A Case Study on the Acquisition of the Chinese Ditransitive Constructions*

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Abstract—This research investigates a Chinese child's acquisition process for the Chinese ditransitive constructions employing the natural observation method. It explores the controversial issue whether the acquisition of early abstract constructions is based on usage-based or rule-governed. The findings propose that the acquisition of early abstract constructions should be the interactive outcomes both the rule-governed and the usage-based. The former can be called internal factors and the latter can be called external factors. These two factors prompt for the acquisition of early abstract constructions.

Index Terms—ditransitive constructions, acquisition, usage-based model, governed-rule

I. Introduction

Close attention has been paid to children language acquisition pervading in these fields over the past decades, such as linguistics, psychology and cognitive science. One of core disputes has been addressed to the early abstract syntactic acquisition. The controversy topic focuses on whether the acquisition of children's early abstract syntax is usage-based or rule-governed. Although the research into children's syntax acquisition starts late in China, many researchers have made greater contribution to it. A lot of studies focus on the acquisition of subject-predicate structure, the acquisition of negative structure, passive construction acquisition and *ba* construction acquisition. However, few studies have been received about the development of children's early ditransitive constructions. Therefore, the primary aim of this research is to examine the overall development tendency towards the children's early ditransitive constructions. A detailed investigation is particularly made on how a Chinese boy acquires the ditransitive constructions and how to use them in the spontaneous situation. Adopting these naturalistic data and spontaneous utterances, this research attempts to present some powerful arguments to explore the controversial issue about whether the acquisition of children's early abstract syntax is usage-based or rule-governed.

II. THEORETICAL FOUNDATIONS

A. Construction Grammar

Numerous linguists have come to realize some deficiencies of the research from the transformational-generative linguistics. They have intended to build a new theory to make up these deficiencies on the basis of the embodied philosophy. Therefore, the advent of cognitive linguistics is matter of course. Construction grammar makes cognitive linguistics become full-fledged. It is debated that there are three basic principles involving in construction grammar, namely the independent existence of constructions as symbolic unit, the uniform representation of grammatical structures and the taxonomic organization of constructions in a grammar (Croft and Cruse, 2004). Therefore, construction grammar regards the constructions as the basic unit. Constructions are stored with pairings of form and function, including morphemes, words, idioms, partially lexically filled and fully abstract phrasal patterns (Goldberg, 2003). From Goldberg point of view, construction itself expresses certain meaning. It is independently of the lexical items in the sentence. Hence, different constructions manifest different meanings. Some constructionists stress that any linguistic pattern may be regarded as certain construction provided that all or some aspects of its form or function are not fully coming from its component parts or from other previous constructions existing in grammar. Others debate that even though linguistic patterns are completely calculated, they can also be stored on condition that there is sufficient frequency occurring. Therefore, constructions show an extensive range in a language, containing morphemes, words, idioms and a variety of sentence patterns. These can be called constructions because they contain pairings of meaning and form, which cannot be predicted from anything else. Namely, constructions represent a continuum from concrete to abstract.

B. The Usage-based Model

This model has been advocated by Langacker (1991), Bybee (1985, 1995), Bybee & Hopper (2001), Goldberg (1995) and Croft (2001). Linguistic representations of grammar are closely related and are ultimately extracted from concrete usage event. The type frequency and token frequency are two principal concepts in the usage-based models. Speakers or

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hearers can map what they hear words, phrases or constructions to the identical existing representations.

Entrenchment is another important concept in the usage-based models. If a schematic construction is high in type frequency, it will be easily entrenched in speakers' minds. If one instance of the constructions is frequently used, the instance will be deeply entrenched in speakers' minds. On the contrary, the abstract constructions are not easily-entrenched. Entrenchment can be said to be the result of high frequency no matter whether it is token or type.

Differing from the generative models, the usage-based model focuses on how linguistic knowledge is stored in the speakers' mind and proposes that regular behavior of linguistic items is captured by schematic constructions and their instances. The generative model holds the dual processing model, claiming that only irregular items are stored in the lexicon while the whole regular behavior is assumed to be generated, (Pinker, 1999). In Bybee's opinion (1995), these generative models do not reach an agreement with frequency effects. And the storage in the lexicon should be evenly divided pervading irregular lexical items, which can prevent irregular items that are infrequent from becoming regular.

However, it is a fact that irregular items of the infrequence have a tendency to become regular in psycholinguistic experiments and child language (Cruse & Croft, 2004). Psycholinguistic experiments which were observed the word production tasks have shown that regular word forms in high frequency are produced faster than those in low frequency. This idea provides some evidences and characteristics for the usage-based model. This model, to begin with, emphasizes that speaker's linguistic system is basically derived from the events of utterance because a close relationship exists between linguistic structures and instances of language use. Secondly, linguistic comprehension and production should be integral to the linguistic system. Linguistic ability of one speaker is constructed by regularities in the mental processing of language. Therefore, it is unnecessary to make a clear distinction between competence and performance. In most cases, they are dependent because performance itself is part of a speaker's competence. That is to say, linguistic representations are emergent. Thirdly, this model holds that linguistic system interacts with non-linguistic cognitive systems. Learners or speakers tend to be sensitive to linguistic patterns derived from use or experience. Finally, this model proposes the importance of context, which helps to interact between semantic and pragmatic in the linguistic system (Barlow & Kemmer, 2000).

Tomasello (2000) advocated the usage-based theory of child language acquisition and his observation and experiments have supported the imitative learning and the symbolic integration. And his research claims that acquisition of all linguistic knowledge, no matter how abstract it might become, should derive from the imitative learning and the symbolic integration of specific utterances on specific circumstances of use. His Verb Island Hypothesis is from his daughter's early grammar development. This hypothesis contains a two-stage theory how the grammatical knowledge of children develops. In Tomasello's opinions, the construction knowledge is fully dependent on based-items during the process of the early stage of language acquisition, namely, associated with specific verbs. It is at a later stage that children have the ability to form the knowledge of abstract constructions and integrated the item-based schemas with the interconnected verbal systems. However, it is possible that children do not equip with the ability of abstract construction knowledge at the verb island stage. They just employ the insular verbs to express specific arguments that cannot be transferred to other verbs. Taking the verb *hit* for example, it presents two arguments: one is called a preverbal argument, expressing one person doing the hitting. Therefore, children at this stage do not equip with the ability to generalize the predicate and cannot construct the knowledge of general semantic roles.

Based on the Verb Island Hypothesis, item-based constructions present us more linguistic phenomenon and experience. The development of item-based constructions mostly includes the imitative learning and the symbolic integration processes. To begin with, children can naturally learn utterances by the way they imitate the utterance models of adult production. This process of imitation is the most obvious for children to acquire the two-word combinations. Children are able to imitate or learn two-word schemas which are produced in the adult utterances. And they finally operate and acquire these utterances by the use of the substitution of the nominals. Besides, children are also able to construct numerous constructions from what they previously heard utterances or sentences by the ways of some mental operations. This kind of mental operations are referred to symbolic integration and the processes of symbolic integration come down to the combination of structure, that is to say, if children intend to express new meaning in the process of communication, what they can do is to integrate creatively the existing constructions that they heard previously to some extent (Tomasello, 2000). Although this process is rather complicated in the multi-word sentences, children still equip with the ability to construct more abstract constructions to integrate or infer the adult's specific communicative intention in adopting different verbs.

III. RESEARCH DESIGN

A. Research Subject and Scopes

This research investigates a Chinese-speaking boy, named Qi qi, who is author's son of this paper. His parents both work in the senior high school. His mother teaches Chinese and his father teaches English. The child's utterances of ditransitive constructions were longitudinally observed under the state of willingness, twice a week by his parents, lasting for one year. The age of the subject starts from 30 months to 42 months. A lot of research shows at this age that it is crucial stage for children to master basic grammar and acquire the abstract syntactic constructions. By the time of 36 months, children have already mastered the system of grammar rules from mother tongue. The research scopes include

NP1+V 给 give+NP2+NP3, NP1+V+NP3+给 give+NP2 and NP1 +给 give+NP2+V+NP3.

B. Research Questions.

Research questions include: (1) What features can be found when the child are acquiring the structures of the Chinese DC? (2) How can these features be explained in the framework of usage-based model? (3) Based on these features, can we draw a clear conclusion whether it is usage-based or based-rule for the child to acquire the abstract syntactic constructions?

C. Data Collection and Processing

This research adopts the naturalistic research method, whose prominent advantage is that a researcher can watch certain subject in the natural situation. We make use of a voice recorder to record the child's utterances interacting with his parents. All utterances take place in a home setting and they have been input computer according to the formats of CHILDIES. And they have been transcribed into text files followed the requirements of the CHAT (MacWhinney, 2000). After all the utterances have been coded, we use CLAN for the statistical analysis. This can guarantee the sufficiency and balance of collected utterance samples. The subject produced 10801 utterances in total. Imitative utterances are excluded to make sure that the child was not repeating or imitating the adult models. Utterances that are excluded belong to the same structure with what was produced immediately after parental utterances. By the end of our recordings, the child has totally uttered 48 ditransitive sentences, of which 20 sentences are imitative. That is to say, the subject only uttered 28 ditransitive sentences , which are not imitative. In order to study and analyze easily, we use the table form to display the 28 Chinese ditransitive constructions.

TABE1
THE DC OF NP1+V(GEI)+NP2+NP3 IN THE CHILD SPEECH

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age	NO	Context of speech	Utterances from the child	Used verb		
2;6	1	The child saw a plastic plane holding in his	给我飞机(gei wo fei ji)	给(gei)		
		father's left hand and said to his father.	Give me the plane	give		
2;6	2	The child cried because his father took his	拿我飞机来(na wo feiji lai)	拿 (na)		
		plane away.	Bring me the plane back	bring		
2;8	3	When his mom went out to buy something to	给我再见(gei wo zaijian	给(gei)		
		eat, the child said to his mom.	Say goodbye to me.	give		
2;11	4	The child finished eating one walnut and his	爸爸又给我(baba you gei wo)	给(gei)		
		father gave him one more.	Dady gave me one more.	give		
3;2	5	The child came back from the kindergarten	老师给我大苹果(laoshi gei wo dapingguo)	给(gei)		
		and said to his mom.	My teacher gave me a big apple.	give		
3.4	6	The child was building a house by building	拿我三角形(na wo sanjiaoxing)	拿 (na)		
		blocks and need a triangle building blocks.	Give me a triangle of building block	give		

TABLE 2 THE DC SENTENCES OF NP1+给(GEI)+NP2+V+NP3 IN THE CHILD SPEECH

Age	NO	Context of speech	Utterances from the child	Used verb
2;7	7	The child was thirty and said to his Mon.	请给我喝点水(gei wo he dian shui)Please give me a cup of water to drink.	喝(he) drink
2;7	8	Mom was sweeping the floor and the child wanted to do.	我给你扫扫地(wo gei ni saosao di)I helped you sweep the floor	扫(sao) sweep
2;9	9	The child was having a candy and his father looked at him, smiling. And he said to father.	我给你吃糖(wo gei ni chi tang)I gave you a candy to eat	吃 (chi) eat
2;11	10	Dady was not feeling well and the child pretended to be a doctor.	我给爸爸打针(wo gei baba da zhen) I took an injection for you	打(da) take
3;1	11	Mom was washing clothes and the child wanted to do	我帮你洗衣服(wo bang ni xi yifu) I helped you wash clothes .	洗(xi) wash
3;2	12	The child was telling his cousin who bought these books	我爸爸给我买的书(wo baba gei wo mai de shu) My dad bought books for me	买(mai) buy
3;2	13	Mom went out to buy something to eat and the child said to mom.	回来你给我带香蕉(huilai ni gei wo dai xiangjiao) You bought some bananas for me when you came back.	买(mai) buy
3;4	14	While having dinner, the chopsticks fell to the floor. The child said to dad.	给我拿双筷子(gei wo na shuang kuaizi) Please bring a pair of chopsticks for me	拿(na) bring
3;5	15	The child wanted to watch the programme Wisdom Tree on the CCTV28, he asked mom to help adjust the TV channels	你给我调智慧树(ni gei wo diao zhihuishu) You helped me to adjust Wisdom Tree	调(diao) adjust
3;5	16	The child asked his dad to tell stories for him,	爸爸给我讲故事(Dad gei wo jiang gushi) Dad told stories for me	讲 (jiang) tell
3;6	17	Mom asked the child who helped him build the house by building blocks	爸爸帮我建房子(Baba bang wo jiang fangzi) Dad helped me build the house.	建 (jian) build

Age	No	Context of speech	Utterances from the child	Used verb
2;7	18	Mom told the child should share with others	给小朋友们吃 (gei xiao pengyou chi_)	吃 (chi)
		while eating biscuits	Gave my companions to eat biscuits.	eat
2;7	19	The child wanted to drink milk and asked his	请帮我打开(qing bang wo da kai)	打开(da kai)
		dad to open it.	Please helped me open the milk.	open
2;9	20	The child noticed his mom taking a box of	给我吃(gei wo chi) Gave me to eat	吃 (chi)
		cake in her hand	cake	eat
2;11	21	Mom said her back hurt	那我给你拍拍(na wo gei ni paipai)	拍 (pai)
			Then I patted your back	pat
3;0	22	The child asked dad who bought books for	谁给我买的? (shui gei wo mai de?)	买 (mai)
		him	Who bought me books?	buy
3;1	23	The child was telling who bought the toy train	阿姨给我买的?(ayi gei wo mai de?)	买 (mai)
		for him.	My aunt bought me the toy train	buy
3;3	24	The child asked his mom to put on his coat	妈妈给我穿上(mama gei wo chuan	穿 (chuan)
		while he was going out.	shang). Mom helped me put on my coat	put on
3;4	25	The child could not find his toy car and asked	爸爸给我找(baba gei wo zhao). Dad,	找 (zhao)
		dad for help	please help me look for my toy car	look for
3;4	26	The child could not reach the books on the	爸爸给我拿(baba gei wo	拿 (na)
		bookshelf and asked dad for help.	na). Dad, please bring me the books.	bring
3;5	27	Mom asked the child who bought the fish for	爸爸给我买的(baba gei wo mai de).	买(mai)
		him	My dad bought me the fish.	buy
3;6	28	The child wanted dad to look at the	让爸爸看看(rang baba kankan).Let dad	看 (kan)
		drawings on the board	look at the drawing	look at

TABLE 3
THE OBJECT ELLIPSIS OF THE DC IN THE CHILD SPEECH

Seeing from the Table1, Table2 and Table3, the subject spontaneously produced the 28 ditransitive sentences in total. The Chinese dtransitive constructions have already appeared when the child is almost at two and half years old. The first ditransitive construction is presented by the verb 给 *give*, which agrees with Zhou(1997). In the construction of NP1+V+NP2+NP3, there are totally six ditransitive sentences to be counted, of which 4 diransitive sentences are presented the verb 给 *give*. This shows that the construction of 给 *give* is frequently used in the daily life. Therefore, the construction NP1+给 *give* +NP2+NP3 should be regarded as the initial category of the Chinese ditransitive constructions. The other two sentences are presented the verb "拿", but they are much differences in term of the pragmatic aspect. Although many a subjects of sentences in the data are omitted in the process of communication, it can be inferred and interpreted from the utterances of context.

In the construction of NP1+给 give +NP2+V+NP3, as shown in the Table 2, the child uttered 11ditansitive constructions without any imitation. At the beginning of the recording, the first word 喝 drink appeared when the child is round two years seven months. These verbs are used in the concrete situation, for example, 扫 sweep; 吃 eat; 打 take; 洗 wash; 买 buy; 拿 bring; 讲 tell. The verb which is the most frequently used is 买 buy. The majority of objects of sentences are omitted during the process of communication. According to the table 3, there are 11 utterances omitting the objects.

Zhou (1997) argued that these structures sharing with both the direct object and the indirect object were called the saturated double object construction and those omitting the direct object or the indirect object should be considered as the unsaturated double object constructions. In an unsaturated double construction, the syntactic components show a close relationship to the verb, but they do not all occur at the same time, and no occurring components might be replenished by the object or person present. There are 11unsaturated sentences in the data and all the direct objects that do not occur can be recovered by the person or object present. For example, in the 28 utterance from the Table 3, the omitted object the drawing can be reduced from the context.

These verbs occurring in the ditransitive constructions are relatively small number. The similar research results were also proved by Zhou (1997), showing that children can not only employ the diransitive constructions, but construct more complex structures under the guidance of the ditransitive constructions. However, much restriction is set on the syntactic and semantic properties of the ditransitive constructions, the amount of verbs occurring in this construction is also rather limited.

According to the collected data, there are also several ditransitive verbs occurring in the child utterances, except for the verb 给 give. For example, 拿 bring; 打 take; 买 buy; 讲 tell; 建造 build; 拍 pat; 穿 put on; 找 look for; 看 look at and so on. These verbs show the features of dispersive development. This developmental trend demonstrates that the typical features have a great effect upon the development of the early verbal acquisition. Seeing from the acquisition sequence of these different ditransitive verbs, we can conclude that the child should follow the cognitive principle of prototype to the cognitive principle non-prototype before three and a half years old.

IV. RESULTS AND DISCUSSION

The preliminary statistical data shows that the child uttered 40 ditransitive constructions (N1VN2N3), of which 15

ditransitive constructions belong to this construction (N1+给 gei+N2+N3). The first case of ditransitive constructions produced by the child is the construction 给我飞机 give me the plane, which is at his two and six months. This kind of construction might be considered to be the initial structure of ditransitive constructions. However, the process in which the child acquire the structure of N1+给 gei+N2+N3 will not be accomplished one moment, on the contrary, it undergoes a long time.

The child's simple utterances may follow the process of syntactic operation. In Tomasello's opinion, children's early sentences could be imitatively learnt from adult input models or they might be constructed by combining whole constructions that have previously been mastered. This skill is called symbolic integration (Tomasello, 1992). Later, he termed it as structural combining (2000). Tomasello identifies four kinds of symbolic integration operations in T's data (1992): substitution, expansion, addition or coordination. Seen from the two argumentsN1N2 are occurring at the same time in the same structure, the acquisition sequence of the child should manifest like this "patient subject sentence (N3 给 give N2)—double object sentence (给 giveN2N3) \rightarrow case marker sentence(把 ba+N3 给 give+N2). The acquisition sequence does not simply follow the process "给 give —给 giveN2—给 giveN3—给 giveN2N3". The position of N3 occurs in the head of sentence firstly. Afterward, it appears after predicate verbs. In our data, this structure is relatively popular, for example, 书给我 give me the book, which occurs at his two and eight months and 糖给爸爸 give dad the candy, which occurs at his two and nine months . This kind of construction can be elaborated from the perspectives of child cognitive psychology. And this can satisfy the pragmatic and communicative needs.

Therefore, during the process of the daily communication, people tend to focus on the persons or objects present which are moving, and can express what they are paying attention to, which follow the principle of figure-background from cognitive linguistics. All these show that the deep semantic syntactic structure needs to be prompted by the use of language.

A. Discussion and Reevaluation from the Usage-based Approach

Tomasello (1992, 2000) made the following statements about the usage-based approach to the early grammatical development. He claims that children's early grammatical knowledge is based on the comprehension and production of specific utterances in the specific use; He emphasizes that the early syntactic development is conservative, when children learn the argument structure of certain verb, their acquisition is independent of the knowledge of other verbs. In other words, the acquisition of children's early grammar shows the features of vertical variations, which follows the changes from rather simple antecedents to more complex decedents under the guidance of the same verb. So the process should not be horizontal, from one verb to another. According to the usage-based approach, the acquisition of children's early abstract constructions is mainly derived from the imitation from adult models or the processes of symbolic integration.

In order to verify the usage-based approach, the models of the parental input have already been analyzed in the last section. The results of parental models demonstrate that only 36% of the ditransitive constructions might be imitated from parental utterances. For the rest 64%, the parental model does not contribute fully. Our data shows that there are 5 diransitive constructions produced by the child creatively, which are not found in the parental models. Obviously our data are not fully in favor of the usage-based approach, because the acquisition of the child's ditransitive constructions are incompletely derived from the imitation of learning or the simple symbolic integration of previously used structures.

However, another explanation will be made it possible that Chinese-speaking children might reach the stage at which they share with the abstract grammatical knowledge. Maybe the ability of their abstract grammar is much earlier than English-speaking children. Tomasello (2000) holds that children at around three and half years or older should possess much verb-general syntactic knowledge. This age range may be not appropriate for the Chinese-speaking children, for Chinese differs greatly from English. The production of the child's ditransitive construction might indicate that he may enter an advanced stage when he has equipped with the abstract and verb-general syntactic knowledge. And he even has the ability to generalize across verbs. Therefore, a comparative study between the Chinese-speaking children and the English-speaking children should be attempted, which is necessary and important for the dritransitive constructions of cross-linguistics.

It deserves to be mentioned that at least 64% of ditransitive constructions will be argued in the data of spontaneous utterance. Tomasello (1992) gave the appraisal in T's multi-word utterances and cannot prove any syntactic development involving verbs, which becomes the arguing focus. This demonstrates that these convincing data in Tomasello (1992) cannot support fully the usage-based approach. If specially paying attention to the development of verb argument structure, the percentage of single change from antecedent schemas to the new schemas of the same verbs would be much lower than his result.

B. The Syntactic Acquisition Is Usage-based or Rule-governed

The innateness hypothesis and the constructivism propose two kinds of different views about the early syntactic development. And they are the most important theories of syntactic development in the field at present. The first one includes all of those approaches that posit an innate universal grammar–dictating some kind of dual process model in which words, fixed expression, and quirky constructions are all acquired by "normal" learning processes, whereas acquisition of the more regular aspects of language is somehow guided by the innate universal grammar. The second

paradigm includes all those approaches that posit only a single of cognitive, social-cognitive, and learning processes to account for the acquisition of all types of linguistic items and structures, from simple to complex, from concrete to abstract. However, these two kinds of approaches cannot make an all-round interpretation for the children's syntactic development.

On the one hand, the data comparison between the spontaneous constructions and the parental input models indicates that the types of argument structure exist in the great differences in the child's production utterances and external input utterances. These differences reflect eminently that the instance frequency from argument structure of the external input is just one of factors affected the early syntactic acquisition. Meanwhile, the early syntactic acquisition is not purely imitative, but more creative. The statement has been supported by de Villiers (1985). He verifies that children can not only focus on the argument structure of certain verb from the external input but also show a lot of similarities between the argument structures from the children's production and mother tongue. However, the cause of this kind of similarity is not immediately imitative. This creativity amply demonstrates that the child can apply certain syntactic rule to a new item. From this perspective, the acquisition of the child's early abstract constructions is based on rules.

On the other hand, the observational data from the child show that the acquisition of the ditransitive constructions goes through the following process. Firstly, the child acquire gradually some so-called argument-structure constructions from the daily life, including objects people act on, objects changing state or location, people experiencing psychological states, objects or people being in a state, and things being acted upon (Goldberg, 1995). Secondly, due to these actions or objects occur frequently, the whole process represents children's generalizations across many item-based constructions, which contributes to the children's abstraction about the meaning and form of the ditransitine constructions. In the end, the diransitive constructions are constructed in the child's mind. Therefore, the ways they construct show the combination of the form and meaning. From the perspective of the activities of the child's input utterances, the process is shown the correspondence relations between the form and the meaning of the constructions. Seen from the point of the child's production utterances, the process displays the correspondence relations between the meaning and the form of the constructions.

V. CONCLUSION

A reasonable explanation is made for the children to construct the abstract construction. The acquisition of the child's ditransitive constructions should not fully be the parameter setting of initial state, but based on plenty of stimuli from the input of adult utterances. Supposed that a baby is born with universal grammar or abstract syntactic category, why can he or she not express spontaneously until he or she is received so many abstract syntax input from the adult utterances? If the setting parameter exists, it only means that the child's cognitive ability has developed into the stage at which the cognitive schema can be constructed. During the stage, the parameter will not work until the child receives a large number of stimuli from the input of abstract constructions. If the development of the child's cognitive ability is regarded as the internal factor which affects the construction acquisition, the input and stimuli from the adult utterances can be considered to be the external factor. Although the two factors function differently, they can coordinate and promote one another. That is to say, the integral factors from the internal and the external contribute to the acquisition of the child's ditransitive construction.

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