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Current Status, Hot Spots, and Future Trends in Research on Negation: A Statistical Analysis

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Abstract: Through reviewing and summarizing existent studies of negation that are published both domestically and internationally which investigate negation as either linguistic expressions/structures or as verbal/multimodal discursive acts, this paper systematically analyzes the characteristics of existent studies with regard to their research objects, research content, research methodologies, and supporting theories. After a thorough analysis, it is revealed that (1) existent publications mainly focus on verbal negation rather than multimodal negation; (2) diverse theoretical frameworks were built in order to analyze negation from different aspects; (3) typical research perspectives are found. For instance, many papers investigate negative expression or structures within specific contexts or explore the acquisition of negative structures by children or other second language learners; (4) the use of corpora is becoming prevalent. For future studies of negation, it is suggested that first, future research can expand its scope to encompass verbal, non-verbal and multimodal negation cross languages and different cultures. Second, interdisciplinary collaboration should be fostered, which means drawing insights from related disciplines such as linguistics, sociology and pragmatics, etc., and recognizing the complementary nature of different fields in both theory and methodology. Third, it is suggested that mixed research approaches be continuously adopted in future research as the combination of qualitative and quantitative approaches can provide a more comprehensive and rigorous understanding of negation as either structures or as discursive acts. Fourth, research on negation is a multifaceted field with a wide range of research approaches and theories. Lastly, this paper acknowledges the richness of current literature on negation but emphasizes the need for further development of negation studies across different languages and cultures.

Keywords: Negation, Verbal-Multimodal, Structure-Discourse, Development

1. Introduction: Negation Studies

Semantically speaking, negation is defined as "denying the existence of things expressing denial (Modern Chinese Dictionary 7th edition 2016) [9]. However, it is a more widely applicable concept than it is defined in dictionaries. From the perspective of Systemic Functional Grammar, for example, the social meaning of negation can be represented with the use of different semiotic signs or in other words, the acts of negation can be conducted through the use of different semiotic resources, individually or in a combined way. While verbal negation such as the use of negative words, phrases and negative sentential structures is usually the most common, non-verbal negation and multimodal negation are also found in human beings' daily communication. In fact, while language is the most important representational system of human beings, non-verbal signs also play an indispensable role in both formal and informal communication. As an auxiliary form of communication, non-verbal expression sometimes even become the dominant form of meaning expression, especially for interlocutors such as deaf and hearing-impaired individuals who use sign language to communicate, and for infants who have not yet acquired the whole language system and therefore, mainly make use of non-verbal signs such as gestures, the rise and fall of sounds, tones, body movement, etc. to express themselves, etc. By "multimodal negation", in this paper it refers to cases in which negation is realized with the use of verbal and nonverbal semiotic resources, with the latter being the

representational semiotic systems that take visual, auditory and other symbols as meaning carriers instead of verbal language [41]. In other words, negation is regarded as multimodal discursive acts that are represented through multimodal semiotic resources. This paper tries to analyze the statistical results in-depth and figure out the current status, hot spots, and future trends in research on negation as both verbal and multimodal discursive acts and as structures and discourses, hoping to offer valuable insights into the nature of negation.

2. Data Resources and Research Questions

In this study, a thorough investigation of existent research papers on negation is undertaken. Specific literatures collected for analysis include those that are published both domestically and internationally, among which, master's and doctoral dissertations are finished in the period from 2011 to 2022. To cover as many related literatures as possible, a searching list is made that cover the seven types of acts of negation: non-existence, failure, denial, rejection, prohibition, inability, and epistemic negation [46]. Typical Chinese and English expressions that are closely related to the concept of negation as well as those of its subcategories mentioned above are included in the searching list, such as English expressions no /not /negate /negation /refuse /refusal /deny /denial /disagree /disagreement /reject /rejection, etc. and "不" (no), "不是" (not), "不行" (can't), "不好" (not good), "否定" (negation), "否认" (denial), "拒绝" (refusal), and "反对" (rejection), etc. After the searching list was decided, this study undertook a systematic search of those expressions in prominent English and Chinese databases such as Web of Science and JSTOR for English literatures, and CNKI (China National Knowledge Infrastructure) for Chinese research papers. Official journal databases of major publications in linguistics and discourse analysis such as Science Direct and Springer, as well as academic social networks, such as ResearchGate, were also searched in the process of literature collection. After removing duplicates and irrelevant literatures that did not pertain to the field of negation as verbal and multimodal discursive acts, or that did not approach negation from the perspectives of linguistics, a total of 307 target literatures were collected, most of which fall into research papers that are published on journals either indexed by CSSCI (Chinese Social Science Index Citation) or SSCI (Social Science Index Citation), as well as dissertations and theses.

In a word, by systematically summarizing and reviewing the target literatures about the studies of negation as verbal and multimodal discursive acts both domestically and internationally and using a statistical approach to examine the characteristics of existent studies with regard to their research objects, research content, research methodology, and supporting theories, this paper tries to analyze the statistical results in-depth and figure out the current status, hot spots,

and future trends in research on negation as verbal and multimodal discursive acts, hoping to offer valuable insights into the nature of negation in use. To be specific, this paper endeavors to answer the following questions: (1) What are the overall characteristics of existent studies? (2) What is the main research focuses of existent studies, especially what research objects are discussed, what research contents are designed, what research methodologies are employed and what research perspectives are taken? (3) In what ways do domestic research differ from those of international studies? (4) What new research subjects have emerged and what are the latest developing trends in this field?

3. Results and Discussion

3.1. Analysis of Research Objects and Research Content in Existent Studies

3.1.1. Studies of Negation: Overall Characteristics of Existent Studies

Table 1. Overall distribution of existent studies with regard to types of research objects.

Negation	As discursive acts	As structures	Total
Total	151	156	307

Based on the statistical analysis, there have been 151 research papers focusing on negation as discursive acts and 156 ones addressing negation as structures such as negative words and phrases. This indicates that there has been considerable research interest in both aspects of negation: linguistic perspective and discursive side. On the one hand, the former area of study mainly explores the ways in which negation functions in all kinds of discourse, such as its role in expressing specific negative meanings such as refusal, disagreement, and rejection etc. Undoubtedly, these 151 papers contribute a lot to our understanding of the discursive, pragmatic and social dimensions of negation. On the other hand, the 156 research papers that examine the structural characteristics of negation focus on the formal, especially the morphological and syntactic aspects of negation, examining different structures used to convey negation in various languages, cultures and contexts, grammatical rules governing negation, and the ways in which negation interacts with other linguistic elements so as to unravel the formal properties and constraints associated with negation. The fact that both aspects of negation have received equal attention in the literature indicates that researchers have recognized the dual nature of negation. By exploring negation as both a discursive act and a linguistic structure, researchers can develop a comprehensive understanding of its role in language and communication.

3.1.2. Studies of Negation: Focus Related to Research Objects

This paper further analyzes the distribution of existent studies according to whether the research objects are children or adults, and the result is shown in Table 2 below.

***Table 2.** Distribution of discursive negation of children or adults as research objects.*

Research objects	Children	Adults	Non-human	Total
Chinese publications	26	36	0	62
Western publications	58	30	1	89
Total	84	66	1	151

As is shown in Table 2, a total of 84 research papers on children's negation are found out of all target literatures, a further analysis shows that the research content of these papers focuses on children's acquisition of negation in the process of their first or second language acquisition. For example, Fan studied children's early acquisition of negative words in Mandarin [24]. Benazzo & Morgenstern discussed how French & Italian bilingual children acquire expressions of negation through multimodal pathways [42]. Fusaro et al. studied children's spontaneous nodding and shaking of head in their early childhood, which obviously belong to studies of multimodal negation [31]. Liu & Zhang studied the negative language bias of Mandarin students aged 6-8 years to the mentally retarded students in the class, which are also more about the discursive characteristics of negation [11]. Thornton et al. discussed the process of producing negative sentences by children with English language disabilities [39]. Grigoroglou et al. explored young children's understanding and use of linguistics negation in inference search tasks [33]. Wang & Xue focused on the types and representational characteristics of multimodal negation acts in 4-5-year-old Mandarin children [36]. Wang & Zhang examined 4-8-year-old children's acts of verbal-gestural negation [37]. Cheng examined second language learners' acquisition of negative structures in English in their early childhood [19]. All these literatures contribute to our understanding of how children of different languages acquire negation.

As for the studies of negation by adults, there are a total of 66 papers collected, which mainly focus on the studies of gestural negation by adults. For example, Liu studied the negative use of non-manual features in sign language interpreters in TV news programs [44]. Brown & Kamiya analyzed the forms and temporal patterns of gestures used by speakers in English negation contexts [1]. There are also studies on the acquisition of second language negation structures by college students other than children. For instance, Li discussed the acquisition of high-frequency negation adverbs "不" (*bu*, no) and "没" (*mei*, have not) by Uyghur students learning Mandarin [13]. Demirkol investigated the ways in which second language English learners refuse others [48]. Additionally, among the collected papers, there is one paper that focuses on 25 infant chimpanzees, which makes the study special as its research object is non-human. In Schneider et al., the authors attempted to explain the primitive precursors of human head-shaking behaviors through studying the head movements of bonobos [5].

3.1.3. Studies of Negation: Focus Related to Research Content

In this section, the research status of negation studies is further discussed by digging into research content of existent studies from a roughly dichotomous analysis between verbal and multimodal negation, and linguistic and pragmatic negation.

(i). Verbal Negation vs. Multimodal Negation

***Table 3.** Distribution of existent studies of verbal vs. multimodal negation.*

	Research content		
	Verbal negation	Multimodal negation	Others
Chinese publications	154	26	2
Western publications	88	31	6
Total	242	57	8

Table 3 presents a comprehensive overview of 242 papers, both domestic and international, focusing on the studies of verbal negation. The majority of these papers are dissertations and master thesis, specifically examining negative linguistic structures in Chinese or western languages. Notable examples include the work of Silva & Mello, who conducted an analysis of three phonetic negation forms in Brazilian Portuguese, examining their distribution and usage rules [28]. Pat-El & Austin explored the negation of verb predicates in semitic languages, aiming to reconstruct the original set of semitic negation particles [34]. D'Anna examined texts collected by Philippe Marcais in the 1950s and discussed verb negation in Fezzani Arabic, focusing on its developmental rules and characteristics [27]. Furthermore, there are cross-linguistic studies, such as Chen's comparative analysis of Chinese and English negation structures, which explores the distinctions between general negatives and specific negatives in these two languages [55]. Wang examined the translational methods of English negative sentences, using Godfrey Hodgson's *The Myth of American Exceptionalism* as a case study [10]. Among the papers surveyed, 57 specifically delve into multimodal negation, primarily focusing on corpus of Internet videos and on-line advertisements. Additionally, there are 8 papers dedicated to literature analysis rather than original articles. These papers primarily consist of review articles that extensively review relevant literature that study negative structures and expressions. Their objective is usually to investigate the current research progress and provide clarity on specific issues or problems.

(ii). Linguistic/Semiotic Perspective vs. Pragmatic Perspective

Table 4. *Distribution of existent studies from different perspectives.*

	Linguistic/semiotic perspective		Pragmatic perspective in broad sense	
	Quantity	Percentage	Quantity	Percentage
Chinese publications	110	61%	71	39%
Western publications	43	34%	83	66%

Based on the findings presented in Table 4, it is evident that the majority of published papers in the domestic context focus on research of negation from the linguistic and semiotic perspective, constituting approximately 61% of the total. In contrast, papers centered on pragmatic research account for 39% of the overall publication count, revealing a substantial discrepancy between these two areas of study in domestic studies of negation. A comprehensive review of the literature reveals that typical Chinese negative words and structures serve as primary research targets. For instance, Huang delved into the negative usage of the Chinese term "什么" (*shen me*, what) in negation [57], while Zhou analyzed the application of the Chinese negative word "不" (*bu*, no) [12]. Zhang examined the characteristics of "并不" (*bing bu*, not) and "没有" (*mei you*, have not) in Chinese direct negation and sentences that express rejection [20]. Scholars have also directed their attention towards metalinguistic negation. Zhang, for instance, investigated the inferential and interpretative processes, characteristics, and pragmatic effects associated with metalinguistic negation [54]. Similarly, Liang explored the negative objects pertaining to metalinguistic negation [21].

On the contrary, papers other than Chinese language predominantly emphasize pragmatics rather than language studies of negation. In detail, about 34% of the targeted papers focus on language studies, while 66% concentrate on pragmatic studies. For instance, Boogaart et al. examined the defense strategies employed during denial when individuals were accused of making inappropriate remarks [38]. Ho conducted a study encompassing 2,577 management responses to negative online comments from dissatisfied customers across hotels of various star ratings, utilizing Speech Act Theory as its guiding framework [51]. Additionally, Marion & Felix explored denial behavior among mentally retarded children, aiming to identify an appropriate art therapy program in response to these observations [35].

3.1.4. Studies of Negation: Focus on Specific Acts of Negation

Table 5. *Distribution of existent studies of specific acts of negation.*

	Micro Negation	Refusal	Denial	Disagreement	Total
Chinese publications	138	43	0	0	181
Western publications	97	12	14	3	126
Total	235	55	14	3	307

Table 5 reveals that studies of micro negation stands as the most extensively research topic within the realm of negative discourses, both domestically and internationally. Typically, research in this area revolves around the complicated use of negative words and expressions in different contexts. For instance, Steffensen examined the developmental characteristics of children's negative responses to yes/no questions [30]. Ma explored the function of intensifying the negative tone of adverbs such as "并" (*bing*, while) and "又" (*you*, again) [59]. Jin conducted a comparative analysis between the sentence patterns "有什么好 X 的" (*you shen me hao X de*, What is there to say?) and "没(有)什么好 X 的" (*mei (you) shen me hao X de*, there is nothing to X), focusing on the differences with regard to their pragmatic functions in specific contexts [15]. Additionally, Kavak investigated the usage of negation in the early language development of Turkish children [53].

There are 55 papers focusing on the studies of acts of refusal. For Chinese literature, the primary focus lies in children's acts of refusal and cross-cultural studies on acts of refusal. For example, Li conducted a comparative study on acts of refusal between Chinese and Japanese [43]; Wei explored the refusal acts of 5-6-year-old children in peer interactions [8]; Li conducted a comparative analysis of refusal expressions between Chinese and Thai people [32]; Zhang investigated peer refusal act within the context of construction activities among children [16]. Internationally, the research emphasis is placed on second language learners and their acquisition of refusal strategies in the target language. For instance, Demirkol examined the ways in which second language learners of English refuse others [48], while Liao & Bresnahan compared refusal strategies in English and Chinese from a pragmatic perspective [4].

However, there are no papers domestically that specifically focus on the research types of denial or disagreement, and the number of papers addressing these types is limited internationally as well. Boogaart et al. discussed the defense strategies employed during denial when the defendant was accused of making inappropriate remarks [38]. Additionally, Akiyama conducted a cross-linguistic comparative study on the acts of denial of English and Japanese children [29].

3.2. Analysis of Research Methods in Existent Studies

Table 6. *Statistical analysis of research methods.*

Methodologies	Domestic	International
Case Studies	84	84
Corpus-based studies	71	103
Comparative studies	52	18
Survey	43	10
Error Analysis	18	0
Experimental studies	13	25
Observation	9	5
Interviewing	7	0
Total	297	245

Based on the data presented in Table 6, obviously more than one research approach is used for each of most existent papers. In other words, methods that are mentioned in Table 6 such as corpus-based approach, case studies, experimental studies are employed in a combined way in existent research which will be discussed in detail below.

(1) Case studies

Among various research methodologies employed, the method of case studies emerges as the most frequently used approach in domestic research, with a total occurrence of 84 instances. In fact, this method is also referred to as the method of case analysis or typical analysis in some publications, and it serves as a scientific analytical tool for conducting in-depth and meticulous investigations of representative entities or phenomena, thereby facilitating a comprehensive understanding. In the collected papers, authors employing this method mainly either focus on the representative phenomenon of linguistic negation or choose representative social groups from a specific language for their research, aiming to individually elucidate the general state of affairs, identifying common principles through the description and analysis of delimited cases of linguistic negation. For instance, Cao examined the general characteristics of Chinese students' responses to ambiguity arising from the misinterpretation of the scope of negation, drawing insights from an investigation encompassing 120 students from Beijing Jiaotong University and its affiliated middle schools [2]. Additionally, Zou explored the acquisition of Chinese negation structures, namely "不" (*bu*, no) + qualitative adjective and "没" (*mei*, have not) + verb + "过" (*guo*, ever) by foreign students at the elementary level. This investigation involved the scrutiny of 64 foreign students representing 18 diverse native language backgrounds [17].

Similarly, the case study method was also prevalent in foreign literature, also accounting for 84 instances. For instance, Choi investigated the development of children's yes-no question answering system through a case study conducted among children aged 1-3 in Britain, France, and South Korea [45]. Antzakas & Woll examined head movements and negation in Greek sign language through a case study of three deaf individuals from Greece [23].

In summary, the case study method has emerged as the predominant approach within the realm of negation research, which is especially true in domestic studies. This approach

has been effectively employed in both domestic and international research, contributing to our knowledge of negation in various language settings.

(2) Corpus-based and comparative studies

Table 6 reveals that domestic research literature employs various methodological approaches, with notable frequencies assigned to the quantitative analysis method grounded in corpus linguistics (71 cases) and the comparative method (52 cases) in domestic papers. On the one hand, the corpus-based approach primarily entails statistical analysis applied to data derived from large corpora and the data analysis technique involves the systematic examination, categorization, and synthesis of big data through appropriate statistical methodologies. On the other hand, the comparative approach is typically employed in conjunction with data analysis techniques to elucidate distinctions among data sets and unveil patterns, developments, and regularities within linguistic phenomena. For instance, Xu employed both these methodologies to investigate the construction of modern Chinese negative adverbs "没" (*mei*, have not) and "没有" (*mei you*, have not), which revealed commonalities between these two negative adverbs, yet concurrently identified disparities in terms of syntactic function, semantic attributes, and pragmatic significance of these two expressions of negations [40]. Similarly, Kong delved into the concepts of no-negation and not-negation in maritime English, unveiling that the maritime English corpus exhibits a considerably higher frequency of "no" and "not" negations compared to other negative expressions. However, it was found that the maritime English corpus contains fewer instances of no-negation and not-negation than the Brown Corpus, with not-negation being more prevalent in maritime English discourse [47].

In international publications, corpus-based approach is significantly more frequently employed compared to comparative method, with 103 instances for the former and 18 for the latter. For instance, Akiyama conducted a cross-linguistic comparative investigation comparing children's denial in English and Japanese-speaking cultures. The study discerned a certain universality in the manner in which children employ denial across different cultures; however, it also unearthed discrepancies by analyzing the frequency of semantic negation and synonymous negation in children's linguistic behavior [29].

(3) Surveys

The survey approach is notably recurrent in domestic literature, accounting for 43 instances. In fact, this approach is widely acknowledged and employed in both domestic and international social research endeavors. The survey, often executed in the form of a questionnaire, involves the systematic solicitation of responses from research subjects through a series of multiple-choice or open-ended questions. This approach serves as a valuable tool for uncovering patterns, commonalities, and disparities within the realm of statistics and social investigations. Language, as a distinctive social phenomenon, operates as a fundamental medium for conveying ideas, expressing emotions, and disseminating

information. Consequently, the survey method emerges as a pivotal means of scrutinizing linguistic phenomena such as negation. To illustrate, Jin conducted an investigation among Chinese students studying in South Korea, aiming to discern the parallels and distinctions between Chinese and Korean negative adverbs. The study further involved an examination of the errors made by Korean students in their acquisition of the Chinese negative adverbs "不" (*bu*, no) and "没" (*mei*, have not) [26].

Likewise, the survey approach is also found in international research, with 10 instances found in pertinent international publications. For instance, Codina-Espurz explored the role of second language learners' proficiency in written expressions of refusal. This inquiry was undertaken through a questionnaire survey administered to 100 Spanish university undergraduates. The findings underscored that the majority of learners tend to employ indirect strategies in refusal, and that age may exert an influence on students' pragmatic development in their second language acquisition [52].

(4) Error analysis

As is shown in Table 6, the approach of error analysis has been employed in 18 domestic papers. This method, as expounded by Zhou [58], entails a systematic examination of errors manifested by learners during the process of acquiring a second language. Its objectives encompass discerning the origins of errors, unveiling the structure of learners' interlanguage systems, and elucidating the processes and governing principles of second language acquisition. In detail, errors, in the context of negation studies, represent the deviations exhibited by second language learners from the norms and conventions of the use of negation in target languages. These errors, or deviations, serve as a valuable resource for discerning systematic and recurring patterns, thereby enabling the identification of pertinent rules governing second language learning. Consequently, this method facilitates the formulation of effective teaching strategies and learning methodologies tailored to address these recurring errors. To illustrate its application, Shen delved into the errors made by Korean students in their acquisition of Chinese negative adverbs "不" (*bu*, no) and "没" (*mei*, have not) [14]. Similarly, Wu explored the acquisition of the Chinese negative words "不" (*bu*, no) and "没" (*mei*, have not) by Thai Chinese learners [56], while Zhang investigated the acquisition of these same words by students in Tajikistan [3]. These studies, through a comprehensive analysis of errors and their underlying reasons, provide valuable insights into the acquisition of Chinese negative words and negative structures by foreign students. Subsequently, they offer recommendations to enhance the proficiency of foreign students in the use of negative expression in Chinese as a second language.

(5) Experimental studies

Experimental approach is used in 13 domestic research papers. In short, the experimental approach predominantly encompasses the use of naturalistic experimentation which is the purposeful and systematic investigation conducted in everyday life context, or educational experimentation which is carried out within pedagogical environments guided by specific educational principles. To illustrate, Wu conducted a limited-scale experiment involving 90 Mandarin-speaking children between age 4 and 7. The study revealed a hierarchical understanding among children concerning four distinct forms of double negation, ranked as follows: "不能不 X" (*bu neng bu X*, can't help but X) < "难道不是吗" (*nan dao bu shi ma*?, Isn't it like that?) < "没有 X 不 Y" (*mei you X bu Y*, if there is no X, there is no Y) < "别不 X" (*bie bu X*, Don't X) [7]. Relatively speaking, the experimental method finds more frequent application in international research papers, as evidenced by 25 occurrences in our targeted papers. For instance, Gilkerson et al. investigated the comprehension of anaphora and sentence negation in 32 children aged 14 to 25 months, employing an experimental approach [18].

(6) Interviewing and observation

Generally speaking, both interviewing and observation are classified as qualitative research techniques. The interview method entails a direct, in-person exchange between an interviewer and an interviewee, aimed at comprehending the interviewee's perspectives. On the one hand, this approach encompasses individual interviews as well as group interviews and may occasionally encompass non-face-to-face formats such as telephone or email interviews. On the other hand, the observation method involves researchers utilizing their own senses or supplementary tools such as cameras, to directly observe the social acts of the research subjects within their natural context, guided by specific research objectives. In practice, these two methods are also employed in negation studies (21 cases in total). For instance, Yin investigated the acts of refusal exhibited by children in kindergarten senior classes during teacher-child interactions. The researcher observed the natural interactions between teachers and children and engaged in face-to-face conversations with the teachers to ascertain the frequency and distinctive features of children's refusal behavior in such interactions. Furthermore, the researcher identified the influencing factors and underlying causes contributing to the manifestation of children's refusal acts specifically in relation to teachers [25].

All in all, the concurrent use of the literature research method and the analytical induction method is commonly found in nearly each research paper, even though these methods may not be explicitly represented in Table 6. In other words, it is important to note that each research paper employs a minimum of two research methods, with a majority incorporating four to five distinct approaches.

3.3. Analysis of Supporting Theories in Existent Studies

Among the gathered research papers, the most prevalent theoretical framework that is explicitly employed is Multimodal Discourse Analysis, with a total of 24 papers adopting this perspective, and Speech Act Theory, Cooperation Principle, and Error Analysis also enjoy substantial utilization, each featuring in 18 research articles.

(1) Multimodal Discourse Analysis

Discourse analysis underwent significant evolution in the 1990s with the emergence of Multimodal Discourse Analysis. Halliday posited that language is social sign and advocated for the contextualization of language within its social context. This dual nature of language permits the expression of meaning through various modalities, thus giving rise to multimodality. In accordance with Halliday's discourse theory, Kress & van Leeuven established a comprehensive framework for multimodal analysis, focusing on three meta-functional meaning of multimodal discourse: representation meaning, interaction meaning, and composition meaning [49], [50]. The collected papers in this study predominantly employ multimodal discourse analysis to investigate how individuals, either children or adults, convey negative meanings by combining language with non-verbal resources, such as Benazzo & Morgenstern [42], Fusaro et al. [31], and Wang & Xue [36], etc.

(2) Speech Act Theory

Speech Act Theory, originally formulated by John Austin, gained formal recognition in the 1950s and 1960s with the publication of *How to Do Things with Words* and Austin's subsequent lectures at Harvard University [22]. In short, three distinct speech acts are delineated: the locutionary act, illocutionary act, and perlocutionary act. In the 18 papers in this study, Speech Act Theory mainly serves as the analytical foundation for investigating language learners' refusal or denial behavior, such as Akiyama [29] and Ho [51], etc.

(3) Cooperative Principle

Grice's Cooperative Principle posits that participants in a conversation should ensure their contributions align with the overarching discourse context. However, real-world conversations often deviate from strict adherence to this principle and its associated maxims, resulting in conversational implicature. This theory finds applicability in various facets of language research. For example, among the collected papers, Zhang studied the inferential interpretation process and pragmatic effect of metalinguistic negation [54], Jin analyzed the syntactic structure, semantic features and functions of Chinese negative sentences [15], and Boogaart et al. found that the accused parties would use the theory of conversational implicature to make a comprehensive denial and defend themselves [38].

(4) Error Analysis

Rooted in cognitive theory at a psychological level and universal grammar at a linguistic level, error analysis-based papers in the corpus systematically examine the errors made by learners in the process of acquiring a second language. They also propose practical solutions based on the errors encountered by foreign students during their acquisition of the Chinese language. Among the collected papers, papers based on error analysis mainly systematically analyze the errors produced by learners in the process of negative acquisition of a second language. And according to the error analysis of foreign students' acquisition of Chinese, some practical solutions are put forward in research such as Jin [26], Shen [14] and Zou [17], etc.

Additionally, a myriad of other theories feature in the discourse of negation research, such as the idealized cognitive model within cognitive linguistics, markedness theory, and the theory of construction grammar among others. These diverse theoretical frameworks also contribute to the comprehensive exploration of negation studies.

4. Conclusion

Building upon the foundation of previous studies, this paper conducts a comprehensive analysis of literature related to studies of verbal, non-verbal and multimodal negation, especially as either discursive acts or structures/linguistic expressions. A statistical approach is used to examine the characteristics of existent studies with regard to their research objects, research content, research methodologies, and supporting theories. The analysis reveals several noteworthy characteristics of current negation research:

First, existent publications mainly focus on verbal negation. The majority of papers, both domestically and internationally, primarily center on verbal negation. In contrast, there is a relatively smaller percentage of research on non-verbal and multimodal negation within China, although these topics have received relatively more attention in international publications. Second, diverse theoretical frameworks were built. Negation research draws upon a wide range of theories spanning linguistics, pragmatics, second language acquisition, and so on. This multidisciplinary approach enriches the depth and breadth of research in the field. Third, common research perspectives are found in existent studies. Despite the diversity of topics within negation studies, common research perspectives emerge. For instance, through case studies, many papers investigate negative expression or structures within specific contexts or explore the acquisition of negative structures by children or other second language learners. Fourth, the use of corpora is becoming prevalent. In detail, a prevalent research trend involves utilizing corpora as a data resource. Researchers employ various corpora, including Australian National Corpus, British English Corpus, and Bergen Corpus of London Teenage Language, etc. Definitely, corpus-based approach offers the advantage of handling vast datasets, thereby enhancing the objectivity and authenticity of research outcomes to a large degree.

Considering these noteworthy characteristics of current negation research above, this paper outlines the following potential directions and future prospects for negation studies:

On one hand, future research can expand its scope to encompass verbal, non-verbal and multimodal negation in cross languages and different cultures. This is especially important for current domestic studies considering the imbalance between the studies of verbal negation and non-verbal negation in domestic publications. On the other hand, interdisciplinary collaboration should be fostered in future research of negation, which means drawing insights from related disciplines such as linguistics, sociology and pragmatics, etc., and recognizing the complementary nature of different fields in both theory and methodology. In addition, it is suggested that mixed research approaches be

adopted in future research because the combination of qualitative and quantitative approaches can provide a more comprehensive and scientifically rigorous understanding of negation as either linguistic expressions or structures or as discursive acts.

Lastly, research on negation is a multifaceted field with a wide range of research approaches and theories. This paper acknowledges the richness of current literature on negation but emphasizes the need for further development of negation studies across different languages and cultures.

Acknowledgments

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