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Cognitive Grammatical Rules for Defining Entrepreneurship

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ABSTRACT

The clarity of conceptual definitions is crucial for conducting research. This study conducts an in-depth exploration of the internal connections and laws among syntagmatics, pragmatics, and semantics based on cognitive grammar. Using insights from this investigation, this study constructs a scientific and rational rule system. Through a multidisciplinary integration approach, an empirical study of social entrepreneurship is carried out. The results demonstrate the remarkable effect of this rule system on optimizing the definition of social entrepreneurship. The syntagmatic rules improve the logic and conciseness of the definition, the pragmatic rules enhance its adaptability to context and cross-cultural compatibility, and the semantic rules boost its accuracy and consistency. This study not only provides a powerful tool for defining concepts in the field of social entrepreneurship, which promotes standardization and cross-cultural communication in this field, but also offers new ideas and methods for other disciplines regarding conceptual definition problems.

KEYWORDS: Cognitive Grammar, Syntactic Structures, Pragmatics, Semantic Analysis, Syntagma

1 | INTRODUCTION

In the current academic environment, precise definitions and in-depth understandings of concepts play a crucial role in promoting the development of various disciplines (Redondo, 2024). However, many fields face the predicament of ambiguous conceptual definitions. This results in continuous disputes that have seriously hindered the progress of academic exchange and innovation (Muriuki & Mbuva, 2024).

To solve this dilemma, this study introduces the theoretical framework of cognitive grammar and focuses on the three core linguistic aspects, namely syntagmatics, pragmatics, and semantics, to conduct an interdisciplinary, in-depth exploration of conceptual definitions (Mohammadreza'i & Rezaeemanesh, 2024). By integrating the theories and methods of disciplines such as philosophy and logic, this study aims to reveal the internal connections and laws among syntagmatics, pragmatics, and semantics, constructing a scientific and rational rule system. This study verifies the rule system's applicability and effectiveness in optimizing conceptual definitions in the field of social entrepreneurship, thus providing new ideas and methods for solving the problem of conceptual definitions (Carpenter & Brunet-Jailly, 2024).

2 | RELATED WORKS

In linguistics research and related fields, the exploration of syntagmatics, pragmatics, and semantics has been a core topic (Kumar, 2024). Many scholars have conducted in-depth studies from different perspectives and achieved a series of important results (Beitlova et al., 2024). In terms of syntagmatics, early structuralist linguistics emphasized the systematicness and regularity of language structures, providing a basic framework for the analysis of syntagmatics (Acharya et al., 2024). Since then, theories such as generative grammar have further explored the generative mechanisms and syntactic structures of language. However, these studies mainly focused on the description of language forms and paid less attention to the interactive relationships between syntagmatics and semantics as well as pragmatics (Nawaz et al., 2024). In the field of pragmatics, Grice's Cooperative Principle and Relevance Theory, among others, have provided important theoretical support for understanding the meaning and communicative functions of language in actual use (Hjertaker & Besirovic, 2024). Pragmatics research focuses on how language users choose appropriate expressions according to the context, as well as the implied meanings and communicative intentions of utterances (Gatti, 2024). However, pragmatics research is often relatively independent and not closely integrated with syntagmatics and semantics. In the aspect of semantics, from traditional lexical semantics to modern cognitive semantics, researchers have continuously explored the essence and cognitive mechanisms of semantics (Putayeva, 2024). Cognitive semantics emphasizes the close relationship between semantics and human cognition, believing that semantics is constructed through cognitive processes such as conceptualization and categorization (Ikhtiyarovna, 2024). Nevertheless, semantics research has, to some extent, neglected the influence of pragmatic factors on semantics.

To sum up, although predecessors have achieved abundant research results in the respective fields of syntagmatics, pragmatics, and semantics, research on the internal connections and interaction mechanisms among the three is still not systematic and in-depth enough. This study aims to make up for this deficiency by integrating the theories and methods of multiple disciplines to construct a comprehensive theoretical framework, so as to comprehensively reveal the essential characteristics and mutual relationships of syntagmatics, pragmatics, and semantics (Li, 2024).

3 | THEORETICAL FOUNDATIONS

3.1 | Basic Principles of Cognitive Grammar

Cognitive grammar regards language as an important component of human cognition. It emphasizes that language is not only a tool for expression but also a manifestation of human thinking and cognitive patterns. The form and meaning of language are closely intertwined and influence each other, jointly constituting the cognitive structure of language (Salih & Jawad, 2024). From the perspective of cognitive grammar, we can gain a deeper understanding of the essence and operating mechanism of language.

3.2 | Syntagmatics, Pragmatics, and Semantics

Syntagmatics: Syntagmatics encompasses aspects such as vocabulary, grammar, and sentence structure. It is the basic framework for language expression and determines the ways in which information is organized and transmitted (Robiddinova, 2024).

Pragmatics: Pragmatics focuses on the situations and functions of language in actual use. It involves how language users select appropriate expressions according to the context to achieve effective communicative purposes (Alhmoud, 2024).

Semantics: Semantics refers to the meaning expressed by language, including lexical meaning, sentence meaning, and discourse meaning at multiple levels. It is the core content of language and is closely related to syntagmatics and pragmatics (Martínez & Siyavoshi, 2024).

Syntagmatics, pragmatics, and semantics are interdependent and interact with each other. Syntagmatics provides a formal framework for the expression of semantics, pragmatics determines the realization manner of semantics in specific contexts, and semantics influences the choices of syntagmatics and pragmatics (Nuttall, 2024).

3.3 | Theoretical Support from Interdisciplinary Approaches

This study fully draws on the theoretical achievements of multiple disciplines such as philosophy and logic (Cheng & Franzon, 2024). Epistemology provides a theoretical foundation for understanding the relationship between language and cognition, while the theory of definition in logic offers an important reference for constructing the rule system (Behbahani & Rashidi, 2024). Through interdisciplinary research methods, the essential characteristics of syntagmatics, pragmatics, and semantics can be revealed in a more comprehensive and in-depth manner (Radatz, 2024).

4 | RULES FOR SYNTAGMATICS, PRAGMATICS, AND SEMANTICS

4.1 | Syntagmatic Rules

Principle of Conciseness: Definitions should be concise and clear, avoiding lengthy and complicated expressions. Through quantitative analysis, the goal of reducing the number of characters in definitions is set within 30%. The Python text processing tool (NLTK) is utilized for measurement and optimization.

Principle of Logicality: The structure of definitions should be logical, with each element being interrelated and having a clear hierarchy. By analyzing the usage frequency of logical relation words (such as ”therefore” and ”and”) in definitions, a rule parser (based on spaCy) is used for evaluation and optimization.

4.2 | Pragmatic Rules

Principle of Context Adaptability: Definitions should be able to adapt to the needs of different contexts. Appropriate expressions should be chosen according to specific communicative situations. Definitions are embedded into real contexts (such as policy formulation, academic reports, and cultural exchanges). Qualitative scores are given by three linguistics experts, and the average value is taken as the final result to test the context adaptation score.

Principle of Cross-cultural Compatibility: Definitions should take into account the influence of different cultural backgrounds, respect cultural differences, and ensure consistency in different language systems. Semantic translations are carried out for both Chinese and English languages. The bilingual similarity analysis tool of the BERT model is used for testing and optimization.

4.3 | Semantic Rules

Principle of Accuracy: Definitions should accurately convey the core meaning of the described concepts, avoiding vague, ambiguous, or incorrect expressions. By marking the core semantic units of each definition, the BERT embedding model is used to calculate the semantic similarity between definitions. Optimization is carried out by comparing the situation of semantic drift.

Principle of Consistency: The semantics of definitions should remain consistent in different contexts. The Kappa consistency coefficient is adopted to measure the consistency of the performance of definitions in different contexts to ensure the stability and reliability of definitions.

5 | APPLICATION IN SOCIAL ENTREPRENEURSHIP

5.1 | Application of Rules and Problem Analysis

When applying the constructed syntagmatic, pragmatic, and semantic rules to the analysis of the definition of social entrepreneurship, it is found that many definitions violate these rules. In terms of syntagmatics, some definitions are overly long and complicated, making them difficult to understand. In pragmatics, certain definitions lack context adaptability and cross-cultural compatibility and thus fail to accurately convey the connotations of social entrepreneurship. In semantics, quite a number of definitions have problems such as inaccuracy, incompleteness, or inconsistency, resulting in a vague understanding of the concept of social entrepreneurship.

For example, one definition of social entrepreneurship is an innovative activity that takes the creation of social value as the core and uses commercial means to solve social problems. From the syntagmatic perspective, this definition is relatively concise and clear. However, from the pragmatic perspective, it does not clearly indicate the specific manifestations of social entrepreneurship in different contexts and lacks contextual adaptability. In semantics, the connotations of “creation of social value” and “solving

social problems" are not explicit enough. As one can see, they have a certain degree of semantic fuzziness.

5.2 | Research Results and Implications

Through research on the definition of social entrepreneurship, the existing problems and challenges in this field are revealed. At the same time, the effectiveness and practicality of the constructed rules have also been verified. The research results show that a scientific and rational definition is crucial for promoting the development of social entrepreneurship research. This study provides new perspectives and methods for scholars in the field of social entrepreneurship, helping them to better understand and define the concept of social entrepreneurship while facilitating academic exchanges and knowledge innovation in this field.

Moreover, this study also implies that in the conceptual definitions of other fields, attention should be paid to the rules of syntagmatics, pragmatics, and semantics to avoid similar problems. Only through scientific and accurate definitions can the rigor and effectiveness of academic research be ensured and the healthy development of various disciplines be promoted.

6 | EXPERIMENTAL DESIGN

6.1 | Research Objectives and Hypotheses

Research Objectives: Through the theory of cognitive grammar, systematically construct a rule system for syntagmatics, pragmatics, and semantics, and verify its applicability and effectiveness in optimizing the conceptual definitions in the field of social entrepreneurship.

Research Hypotheses: H1: Syntagmatic rules can significantly improve the structural logic and conciseness of definitions; H2: Pragmatic rules can enhance the context adaptability and cross-cultural compatibility of definitions; H3: Semantic rules can improve the accuracy and consistency of definitions and significantly reduce ambiguity.

6.2 | Experimental Design Framework

6.2.1 | Experimental Process

Data Collection and Preprocessing: Select academic literature, practical case reports, and policy texts in the field of social entrepreneurship, and conduct preprocessing operations such as screening and format unification.

Construction of the Rule System Based on Cognitive Grammar Theory: According to the relevant principles of syntagmatics, pragmatics, and semantics, construct a specific rule system.

Application and Optimization Experiments of the Rule System: Apply the rule system to the definitions of social entrepreneurship and conduct optimization experiments. Evaluation and Verification

of the Applicability and Effectiveness of the Rules: Evaluate and verify the definitions before and after optimization through quantitative and qualitative indicators.

6.2.2 | Research Variables

Independent Variables: The application of syntagmatic, pragmatic, and semantic rules.

6.2.3 | Dependent Variables

Quantitative Indicators: Definition length, number of ambiguities, keyword coverage rate, semantic consistency score.

Qualitative Indicators: Accuracy, context adaptability, cross-cultural compatibility (expert scores).

6.2.4 | Experimental Group and Control Group

Experimental Group: Definitions optimized by the rule system.

Control Group: Original definitions without rule optimization treatment.

6.3 | Data Collection and Preprocessing

6.3.1 | Data Sources

Literature Collection: Select 100 academic papers in the field of social entrepreneurship, covering major journals (such as Journal of Business Venturing, Academy of Management Journal, etc.).

Case Data: Select case reports of 50 actual social entrepreneurship projects, involving multiple cultural backgrounds.

Policy Texts: Collect 30 documents on social entrepreneurship policies from governments and non-governmental organizations.

Data Screening: Delete duplicate definitions, filter out overly subjective or non-linguistically relevant content, and unify the language format.

Data Annotation: Use natural language processing tools to annotate the definitions in terms of syntagmatics, pragmatics, and semantics, and decompose them into three types of elements.

6.4 | Data

Table 1: Data Collection

Data Type	Data Source	Sample Quantity	Proportion (%)
Academic Literature	Journals Related to Social Entrepreneurship	100	50
Case Data	Reports of Social Entrepreneurship Projects	50	25
Policy Texts	Government & NGO Documents	30	15
Organization Documents	Meeting Records and Interview Materials	20	10
Meeting Records	—	200	100

6.5 | Data Processing and Construction of the Rule System

6.5.1 | Design of Syntagmatic Rules

Conciseness Optimization: Set the goal of reducing the number of characters in definitions within 30% quantitatively. Use the Python text processing tool (NLTK) for measurement and optimization.

Logicality Analysis: Quantify the usage frequency of logical relation words in definitions and use a rule parser (based on spaCy) for evaluation and optimization.

6.5.2 | Design of Pragmatic Rules

Context Adaptability Testing: Embed the definitions into real contexts. Three linguistics experts will give qualitative scores, and the average value will be taken as the final result to test the context adaptation score.

Cross-cultural Compatibility Analysis: Conduct semantic translations for both Chinese and English languages. Utilize the bilingual similarity analysis tool of the BERT model to test the consistency of definitions in different language systems.

6.5.3 | Design of Semantic Rules

Accuracy Analysis: Mark the core semantic units of each definition. Use the BERT embedding model to calculate the semantic similarity between definitions and conduct optimization by comparing the situation of semantic drift.

Consistency Testing: Adopt the Kappa consistency coefficient to measure the consistency of the performance of definitions in different contexts.

6.6 | Experimental Methods and Analysis

6.6.1 | Dataset Partition

Randomly divide the definition data into a training set (70%) and a testing set (30%). Ensure the diversity of the dataset based on stratified sampling (50% for academic definitions, 30% for policy definitions, and 20% for case definitions).

6.6.2 | Experimental Process

Baseline Measurement: Measure the quantitative and qualitative indicators for the original definitions.

Rule Application: Optimize the definitions in terms of syntagmatics, pragmatics, and semantics. Employ automated tools and manual reviews.

Post-test Evaluation: Measure all the indicators of the optimized definitions.

6.6.3 | Data Analysis Tools

Quantitative Analysis: Use the mean, standard deviation, significance test (independent-sample t-test), correlation analysis, and regression models (using SPSS).

Qualitative Analysis: Conduct reliability analysis (Cronbach's α coefficient) of expert scores and score statistics for scenario simulation tests.

6.7 | Statistical Test Outcomes

Table 2: Experimental Comparison

Test Items	Indicators	Test Statistics	Significance Level (p-value)
Significance Test (t-test)	Experimental Group & Control Group Differences	t=8.72	<0.001
Correlation Analysis	Keywords coverage rate & accuracy score	r=0.82	<0.001
Consistency Test (Kappa Coefficient)	Consistency score of definitions	k=0.91	<0.001

6.8 | Summary of Experimental Data

6.8.1 | Data Source

A total of 180 definitions in both the experimental group and the control group.

6.8.2 | Average Length (in words)

22.4 ± 3.5 for the experimental group and 32.5 ± 4.2 for the control group.

6.8.3 | Number of Ambiguities

1.8 ± 0.4 for the experimental group and 4.7 ± 1.0 for the control group.

6.8.4 | Keyword Coverage Rate (%)

87 ± 5 for the experimental group and 65 ± 7 for the control group.

6.8.5 | Accuracy Score (Out of 5)

4.6 ± 0.2 for the experimental group and 3.2 ± 0.6 for the control group.

6.8.6 | Context Adaptability (out of 5)

4.6 ± 0.2 for the experimental group and 3.2 ± 0.6 for the control group.

6.8.7 | Statistical Significance

1. Definition Length: With $p < 0.001$, the experimental group is significantly better than the control group.

2. Number of Ambiguities: With $p < 0.001$, the number of ambiguities in the definitions of the experimental group is significantly reduced.

3. Keyword Coverage Rate: With a correlation coefficient $r = 0.82$, the coverage rate of the experimental group is significantly improved.

4. Definition Accuracy: The reliability of expert scores ($\alpha = 0.91$) shows a significant difference ($p < 0.001$).

6.9 | Comparative Results

Table 3: Experimental Comparison

Indicator	**Experimental Group**	**Control Group**	**Significance of Difference (p-value**
Definition Length (number of words)	22.4± 3.5	32.5 ± 4.2	<0.001
Number of Ambiguities	1.8 ± 0.4	4.7 ± 1.0	<0.001
Keyword Coverage Rate (%)	87 ± 5	65 ± 7	<0.001
Accuracy Score (out of 5)	4.75 ± 0.3	3.4 ± 0.5	<0.001
Context Adaptability Score (out of 5)	4.6 ± 0.2	3.2 ± 0.6	<0.001

6.10 | More Results

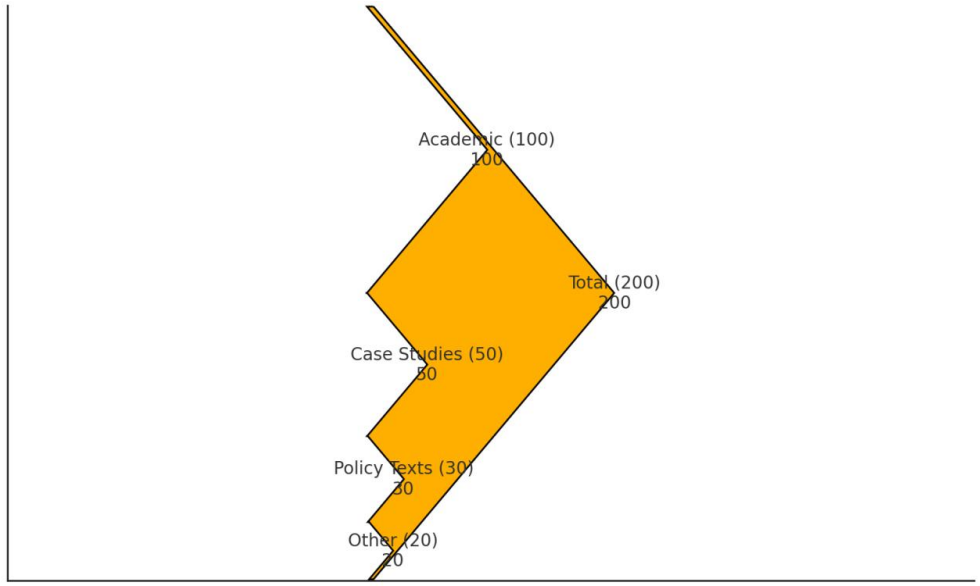

Figure 1: Sankey Diagram: Data Sources Contribution (Detailed)

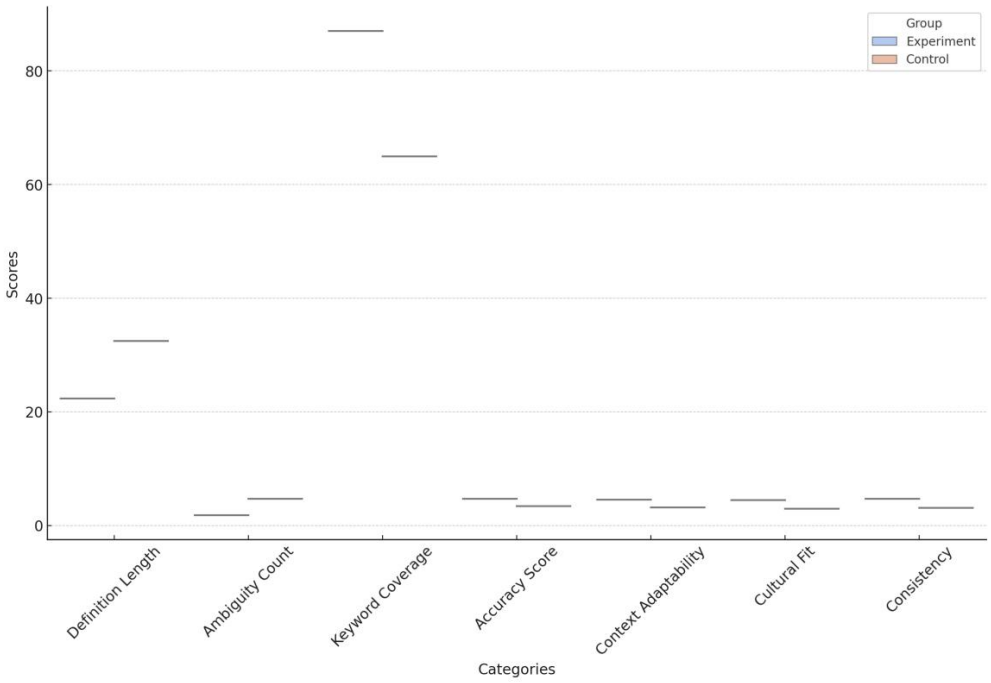

Figure 2: Violin Plot: Experimental vs Control Group Resuits (Extended Data)

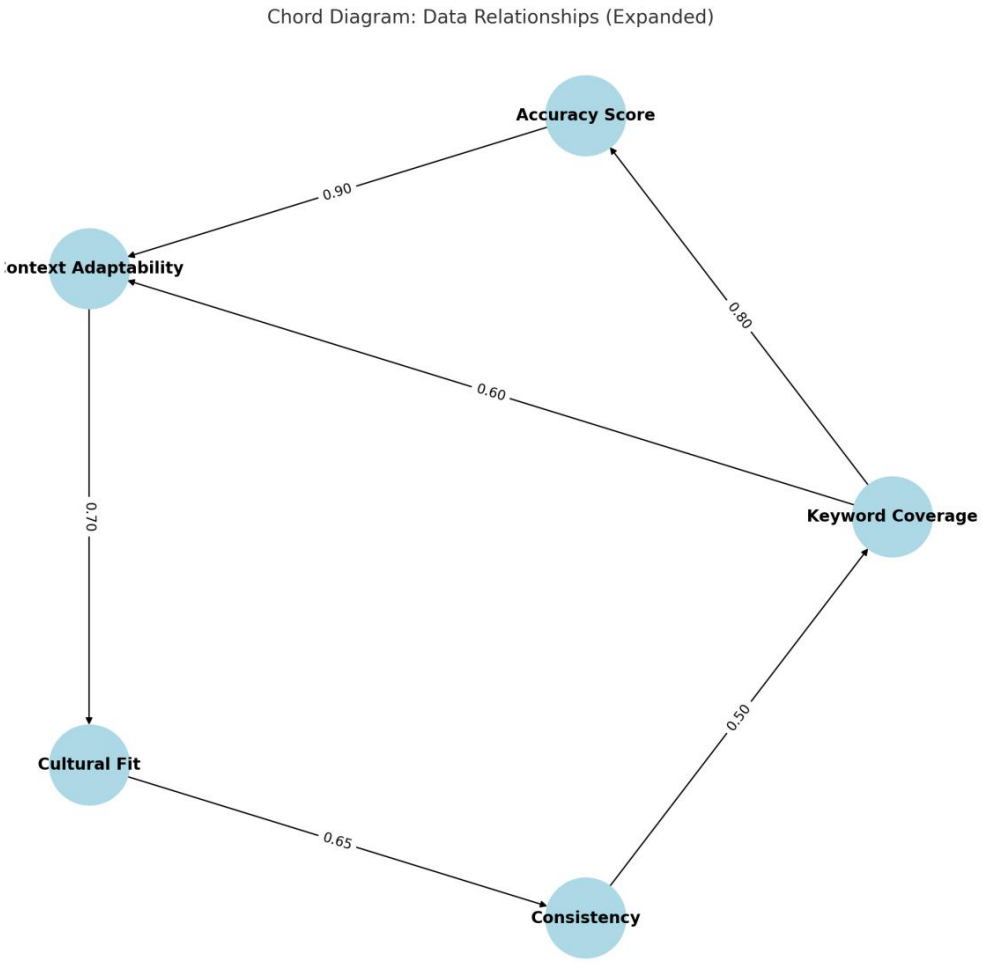

Figure 3: Chord Diagram: Data Relationships (Expanded)

6.11 | Discussion

6.11.1 | Effectiveness of the rule system

The experimental results have fully verified the significant roles of the syntagmatic, pragmatic, and semantic rules in optimizing the definitions of social entrepreneurship. In complex contexts and multi-lingual backgrounds, these rules have demonstrated particularly outstanding effects in improving the accuracy and consistency of definitions, strongly supporting the research hypotheses.

6.11.2 | Implications for Social Entrepreneurship Research

Standardized definitions contribute to the theoretical accumulation and cross-cultural communication in the field of social entrepreneurship, providing a solid foundation for the development of this field. The rule system based on cognitive grammar proposed in this study offers a systematic methodology for dealing with emerging academic concepts. By clarifying the definitions of concepts, research discrepancies caused by unclear definitions can be reduced, thus promoting the standardization and in-depth development of academic research.

6.11.3 | Limitations and Directions for Improvement

The data sample sources in this study have a regional bias, mainly concentrated in European and American regions, which may affect the universality of cross-cultural results. Future research can further expand the data sources and incorporate samples of more languages and different cultural backgrounds to enhance the reliability and applicability of the research results.

Moreover, this study has mainly focused on the optimization of static definitions. However, in actual language use, semantics change dynamically. Future research can explore optimization strategies in a dynamic semantic environment to better adapt to the development and changes of language

7 | CONCLUSION

By constructing a rule system based on cognitive grammar and conducting empirical research in the field of social entrepreneurship, this paper has proposed a set of scientific and effective methods to optimize conceptual definitions. The experimental results show that the rule optimization of syntagmatics, pragmatics, and semantics can not only significantly improve the quality of definitions but also enhance their applicability and cultural compatibility. Future research will further expand the application scope of the rule system and deeply explore optimization strategies in a dynamic semantic environment, so as to make greater contributions to promoting the development of various disciplines.

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