

RESEARCH ARTICLE

Psychological mechanism and cognitive basis of humorous speech

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ABSTRACT

To more clearly present the psychological mechanism and cognitive basis of humorous speech, this study measured college students using various scales, discussed the role of humorous coping in resolving their social anxiety and regulating their mental health, and attempted to construct a cognitive symbol working model from three dimensions: theory of innocence, modern semiotics, and conceptual integration theory. We used the proposed model to present the psychological mechanism and cognitive basis of humorous speech. This study found that humor coping is positively correlated with college students' social anxiety, which is positively correlated with mental health. Affinity humor style and humor coping can positively predict college students' communication anxiety, but affinity humor style has better predictive power. This research held that relevance is the general principle of communicative cognition and has become a space of conceptual synthesis network. The combination of conceptual fusion and deviation theory with conventional theory can help us better understand verbal humor and reveal its cognitive basis. There is a close relationship between humorous language and human psychological mechanisms. Finally, there is also a clear relationship between different psychological mechanisms and the structure of humorous language.

Keywords: psychological mechanism; cognitive basis; humorous speech

1. Introduction

Humorous speech is a common form of language communication in human daily discourse, which shows the important and universal thinking ability of humans. Humorous speech is a markedly common form of language communication in daily life, which often means one thing and another, making people understand the mystery of humorous language in aftertaste and epiphany^[1]. Psychologically, humor reflects the mentality of writers and artists. In terms of social functions, humor is an expression of self-defense, self-desire, and the release of self-emotion^[2,3]. However, from the analysis of the different causes of humor, the two situations worth distinguishing are life and language humor. With the development of cognitive science and the rise of cognitive linguistics, people are increasingly dissatisfied with studying the characteristics and essence of verbal humor from the perspective of traditional rhetoric, semantics, or pragmatics^[4,5].

Humor, as a complex psychological phenomenon, involves both cognitive processes and emotional reactions, and plays a role in social interaction. From a cognitive perspective, humor is often based on "cognitive recombination". This refers to when the audience encounters information that does not match their previous experience or expectations when exposed to humorous content, forcing them to reevaluate or interpret this

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information. The use of metaphors and analogies is particularly crucial in this process, as they provide a novel and unexpected perspective for humor. Emotional factors also play a crucial role in humor. Firstly, when we “decode” the pun of a joke or suddenly understand its meaning, we experience a sense of pleasure, which is a direct reflection of the brain’s problem-solving ability. In addition, humor serves as a coping strategy to help us combat negative emotions and alleviate psychological and physiological stress. It cannot be ignored that humor is influenced by development and culture. There are significant differences in humor preferences between children and adults; Different cultural backgrounds and life experiences can also shape people’s understanding and preferences for humor. This is particularly evident in cross-cultural communication. Overall, humor is a multi-level and multidimensional psychological phenomenon that plays an indispensable role in our daily lives, whether at the cognitive, emotional, or social levels. Humorous words, as a form of communication with the function of suppressing laughter, are rich in content and diverse in meaning, but countless humorous words have created the effect of reaching the same goal by all means^[6]. However, humor is often difficult to understand because of differences in language, thinking, and culture. Language is the communication between speaker and listener. Only when the speaker fully understands the psychology of the audience and says different words according to different psychological states can the audience laugh, thereby achieving the humorous effect^[7]. Moreover, the audience can better understand other people’s humor if they have relevant knowledge of language psychology.

2. Literature review

Humor error-resolution theory can substantially explain the psychological process of understanding humorous speech. The so-called “good” and “false” refers to the situation or nature of things that are disproportionate and contradictory^[8,9]. Xu^[10] holds that being honest is an important factor in humor, and one of the necessary conditions of humor is that there is a difference between the expected result and reality. Conceptual synthesis is a theory and universal model of meaning construction. Moreover, conceptual synthesis theory has a strong explanatory power to language^[11,12]. Cutler et al.^[13] questions the explanation of the inferential synthesis power of conceptual synthesis and designs a new model for explaining speech production and understanding based on the “four-space” model. This model is regarded as an effective supplement to conceptual synthesis theory. Theory of deviation from convention proposed in reference^[14] is a general theory to interpret all types of humor. This theory proposes a necessary and sufficient condition for humor interpretation, and its necessary and sufficient condition is deviation. Moreover, readers think that there is a violation of their subjective identification in the scene.

Yuan and Ge^[15] holds that in humor interpretation, “the listener takes relevance as the guidance under the explicit input space, and extracts different parameters in the cognitive context in order to integrate and obtain the speaker’s communicative intention.” Huang and Jia^[16] proposes the “relevance integration model.” Relevance means “if and only if a hypothesis has contextual effect in a certain context, it is relevant in that context”^[17]. Undoubtedly, the speaker and receiver in humorous communication have to exert extraordinary cognitive effort to finally appreciate the colorful communication effects.

In the field of cognitive psychology, the theories of Martin, Puhlik Dior, Gary and others are recognized by most scholars. They divide humor into four styles: affinity humor style, self-improvement humor style, ridicule humor style and self-deprecation humor style. The first two humorous styles have positive significance, while the last two humorous styles are potentially harmful to health^[18,19]. Humor can play a psychological adjustment role, and it is particularly important to correctly understand and use humor. Individuals who tend to be friendly humor style and self-improvement humor style are more popular with people, which makes people really happy and reduces loneliness. And mental health is a necessary condition for physical health. And because different

humorous styles have different effects on individual's physical and mental health. Therefore, the relationship between humor style and mental health is studied to guide people to use humor correctly and properly, and not to make humor their own shortcomings, thus promoting mental and physical health.

Conceptual integration theory, which appeared in the field of Western cognitive linguistics in the late 1990s, has attracted considerable attention because of its powerful explanatory power. To clearly present the psychological mechanism and cognitive basis of humorous speech, the current study measured college students using various scales and discussed the role of coping with humor in resolving their social anxiety and regulating their mental health. This research also attempted to construct a cognitive symbol working model from three dimensions: theory of innocence, modern semiotics, and conceptual integration theory. Accordingly, we used this model to present the psychological mechanism and cognitive basis of humorous speech. The naive theory refers to the natural beliefs and beliefs that individuals hold about knowledge or phenomena in a specific field before formal learning or specialized training. These theories are formed through daily experience and individual intuition, often simplified and sometimes not entirely accurate. Semiotics is the discipline that studies symbols, symbol systems, and symbolic behavior. Modern semiotics usually focuses on the relationship between symbols and the things they represent, as well as how symbols generate meaning in cultural and social contexts. In advertising, movies, art, and other media, semiotics is often used to analyze and explain how symbols convey information, ideas, and emotions. Conceptual integration theory, also known as "mixed theory," is a framework that describes how people combine information or concepts from different sources into new, complete ideas or cognitive structures. Conceptual integration plays a crucial role in problem-solving, decision-making, and creative thinking. For example, when people try to combine two seemingly unrelated concepts to create new ideas or solutions, they may be integrating concepts.

This study puts forward the following hypotheses:

Coping with humor is negatively correlated with college students' social anxiety;

The level of social anxiety is related to the mental health of college students. The higher the level of social anxiety, the worse the mental health.

3. Research method and process

3.1. Research objects

This study adopted a random sampling method, taking four-year undergraduate students as research objects. A total of 600 questionnaires were distributed, 572 of which were recovered. After eliminating invalid questionnaires, such as incomplete basic information, incomplete answers, and all repeated options, 529 valid questionnaires were recovered, with an effective recovery rate of 88.17%. Among them, there are 267 boys and 262 girls; There are 259 liberal arts students and 270 science students. There were 205 people who were positive and 324 people who were negative in the mental health scale.

3.2. Research tool

3.2.1. Humor style questionnaire

This research adopted the revised Humor Style Questionnaire (HSQ) with 25 items, all of which are positive scores, including four dimensions: affinity, self-improvement, ridicule, and self-deprecation. The scale uses a Likert seven-point scale, ranging from 1 (completely disagree) to 7 (completely agree).

3.2.2. SCL-90 scale

The SCL-90 scale includes 90 items and 9 measuring factors: somatization, compulsion, interpersonal sensitivity, depression, anxiety, hostility, terror, paranoia, and psychosis.

3.2.3. Interaction anxiousness scale

The Interaction Anxiousness Scale (IAS) has been verified by Chinese scholars, and it has good reliability and validity. The questionnaire has 15 items, and each item is divided into five grades, ranging from 1 (not at all consistent with me) to 5 (extremely consistent with me) points.

3.3. Data processing

SPSS 26.0 was used for data entry and the corresponding processing. Independent sample t test was used in the influence of gender and subject type on humor style. Analysis of variance was used in the grade differences of humorous styles. The relationship between mental health and humorous style was analyzed as well.

4. Result

4.1. Humor style and social anxiety of college students

In terms of humor style, college students use affinity humor the most, followed by self-improvement humor, ridicule, and self-deprecation. This situation shows that college students are generally friendly, positive, and healthy in the use of humor. In terms of social anxiety, the average score is 40.03, which is above the average score of 38.9 given by IAS. These scores are limited to relevant research fields, and the results may be different in countries with different cultures.

4.2. Differences between college students' humorous style and social anxiety

The results in **Table 1** show significant differences between male and female college students in terms of affinity, ridicule, self-deprecation, and social anxiety. However, there is no significant difference in the self-improvement dimension. Judging from the score, in terms of humor style, females use more self-improvement humor and less self-deprecation and ridicule humor. In terms of social anxiety, males score significantly higher than females.

Table 1. Differences between college students' humorous style and social anxiety.

	Genders	M	SD	T
Affinity type	Male	27.028	5.447	3.459***
	Female	28.633	5.275	
Self-improvement type	Male	21.777	6.503	-0.632
	Female	23.247	6.305	
Mock type	Male	20.507	7.399	7.531***
	Female	16.635	6.209	
Self-deprecating type	Male	15.305	6.779	4.463***
	Female	12.194	6.349	
Social anxiety	Male	41.027	6.517	2.297**
	Female	38.405	6.098	

Note: ** $p < 0.01$, *** $p < 0.001$.

4.3. Correlation analysis of the SCL-90 score, humorous coping, and social anxiety

Correlation analysis (see **Table 2**) indicates a positive correlation between humor coping and college students' social anxiety, and between social anxiety and mental health. However, there is no significant correlation between humor coping and college students' mental health level.

Table 2. Correlation analysis of the SCL-90 score, humorous coping, and social anxiety.

	Total health score	Social anxiety	Humorous coping
Total health score	1		
Social anxiety	0.367**	1	
Humorous coping	-0.028	0.132**	1

Note: ** $p < 0.01$.

In this study, there is a significant correlation between humorous coping and social anxiety. This result shows that when encountering embarrassment and difficulties in expressing language and behavior, humorous coping can be considerably resolved.

4.4. Regression analysis of humor style and humor coping on communication anxiety

The results of multiple regression analysis of humor style and humor coping on communication anxiety are shown in **Table 3**.

Table 3. Regression analysis of humor style and humor coping on communication anxiety.

	<i>R</i>	<i>R</i> ²	ΔR^2	<i>F</i>	Beta	<i>T</i>
Affinity type	0.31	0.039	0.038	45.854***	-0.195	-3.238***
Humorous coping	0.365	0.14	0.118	32.502***	-0.261	-4.144***
Self-deprecating type	0.39	0.163	0.137	27.7***	0.195	3.178***

Affinity humor style and humor coping can positively predict college students' communication anxiety. Meanwhile, self-deprecating humor style can negatively predict college students' communication anxiety, with a multiple correlation coefficient of 0.39 and a joint interpretation variance of 13.7%. In particular, affinity humor style has better predictive power.

5. Discussion

At present, the use of humor styles by college students is mainly based on affinity and self-improvement and less on ridicule and self-deprecation. This situation shows that college students prefer to use friendly and positive humor, which has a high relationship with their education level. In terms of humor style, Chinese college students use affinity humor the most, followed by self-improvement humor, ridicule, and self-mockery. This result indicates that Chinese college students are generally friendly, positive, and healthy in their use of humor. In terms of social anxiety, the average score is 40.03, which is higher than the average score of 38.9 given by IAS. Studying in Chinese universities is a preparation from school to society, and the situation they face is more complex than before. Currently, Chinese college students are becoming increasingly diverse. If they cannot master good social skills, their social anxiety will inevitably be high.

This study finds significant differences between male and female college students in terms of affinity, ridicule, self-deprecation, and social anxiety. However, there is no significant difference in the self-improvement dimension. Judging from the score, in terms of humor style, females use more self-improvement humor and less self-deprecation and ridicule humor. In terms of social anxiety, males score significantly higher than females. The possible reason is the different physiological characteristics of men and women and the influence of traditional culture. In particular, traditional culture endows men with the characteristics of being brave, strong and aggressive, while women are required to be gentle, virtuous, and uncontested. Therefore, males are more aggressive than females, and cynical humor is also a form of attack.

Humor coping is significantly related to social anxiety, and social anxiety is significantly related to mental health. However, humor coping is not significantly related to mental health. Previous studies have indicated that humor can be used to cope with various stresses and pressures in life and can effectively reduce personal social anxiety. The current study regards humor as a regulating variable to cope with stress events, and humor can play a stress buffering role in stress coping. Affinity humor style and humor coping can positively predict college students' communication anxiety. Meanwhile, self-deprecating humor style can negatively predict college students' communication anxiety, with multiple correlation coefficient of 0.39 and joint interpretation variance of 13.7%. Self-deprecating humor style is detrimental to college students' mental health, and college students who often use self-deprecating humor style will damage their self-confidence and exacerbate their level of depression and communication anxiety. Therefore, the hope is that college students will sufficiently focus on humor and use it as much as possible in their lives to cope with and resolve stress.

In the “language psychology” mechanism of “combination error,” “interference” is also one of the manifestations. People have many desires in their social life, and these desires cannot always be satisfied. If they are not satisfied, then they will produce psychological “depression,” which will lead to mental abnormality if it is not released reasonably for a long time^[20]. Various channels are available to release this inner repression, and art is the channel for artists to release their repressed desires and seek “disguised satisfaction.” When a group of language symbols express two unrelated meanings simultaneously, or express a special meaning with two conflicting concepts, it is not consistent with the general habit of language combination.

Humor is a cognitive process. When we appreciate humor, our consciousness goes through a process of obtaining humor from objective things. In cognitive psychology, metacognitive ability refers to the knowledge and cognitive process, in which subjects grasp, monitor, or control their conscious activities and those of others^[21]. When creating the metacognitive ability of humorous speech, people can unconsciously use the principle of optimal relevance to predict the cognitive reasoning activities of the audience, so that the speech can achieve humorous effects. This process is illustrated in **Figure 1**.

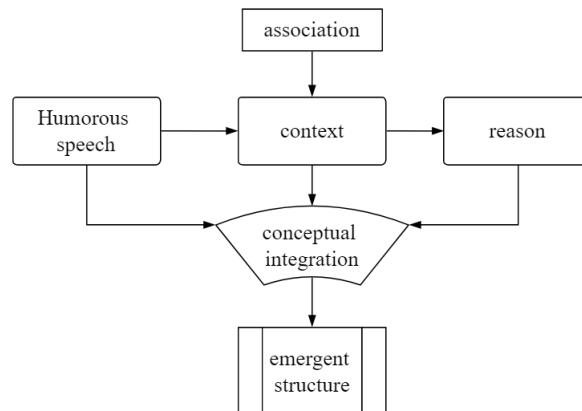


Figure 1. Reasoning and integration process of humorous speech interpretation.

In humor theory, error correction is key to the humor of discourse. Within the framework of relevance theory, being correct is an explicit stimulus that follows the principle of relevance. Moreover, deconstruction is a process in which readers with relevant communicative competence exert the corresponding cognitive effort to obtain the contextual effects. Conceptual integration, which is a new conceptualization process, is the process of forming and understanding new concepts by using the transformation and mapping of old and new schemas.

Conceptual blending theory uses conceptual blending network, mutual mapping, and integration of psychological spaces, and then produces a new explicit structure in conceptual blending space. That is, the

audience judges whether humorous words are in conflict with their own consistent recognition or moral principles of events. This theory also judges whether the relevant factors in humorous speech situations are completely normal. In this way, the new structure in conceptual synthesis (i.e., conditions for humor) is clearly revealed. Therefore, the entire process of verbal humor interpretation has also been clearly revealed. This psychological cognitive process is presented in **Figure 2**.

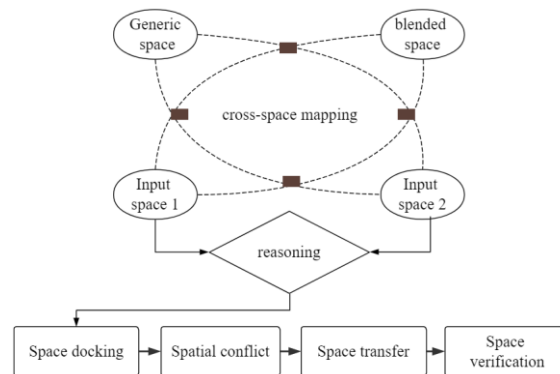


Figure 2. Conceptual integration of humorous speech interpretation.

The interpretation of humorous speech involves four processes: space docking, space conflict, space transfer, and space verification. Spatial conflicts will inspire people to understand the relationship between humor and speech. If conceptual integration theory is used to explain a wide range of speech phenomena, then it must be incorporated into the system of relevance theory for expansion. Speech comprehension is a compound process of explicit information and implicit information. Relevance theory mainly discusses listeners' reasoning process but fails to analyze how speech signals guide and activate the cognitive conceptual structure.

6. Conclusion

This study finds that humor coping is positively correlated with college students' social anxiety, which is positively correlated with mental health. Moreover, there is no significant correlation between humor coping and college students' mental health level. Affinity humor style and humor coping can positively predict college students' communication anxiety, while self-deprecating humor style can negatively predict their communication anxiety. However, affinity humor style has better predictive power. This study holds that relevance is the general principle of communicative cognition, and the mapping between mental spaces and the operation of integrated spatial cognitive work programs can not be independently replaced by class spaces and become a space of conceptual synthesis network. Combining conceptual fusion theory with deviation and convention theory can help us better understand verbal humor and reveal its cognitive basis. A close relationship exists between humorous language and human psychological mechanism. Lastly, there is also a clear relationship between different psychological mechanisms and humorous language structure. However, the results may be different in different countries and regions due to their own cultures, which needs to be further explored by further studies.

Author contributions

Conceptualization, YS and YH; methodology, YS; software, YS; validation, YS and YH; formal analysis, YS; investigation, YS; resources, YS; data curation, YS; writing—original draft preparation, YS; writing—review and editing, YS; visualization, YS; project administration, YS. All authors have read and agreed to the published version of the manuscript.

Conflict of interest

The authors declare no conflict of interest.

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