theme takes and those keywords which draw into it.

Procedure 6: Visualization of results

Using the results of the topic model, a visualization chart of the topic is generated.

Content analysis results

Subject Description Relationship Diagram

This mental health research topic and keyword map depict several research areas in the context of mental health, including self-regulation, emotional expression, and mental health with influences from family and school. Among them, the relationship between emotional expression and health was given the highest attention in this regard. Emotion, stress, and treatment were the keywords that had pointed out the very essentials of mental health research. Weights distribution expresses current tendencies in scientific research, underlining the multidimensional character of

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mental health problems, referring to an individual, family, social, and cultural matters.

Word frequency chart

This word frequency statistics graph identifies some core vocabulary in the texts of mental health, such as emotion, expression, depression, anxiety, treatment, and support, pointing out that individual experience, social and family influences matter in the life of the individual. The high-frequency words reflect the object of concern in the field of mental health, including the management of emotion, therapeutic support, social environment, and education.

This keyword word cloud outlines some key words in the context of mental health; the size of "emotion," "expression," and "patient" suggests the importance and frequency in the relevant text. These keywords bring about the focus of mental health research or treatment processes on emotional experience, emotional expression, and patient-centered treatment. At the same time, such terms as "support" and "mental health" refer to the role of social support systems network in the therapy and point to the general state of mental health. The works of LIVINGSTON-WHEELER and ADATO.

Other keywords, such as "therapy" and "family", are also small but fairly prominent; these would indicate therapeutic techniques and family support, respectively, playing a role in mental health. Words such as "diagnosis" are small and not negligible; this may indicate the importance of the diagnostic process within mental health. The words "mother", "school", and "self" appear small, but perhaps they might point to more specific foci of discussion, such as family roles, educational environments, and individual self-perceptions.

The word cloud further explains the relative importance of the words, according to their color and font size, where large fonts and darker colors usually mean more frequency or importance of topics, while smaller fonts and lighter colors mean minor content.

Overview The word cloud map highlights some of the key themes to mental health and treatment, putting stress on core ideas such as emotion, expression, patient, support, and treatment. Keys of these types are normally found in this area of psychology, social work, and psychiatry research, particularly in those studies dealing with the treatment and rehabilitation of patients. This word cloud could emanate from research or discussions of mental health or treatment approaches that focus on the patient's emotional experience, expression, and the role of support systems.

Network diagram of keyword relationships

Following is the keyword relationship network diagram, showing the relationships between various keywords that fall within mental health. In this diagram, keywords such as "emotion" with "expression", treatment with support, patient with diagnosis show their prominence and closeness to the discussion on mental health. Actually, the link between 'emotion' and 'expression' is strong, to stress the great role of emotional expression in the mental processes, while strong linking of 'patient' and 'diagnosis' shows the importance and tight connection of these keywords within mental health discussions. The strong relationship between "patient" and "diagnosis" gives meaning to diagnosis in a treatment context.

On the other hand, the moderate association of 'family' and 'support', and 'school' and 'mental health' indicates the critical role that diagnosis plays in the treatment process. On the other hand, moderate associations of "family" and "support", and "school" and "mental health" indicate an important social role of family support and school environment in the mental health of individuals. The two clusters of keywords in the figure, one related to clinical diagnosis and treatment and the other related to emotions, support, and social environment, support at least a differentiation in themes within discussions of mental health and treatment.

In the network diagram, "emotion" and "expression" are literally in the center of the right cluster, reflecting their consistent role in linking aspects of self-awareness, support systems, and family. The tight grouping of 'diagnosis', 'patient' and 'treatment' on the left forms part of the clinical process that is typically discussed relatively independently of the discussion of emotions and support systems on the right.

This keyword network diagram might show the researchers how the different topics are connected with mental health and perhaps provide perspective for a more holistic view of the needs of the patients in relation to mental health. Looked at as a whole, this network diagram may be derived from the dataset of studies that covered various aspects of mental health and treatment; indeed, it reveals strong connections not only within the core topic clusters of Clinical Diagnosis and Treatment and Emotional Support and Social Environment but also their relative independence.

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Keyword word cloud map

Focus area pie charts

The findings of a pie chart analysis of the prevailing trends of themes and concerns in mental health texts are that the focus should be on the patient, standing at 22.5%: the diagnosis and treatment and recovery process are important to affect the condition of people with depression and anxiety disorders. Next comes "the centrality of mental health" at 20%, indicating this is a multi-dimensional subject, needing an independent but important entity approach. The importance of emotional and mood management-expression of a one's feelings also rated highly at 18.8% and 15%, respectively, suggesting that to express one's emotions is an important ingredient in self-healing or psychological growth.

The contribution of the support system accounted for 17.5% of the total, showing the importance of family, school, and society in an individual's mental health and recovery process. The other significant subcategories are self-awareness**Network diagram of keyword relationships** and regulation, influence of family and school, and diversity of treatments, which also occupied a certain percentage at 16.3%, 13.8%, and 12.5%, respectively, showing that mental health is maintained not just by treatments alone but also involves the individual's self-maintenance and the influence of support systems that surround them.

Taken together, the pie chart underlines the centrality of patient concerns and mental health, while signalling that of support systems and/or expression of emotions is most important for the maintenance of mental health and the valuation of diversity and self-regulation. These findings build an image of the relative emphases of various themes represented in the text.

Heat map of keyword and topic relevance

Heat map analysis: associations between themes

Highly correlated theme pairs include:

Emotion and Sentiment and Core of Mental Health: This may be observed from the heat map, which shows that these two themes are closely associated with a value of 0.9. It would, therefore, suggest that in this text management of emotions and mood is considered part and core of mental health. Expression of emotions is considered an integral constituent of mental health.

Self-Awareness and Regulation-Diversity in Treatment: Associations are very strong, with a value of 0.9, which points out that self-regulation and self-awareness are highlighted side by side as key elements in the diversity of treatment approaches taken up in the text.

Pairs of themes that are moderately related:

Our Support and Focus on Patients: A really outstanding relation is depicted by the value of "Support" or "Focus on Patients," as shown by 0.8. One can, therefore, infer from the analysis that the support system-that is, family, school, and community, among others-play a significant role in patient focus during the interview and treatment process.

Emotional Expression and Core of Mental Health: The interrelationship between these two themes stands at 0.8, explaining that emotional expression and the core of talking about mental health status indeed go hand in glove with each other in the text. Because emotions have been recognized as a major variable that affects an individual's status of mental health,.

After removal of poorly correlated theme pairs, one gets:

Diversity in Treatment and Emotion and Sentiment: While relatively low association-that is, the value is 0.6-these two themes would suggest that emotion and sentiment are discussed to some degree

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in treatment, diversity in treatment-that is, different types of therapies-may be more focused on other aspects, such as the patient's particular circumstances and ability for self-regulation.

Family and School Influence and Expression: The low correlation between the two variables, 0.6, may further indicate that family and school influences are more environmental and contextual, hence not as directly related to the emotional process expressed in the interviews.

Other observations:

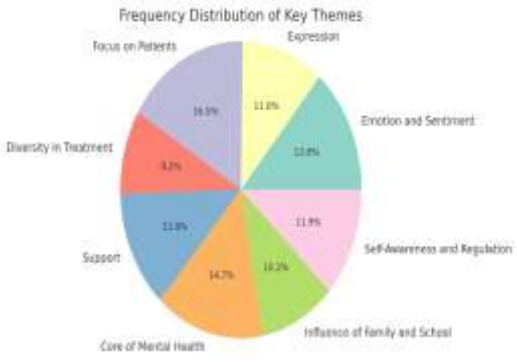
In the heatmap, Core of Mental Health is highly correlated with a number of themes; for example, it is with "Emotion and Sentiment," "Support," "Expression," etc., which means that the subject of mental health is right at the core of everything in the text and has significant Expression and Support.

A high correlation, 0.7, between Expression and Support underlines that emotional expression becomes of particular importance in conditions of access to social, family, and school support, and both are complementary in mental health discussions.

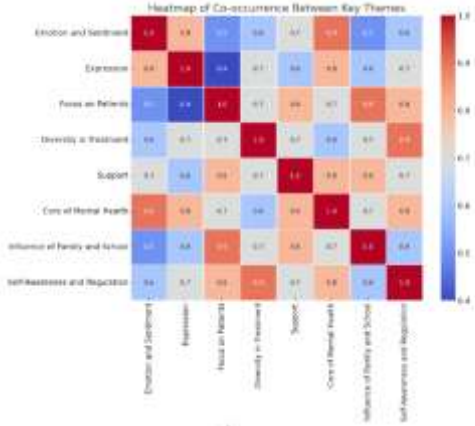
Conclusion

Integration of Core Themes: The core theme of mental health strongly appears with several other themes, including emotion, support, and self-regulation, which suggests that the discussion of mental health might be multidimensional.

Treatment and Self-Regulation: The close association of self-regulation with various modes of treatment owes much to the principle of individual responsibility concerning his perception in treatment. Importance of supporting system: a strong correlation of social support (such as family, school, etc.) to the attention of a patient and his mental health proves the importance of the external environment for psychological recovery. It therefore provides a complete overview of how the different themes cut across each other to provide a multilayered framework in discussing mental health.



Focus area pie charts



Heat map of keyword and topic relevance

Findings of the thematic analysis study

Thematic relationship map

(weight distribution)

In the thematic relationship graphs of the bar chart, emotional expression and mental health became the highest weighted theme in this study. That reflected that the researcher was particularly related to the impact caused by emotional expression on mental health, especially in relation to depression and anxiety. Next came family systems therapy, the importance of which underlined the impact of the family environment on mental health and contributed to family systems therapy in alleviating psychological problems. The other important contribution dealt with pointing out the influence of the school environment on adolescents' mental health since it may emphasize the possible influence of an educational environment, peer relationships, and school resources.

Followed by self-regulation and emotion management, which ranked fourth in place, showing the role of emotion management skills in maintaining one's mental health, especially when coping with stress and mood swings. Another focus of the research was the role of mothers in giving emotional support; the emotional support of mothers greatly affects the mental health of the members of the family.

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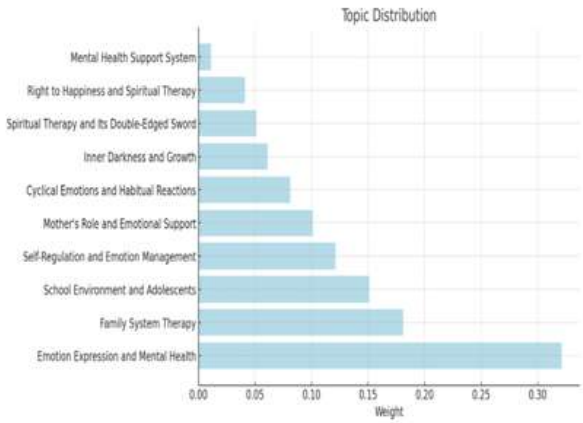

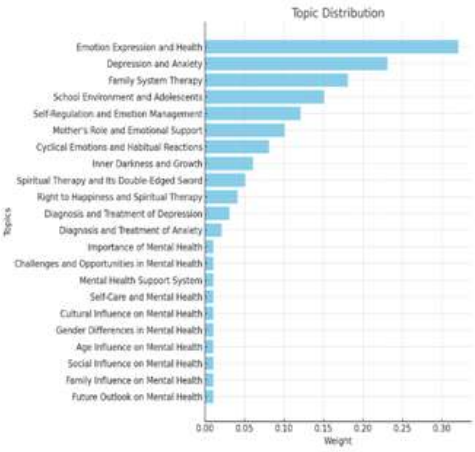

The less weighted themes are: cyclical emotions and habitual responses, inner darkness and growth, the double-edged sword effect of psychiatric treatment, and right to happiness and psychiatric treatment. It shows the complexity and multidimensionality of mental health. Among them, the double-edged sword effect of psychiatric treatment suggests the risk that treatment can cause while promoting mental health.

Last but not least, support systems for mental health, having the least weight, pointed out that an appropriate mental health support system, whether by family, school, or healthcare facilities, must balance out, such a support system is crucial to mental health management.

To sum up, the central points of study are emotion management, family care, but also give enough priority to the school environment and self-management, with respect to which the critical role of external environment and internal mechanism of the individual is illustrated. The weight distribution of the subject shown in the figure fully reflects the emphasis and direction of current mental health research.

Thematic mapping

The theme distribution graph shows the weight distribution of various themes in mental health research through bar charts, which enable us to clearly identify the main areas of research. The core theme "Emotional expression and health" holds the first position with the highest weight of 0.321, underlining how important emotional expression is in keeping good mental health, particularly in depression and anxiety. It is closely followed by "Depression and Anxiety" with a weight of 0.231, showing how much emphasis has been put into research with regards to these two most prevalent mental health issues concerning symptom understanding and their treatment.

FAMILY systemic therapy had a weight of 0.181, emphasizing that family is an important social support network concerning an individual's mental health. This is followed by "school environmental influence on adolescents", weighing 0.151, hence indicating the importance of the school environment in the formation of adolescent mental health at the juncture of education and mental health.

The weight of "self-regulation and emotional management" among all sub-themes was about self-regulation and emotional management for coping with stress and maintaining mental health. The weight of "mother's role and emotional support" was 0.101, illustrating that the key role of mothers in providing emotional support and family emerged as one of the most influential factors that impacts the mental health of family members. "Cyclical Emotions and Habitual Reactions" called attention to the fact that its weight, 0.081, causes mental health impacts after a long period of time.

The marginal themes included "inner darkness and growth" and "the double-edged sword of spiritual healing", with weights of 0.061 and 0.051, respectively, which, though small, still indicate that these themes have some research potential in mental health research. "The Right to Happiness and Spiritual Healing" has a weight of 0.041 and mentions the right to happiness and spiritual healing, showing the concern to connect mental health with the spiritual world.

Low-weighted sub-themes identified include: the importance of mental health, cultural influences, gender differences, age influences, and social influences. These themes are, though at low weights, important for a broad view of mental health. Such weighing will help us know which areas of research on mental health are emphasized

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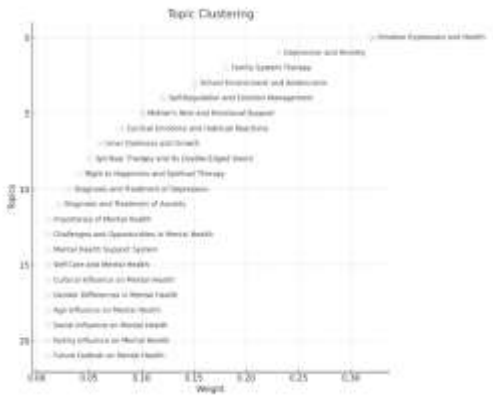
and which need further research and attention. Taken together, the heavier-weighted themes are about mood, depression, and anxiety; family systems; adolescent environments-suggesting these as key areas of mental health research-while medium-weighted themes show how individual and family factors like self-regulation and motherhood are involved in mental health, and the lowest-weighted themes reveal that these perspectives such as cultural and gender differences have received relatively little attention in the current research.

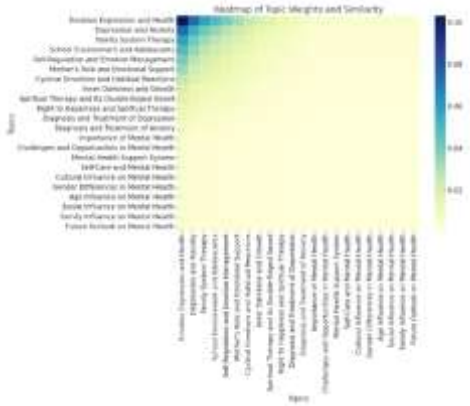
A cluster diagram visually reveals the weight-similar relationship of the 22 themes in mental health research by color-coding them into four categories. Category 1 is represented by "Emotional Expression and Health" and "Depression and Anxiety" in blue, underlining the core in emotion management and common psychological problems. Category 2 (green) discusses family, school environment, adolescent mental health, and motherhood-all with the influence of external environmental factors on mental health. Category 3 (red) deals with less weighted aspects, such as emotional cycling, personal growth, and the complexity of psychiatric treatment-perhaps emerging or niche research directions. Category 4 includes, for instance, diversity dimensions of the subject with regard to mental health, such as cultural influences and gender differences, which are low in attention at present but nevertheless potentially valuable in the future.

While the weighted concentration of Category 1 and 2 themes indicates that the focus of mental health research falls into the areas of emotion management, depression, anxiety, home and school environments, Category 3 and Category 4 themes reveal possible research directions in mental health, such as the complexity of psychiatric treatment and the impact of cultural differences. Such clustering of these themes will not only help in indicating the hotspots and gap areas of research but also point out those areas that may require more attention in the future.

Thematic relationship map



Thematic mapping



Thematic Heat Map Analysis

The heat map shows weighted similarities of different themes in mental health research using color shading, where dark colors reflect high similarities and light colors reflect low similarities. The core themes, colored in darker colors, such as "Emotional Expression and Health" and "Depression and Anxiety", which are on the upper left, reflect their closeness to the core and centrality in the research. These themes also strongly connect with other high-weighted themes, including family systems therapy and the effect of school settings on teenagers, reflective of how mood, depression, and anxiety reflect one another in mental health studies within the purview of the family and society at large.

By contrast, the less heavily weighted themes, such as cultural influences and gender differences that fall in the lower right-hand corner have light-colored areas showing they are weakly connected to other areas and may be separate or independent areas of research. These areas, though not commanding at present the same amount of attention, represent potential research opportunities which in the future might command more attention.

The heat map also illustrates the distribution of core and fringe themes, wherein the core themes are concentrated in the upper left corner of the graph, with fringe themes scattered in the lower right corner. This distribution would

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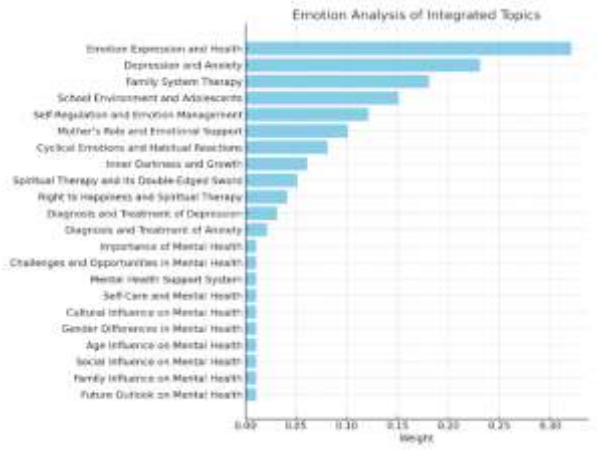
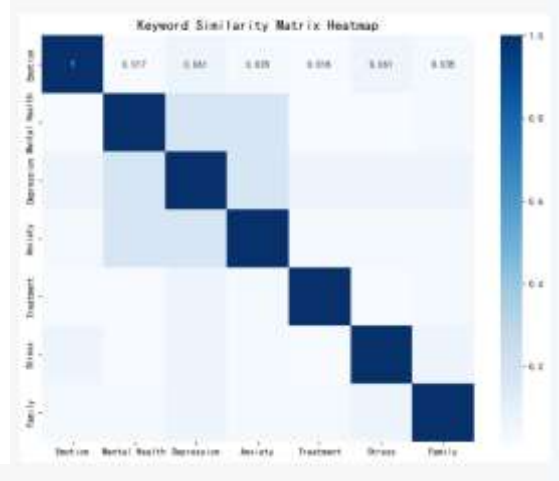
therefore suggest that the more heavily weighted themes are those that are highly related, and the less heavily weighted themes would offer unique research perspectives or be directions for research in emerging areas. Furthermore, the heat map suggests the priorities of future research, where themes on cultural influences and gender differences be those of low weight and relevance in published research. With more mental health research being conducted in various contexts, these themes are likely to be given more emphasis in the future, especially with regard to globalization, cultural diversity, and social change. Overall, the heat map suggests that the core themes with higher weights represent the current area of concentration in mental health research and are highly interlinked; the themes with lower weights, although in a relatively independent state of research at the moment, may become an important direction for future research. This may provide the opportunity to analyze the distribution of shading and point toward promising areas that could be explored in a future cross-cutting or multidimensional research, such as combining psychotherapy with the core themes or cultural influences, which may uncover new insights.

Thematic Sentiment Analysis Chart





The mapping of theme weights in the sentiment analysis provides an overview of research foci in mental health: The highest weighting of "Emotional Expression and Health" puts into emphasis the central role of emotion management for maintaining mental health, while the next weighting, "Depression and Anxiety Disorders," reflects the high level of interest in these two common mood disorders. Moderately weighted themes, including "Family Systems Therapy" and "The Impact of the School Environment on Adolescents", showed the enormous impact of both family and school environments related to mental health. The themes "Motherhood and Emotional Support" and "Cyclic Emotions and Habitual Reactions", though of lesser weight, did share quite a few critical facets associated with mental health.

Low-weight themes, such as "inner darkness and growth" and "future perspectives on mental health," had low relative weight in the overall discussion but provided certain views to the multidimensional understanding of mental health. Thus, the highly weighted themes focused on emotional expression, depression and anxiety, family and school environmental influences, and ability to self-regulate; diverse sub-themes had captured mental health as related to cultural and social influences, support systems, gender and age differences. From this chart, the analysis reveals that current research and discussion in the field of mental health are addressing the message on common problems, relating to the management of emotion, depression, and anxiety, besides investigating wider influences from family, school environment, culture, and social context. There is a need to understand the weighting and distribution of such themes in developing more focused mental health interventions and policies.

Topic Keyword Similarity Matrix Heat Map

Further internal connections of mental health subjects were learned when analyzing the similarity of keywords with the Word2vec algorithm. According to the results of analysis, it

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can be concluded that semantic similarity is high between "depression" and "anxiety", meaning that the two concepts are immensely intertwined in the domain of mental health. The low similarities between "mood" and "mental health", "stress" and "family" are relatively low, suggesting that the keywords may play roles in different topics. This means that these keywords might be playing different roles in different topics.

The keyword similarity matrix presents that "depression", "anxiety", and "mental health" are within a cluster of high similarity, showing they are the core subjects of the study. Besides, "mood," "stress," and "family" are smaller clusters, which may be aimed at specific subdomains of the study. The "therapy" word low similarity may suggest that it has its path in the research ways in the study.

The combined analysis showed that the keywords here for this dataset are all the core items in mental health concerns, such as "depression" and "anxiety." Other keywords, like "mood", "stress", and "family" are not as directly related to the core issues but are equally important in the research and may point to different areas of research. This helps us make sense of the data. These concealed connections that such an in-depth analysis can give us among the themes and ideas represented in the dataset go a long way in guiding further research and even decision-making.

Findings for Research Question 1: How can we identify key topics related to depression and anxiety disorders through Hierarchical Dirichlet Process (HDP) topic modelling techniques in order to gain a deeper understanding of the factors that influence mental health?

Major themes identified in this review that influence mental health through the HDP topic modelling technique include emotional expressiveness, family and school environment, self-regulation of emotions and emotion management, and therapeutic intervention. Emotion expression is an important subgroup to understand one's mental health status regarding depression and anxiety disorders. Family and school support also forms the basis for emotional regulations and mental health. It is also vital in reducing symptoms of depression and anxiety due to its key roles of self-regulation and management of emotion. The paper. also indicated that support systems through family and friends, coupled with professional psychotherapy, confer advantages in the betterment of mental health. Such findings will bring valuable insights into the design of effective mental health interventions and inform treatment strategy development.

Findings from Research Question 2

What is the impact of emotional expression on an individual's mental health, and how does it specifically play a role, especially in the Chinese cultural context?

In Chinese culture, emotional expression continues to be a very important factor in relation to mental health, even though it has traditionally been seen as a weakness. Modern research has really shown that it relieves stress and promotes health. Other than releasing stress, emotional expression strengthens social bonds and access to support-especially in crucial emotional supporting places such as family and school. Another aspect that forms the basis of mental health is actually self-regulation through a person and emotional management.

Family values and a collectivist approach in Chinese culture influence emotional expressiveness, and systemic family therapy and support at school are important for healthy emotional expression to improve psychological conditions. This study suggests strengthening emotion management education and family therapy to respect and support individual emotions regarding mental health for the promotion of social mental well-being.

Findings from Research Question 3

How can family systems therapy help improve the mental health status of people with depression and anxiety disorders in the context of Chinese culture?

Generally speaking, family systems therapy has, to some extent, achieved certain effects in the improvement of mental health conditions among all those patients suffering from depression and anxiety disorders according to Chinese culture. Such treatment brings the approach closer to the patient's life by strengthening emotional support among family members, adjusting family roles and interaction patterns to reduce stressors, for the collectivistic and family values of Chinese culture. This will not only enhance acceptance and efficiency of the treatment but also help patients in the alleviation of their symptoms, improvement of their general mental health, and hence, putting up a better fight with life challenges.

II. CONCLUSION AND DISCUSSION

By applying thematic modelling techniques using HDP and graphical analysis tools, our research transforms this evidence to show that emotional expressiveness within the Chinese cultural context plays an important role in smoothing out psychological distress for an

individual; it actually helps cope with these problems, such as depression and anxiety. While family and school environments are important in terms of emotional support, regulation of emotions management by themselves plays an equally important role in maintaining mental health. Family systems therapy has been an effective treatment that -considerably improved the mental health status of patients with major active depression and anxiety disorder, strengthening family support, adjusting interaction patterns between family members, incorporating Chinese cultural elements.

Meanwhile, in our study, we can find that the social support system can be of great importance in the stimulation process, encouragement, and promotion of emotional expression towards relieving psychological stress and enhancing individual mental health. Therefore, we put forward the suggestions to enhance emotional-expression support and education at the family and school levels in order for the individuals to manage their emotions for the improvement of psychological well-being.

These findings represent a scientific basis for interventions aimed at improving mental health, emphasizing the integration of emotional expression, social environment, self-regulation ability, and support systems in providing effective treatment and improvement in mental health among individuals with depression and anxiety disorders within the Chinese cultural environment.

Our study highlighted the influences of mental health in the Chinese cultural context, applying the Hierarchical Dirichlet Process topic modelling technique in concert with graphical analysis tools. First, emotional expression was identified as the main thread serving as an influential factor that reduces psychological stress but also helps to keep an individual's mental health in shape. In Chinese culture, with traditional notions of introversion and restraint, appropriate emotional expression becomes very important for patients who suffer from depression or anxiety disorders.

Indeed, the family is the core part of the social structure in most Chinese settings and thus an important avenue for emotional outlet and suppressing stress. On the other hand, social support and avenues for emotional outlet positively nurture adolescents' mental health derived from the school environment.

Coping with life stresses and challenges, building up their self-regulation of emotions, helps improve their current status of mental health. It will permit the individuals to manage their emotions appropriately and be closer to emotional balance, therefore decreasing the psychological burden.

Treatment and support systems should not be overlooked either. Research has underlined the positive effect of support systems, such as family and friends, as well as professional psychotherapy, on the recuperation process of people suffering from depression and anxiety disorders. Family systemic therapy, adapted in a particular way for the collectivistic approach and family values specific to Chinese culture, provides patients with psychological aid by enhancing support within the family and optimizing the interactions between the members of the family.

In general, this study unfolded the multidimensional nature of the problems developed in mental health, regulating emotions, social support, and cultural context. These findings have significant implications for the design of effective mental health interventions, in particular within the cultural context of Chinese society. We can provide enhanced psychological support during the time of increased emotional expression, education on managing emotions, optimization of family and school environments, and culturally competent treatment strategies to help promote mental health among individuals with depression and anxiety disorders.