

# A Review on the Role of Token Frequency in the Acquisition of Argument Structures

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*Abstract*— The role of frequency in second language acquisition has become an important focus among second language acquisition researchers. Argument structure, as one of the core topics of verbs, has always been the focus of academic attention. Frequency has a certain influence on second language construction acquisition, and the corresponding research is abundant. This paper reviews the research on the acquisition of argument structure construction with token frequency and its enlightenment to teaching, and puts forward some suggestions for future research.

*Keywords*— token frequency, second language acquisition, argument structure construction.

## I. INTRODUCTION

Ellis (2002) proposed that frequency is the key factor to determine the success or failure of language acquisition, while paradigm and frequency determine the acquisition of second language constructions. The frequency of language phenomena plays an important role in learners' cognitive structure. Frequent contact with language and practice directly affect learners' grammatical accuracy and language fluency. Learners process and store a large number of tokens in language input as types, and then generalize and abstract them (Chen, 2017). According to the usage-based theory, language learning is frequency-driven and is a process in which learners experience, adjust and adapt to the target language. This process begins with the accumulation of specific constructions to the formation of constructional schema (Bybee, 2008). Xu pointed out: "the relationship between the token frequency and language acquisition is an

important research topic based on the concept of language acquisition." The token frequency refers to the number of specific words that appear in the text. (Bybee, 1997: P.378).

According to Goldberg (1995), construction is the pairing of form and meaning. The acquisition of argument structure construction is a core topic in the study of language acquisition. Argument structure refers to the semantic role relationship between predicates and their related noun phrases, and argument structure construction is the construction that reflects this relationship (Qian, 2017). Common constructions include dative construction, causative-motion construction, intransitive construction and so on (Goldberg, 2006). This paper reviews the relevant empirical research on the acquisition of token frequency in the construction of different arguments, and puts forward some shortcomings of the research, which has some implications for future research.

## II. THE EMPIRICAL STUDIES ON ARGUMENT STRUCTURE CONSTRUCTION

The usage-based theory of language acquisition holds that language use and experience are the basis for the development of grammatical competence, and grammatical learning is a categorization process of developing constructional abstract knowledge (Ellis & Larsen-Freeman, 2006). Among them, the relationship between token frequency and language acquisition is an important research topic based on the concept of language acquisition (Ellis 2008; Boyd & Goldberg, 2009; McDonough & Kim, 2009, etc.). Some studies have found that high token frequency can improve the probability of case recognition and promote the acquisition of constructions (such as Year & Gordon, 2009; Goldberg, 2013). However, Taylor (2012) believes that high token frequency may entrench the acquisition of constructions and hinder the development of schema and the emergence of language rules. (cited from Xu, 2017) Different empirical studies use different test tasks to investigate the role of token frequency in argument structure construction acquisition.

### 2.1 Grammar judgment task and grammar acceptability scoring task

According to Ambridge et. al. (2011), when learners are exposed to the recurrent and proven usage of a verb, they "form an increasing probability inference" that it is ungrammatical to use the verb in an unproven structure; therefore, this enables them to construct accurate syntactic construction. The view that token frequency is the key to the overgeneralization of constraints, has been confirmed in studies by Theakston (2003) and Ambridge et. al. (2006).

Theakston's (2003) research used the grammaticality judgment tasks to evaluate the role of entrenchment in the overgeneralization of verb argument structure. There were two groups of subjects in the study, children from two primary schools in the Greater Manchester area who spoke only English. Fifty-nine children with an average age of 5.8 years formed a younger group, and 55 children with an average age of 8.5 years formed an older group. In the

study, researchers showed them examples of argument structure errors, which contain high-frequency and low-frequency words that match semantic categories, and asked them to point out whether or to what extent these sentences conform to grammar. The results showed that in all groups, sentences with argument structure errors with low-frequency verbs were significantly more grammatical than sentences with high-frequency verbs. These findings show that verb frequency plays an important and continuous role in determining the speaker's choice of verb argument structure. However, in the future, the interaction between children's knowledge of the development of argument structure of verbs and different types of prepositional input should be studied in detail.

Ambridge et. al. (2006) surveyed 27 children who spoke monolingual English and 42 adults from schools or universities in the north of England (all undergraduates, most of them aged 18-19) according to the score of grammatical acceptability. It was found that verb frequency played a role in reducing children's errors in overgeneralization of argument structures. However, this study is limited to investigating the generalization errors of a specific argument structure, so it is impossible to determine whether frequency-induced entrenchment plays a role in inhibiting the generalization of all constructions.

Gao et. al. (2011) investigated the impact of semantics, mother tongue, and frequency on Chinese and Korean English learners' acquisition of English middle structure. 60 Chinese students, 16 Korean students and 24 native English speakers in two levels participating in the grammar judgment task found that frequency has different effects on second language learners and native speakers. Native speakers were more sensitive to frequency, while second language learners relied more on grammar rules and guessing strategies. However, in this study, there is only one horizontal group in the Korean group, so it is impossible to know whether the members of the Korean group are affected by mother tongue transfer, the interaction between variables is not fully discussed, and the effect of frequency is only examined from the perspective of input.

Han and Xue (2014) used a six-factor mixed design to

investigate Chinese English learners' acquisition of English dative alternation through grammatical judgments. College English teachers and senior high school students were used as high and low level English learners. A group of 60 people, all subjects were native Chinese speakers. The study found that frequency has a more obvious effect on atypical verbs and low-level learners.

Zhang et. al. (2018) conducted a grammar judgment test on 102 junior high school students based on the usage-based theory. It was found that the learning of category implicit knowledge was significantly affected by high-frequency paradigm, while the corresponding explicit knowledge was rarely affected by this learning style. Sequential Zipf frequency can significantly promote learners' acquisition of implicit knowledge of target construction VP-NP-AP construction in the short term. At the same time, it can also significantly restrain the generalization errors of the target construction. However, the task of investigation is relatively single, and the ambiguous constructions of the test semantics are not taken into account, which can not reflect the real situation of language learning.

### **2.2 Mandatory selection of task**

Goldberg (2006,82) pointed out that the high token frequency of a typical example will promote the formation of constructive meaning. Goldberg et. al. (2007) tested 126 English-speaking undergraduates at Princeton University with a mandatory selection task. They were asked to find out which of the two scenes shown in the video corresponds to audio sentences. Studies have shown that high token frequency can promote the acquisition of double-object constructions.

### **2.3 Conversational interview**

Ellis & Ferreira-Junior (2009) aimed at the ditransitive construction to analyze the conversational interview data of four native Italian and three Pompuche L2 learners communicating with their English-speaking peers based on the corpus. It found that the distribution of tokens of the argument structure of input verbs was in accordance with Zipf's rule. At the same time, it showed that the distribution of token frequency in input could promote

learners to acquire the most frequent, typical and general examples. However, due to the small sample size, whether the sentences produced by the subjects can fully prove that the frequency of formal symbols can promote the acquisition of constructions needs further research.

### **2.4 Induced output task and acceptability judgment task**

Year & Gordon (2009) examined the role of verb prototype, input distribution and frequency in the acquisition of English ditransitive structures by Korean native English learners. First-year students in a public middle school in a rural community in southern Korea didn't attend extracurricular cram classes. The study investigated the extent to which a typical high-frequency ditransitive verb (give) promoted the acquisition of English ditransitive constructions by Korean children in communities that rarely came into contact with English outside the formal classroom with induced output tasks and acceptability judgment tasks. The results showed that Korean rural students didn't play a significant role in learning high-frequency prototype verbs in English ditransitive constructions in a relatively formal classroom environment, but the high token frequency could improve the probability of case recognition and promote the acquisition of construction. This conclusion is confirmed by McDonough & Nekrasova-Becker (2014) through a survey of Thai students' acquisition of English double-object constructions.

Korean scholar C.YOOK (2013) used corpus-based data to explore the effect of frequency on the acquisition of dative construction verbs by Korean English second language learners. In this study, 30 low English proficiency Koreans, 30 high English proficiency Koreans and 30 native English speakers took part in an acceptability judgment test and an induced output task. It found that if there was enough input frequency, English learners were more likely to acquire dative constructions. It showed that the high token frequency can promote the acquisition of constructions to a certain extent. However, it doesn't consider whether other factors such as mother tongue transfer (because Korean learners only accept sentences of prepositions and cases) will affect Korean

learners' English and construction and the acquisition of verbs in the construction.

### **2.5 Listening test task**

McDonough & Trofimovich (2013) compared the effect of Zipf frequency on Thai students' acquisition of Esperanto (Esperanto) and object construction in the process of inductive and deductive teaching, tested the listening test to identify the object task, and found that the subjects who received balanced frequency input in the process of deductive teaching performed better than those of other frequency groups. Among them, the example of low token frequency in balanced frequency input may be more useful to determine that the pattern is not unique or limited to specific lexical nouns.

### **2.6 Free Association and Vocabulary fluency task**

Ellis et. al. (2014) used free association and vocabulary fluency task to investigate the sensitivity of verb argument construction (VAC) and its processing methods to the use of statistical patterns in 40 native English-speaking and non-English-speaking volunteers. Multiple regression analysis of the frequency of verb morphemes generated by each VAC in the two experiments showed that VAC processing involved rich associations. Through the adjustment of verb type and token frequency and the chance of their use, grammatical, lexical and semantic cues were connected, which had an impact on the psychological representation of VAC. The experience of the use of verb form frequency in VAC affected the fluency of language processing. In use, the higher the token frequency of an example, the greater its contribution to the definition of categories.

### **2.7 Translation task**

The syntactic structure of English reflexive verbs is a special kind of structure, which is a difficult point for second language learners. Its syntactic structure can be realized by reflexive construction and adjective passive construction. These two constructions are polysemous relations within words. Xu (2016) tested Chinese college students with translation tasks and found that token frequency plays an important role in complex constructions. However, the sample size is small, so more

stringent tests should be carried out to investigate the detransitivization and acquisition of reflexive verbs. In the study of the effects of token frequency, word frequency and salience of form-meaning mapping on English passive construction acquisition at different acquisition stages, Xu (2017) tested first-year non-English majors with induced translation questions, which found that token frequency effect was significant at the primary level of acquisition, but not at the high level. The results showed that the high token frequency plays a certain role in the acquisition of argument construction by L2 learners. However, in this study, the type frequency is not included in the study, and it is not examined from multi-dimensions.

### **2.8 Context- filled task**

In view of the influence of token frequency on the acquisition of caused-motion construction, Chen(2018) used English words designed by Nation to fill in the context blanks of 100 non-English major freshmen and found that token frequency didn't lead to the generalization of it by L2 learners, but led to entrenchment memory. The higher the token frequency of the construction is, the stronger the curing degree is. In addition, the high token frequency can not only entrench the configuration, but also protect the configuration from the change. The constructions with high frequency were more common and used more frequently than those with low frequency. The high token frequency of the construction is easier to learn than that of low token frequency construction.

## **III. CONCLUSION**

The usage-based theory of language acquisition attaches great importance to the role of token frequency in construction acquisition, but there are still some deficiencies in the study of token frequency, such as insufficient sample size (Xu, 2016) and the influence of mother tongue transfer (Yook, 2013). Therefore, there is still a dispute as to whether token frequency promotes the acquisition of constructions. However, in teaching, the method based on frequency plays a good role in promoting learning construction. In the initial teaching stage, teachers

can teach for the constructions with high frequency, and then teach more abstract constructions to the students when they have a certain foundation. Different scholars use different research methods to test subjects at different levels (children, adolescents, college students, etc.), such as translation tasks, acceptability judgment, grammatical judgment, etc., and draw some different conclusions. Some studies suggest that high morpheme frequency can promote second language learners' acquisition of different argument constructions and inhibit overgeneralization (such as Xu, 2016; Goldeberg et. al, 2007; Theakston, 2004, etc.); other studies believe that the effect of frequency on second language acquisition is sometimes not obvious (Hulstijn, 2002; Eubank & Gregg, 2002, etc.). And most of the empirical studies on argument construction acquisition focus on ditransitive constructions (such as Year, 2009; Yook, 2009; Ellis et. al, 2009, etc.) seldom discuss other argument structure constructions, so we can use multiple tasks to study other argument structure constructions in the future research.

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