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A study on the Corresponding Relations of Lexical Semantic Categories and Semantic Roles and the Characteristics*

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ABSTRACT. *Based on the large-scale tagged corpus, this paper makes a statistical analysis of the corresponding relations of lexical semantic categories and semantic roles, explains the motivation, and further concludes the characteristics of the corresponding relations. It is hoped that this study can help promote Chinese Linguistics, especially computer semantic analysis of Chinese syntax.*
Keywords: lexical semantics, semantic role, corresponding relation

1. **Introduction.** Chinese lacks morphological changes. In addition, its lexical categories and sentence elements are not comparisoned. Moreover, there is a complicated relationship between syntactic structure and semantic relationship. As a result, it is almost impossible to attain the goal of understanding the meaning of Chinese sentences as we do with Indo-European languages by categorizing parts of speech with the help of morphological changes, determining the syntactic structure with parts of speech, and then deriving the semantic relation by syntactic structure. So how can we find a fixed characteristic to start with and to determine the syntactic structure so as to analyze the semantic relations? Mr.

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Zhang Zhigong once made it clear that the combination of Chinese words is as a matter of fact a combination of lexical meanings, as long as the meaning of one word collocates well with that of another, that's a reasonable combination. Some people think that Chinese has a semantic grammar, and parataxis is its important feature. We believe that the syntactic elements and semantic roles of a word is uncertain, and they vary with the change of syntactic structure and semantic structure. But we know the meaning of a word and the semantic category it belongs to are fixed. If we can start with the lexical semantic category, show its corresponding relation with semantic roles and syntactic elements, derive the syntactic structure and semantic relation with the lexical semantic category, and analyze the syntactic structure and semantic relation, we can effectively achieve the purpose of understanding the meaning of a sentence. For this purpose, we built a large-scale tagged corpus. We segmented words and tagged part-of-speech, lexical semantic categories, syntactic elements and semantic roles. Based on the corpus, we did the statistical analysis and generalized the corresponding relations between the lexical semantic categories and the semantic roles as well as the corresponding relations between the semantic roles and the syntactic elements so as to lay a good foundation for computer to understand and analyze the sentence. This paper mainly discusses the corresponding relations of lexical semantic categories and semantic roles and the characteristics.

2. **The Construction of the Corpus.** This paper is based on two corpora—The Tagged Corpus of Chinese Textbooks for Primary and Secondary Schools and the Information Database on How the Lexical Semantic Categories Constrain the Mapping of the Semantic Roles to the Syntactic Elements.

2.1. **The Tagged Corpus of Chinese Textbooks for Primary and Secondary Schools.** Firstly, we conducted the word segmentation and part-of-speech tagging of the Chinese texts collected from the Chinese textbooks published by the People's Publishing House for primary and secondary schools with the word segmentation and lexical marking system of the Institute of Computational Linguistics of Peking University. After manual proofreading, we took the sentence as the basic unit and labelled the semantic roles and syntactic elements. The syntactic elements and markers used are subject(S), predicate(P), object (O), attributive (A), adverbial (D), complement (C), concurrent chunk)(J), independent chunk)(T)[1].The semantic roles and markers used are agent(S), theme(D), possessor(L), comitative(Y), patient(O), objective(K), causer(Z), result(R), dative(T), relative(X), partitive(F), source(B), instrument(I), material(M), manner(Q), reason(C), aim(G), direction(A), range(E), time(H), location(P) ， quantity(N) and comparison(J).

2.2. T**he Construction of the Information Database on How the Lexical Semantic Categories Constrain the Mapping of the Semantic Roles to the Syntactic Elements.** There are three steps in the building of the Information Database. They are extracting the head word, labeling the lexical semantic category and building the database.

We designed the extraction procedure featuring the semantic roles and syntactic elements,

and extracted all the head words that meet our requirements from the Tagged Corpus of Chinese Textbooks for Primary and Secondary Schools. According to the semantic classification system and symbol in *Tongyici Cilin*[2], We marked the head words with lexical semantic categories(hereinafter referred to as "SC").[3] Finally, we presented the corpus information about head words extracted and semantic categories tagged in the form of a table. That is how the Information Database was built. The Table below is just a sample.

Head Word	Statistical Frequency	Semantic Categories	Head Word	Statistical Frequency	Semantic Categories
县长	10	Af	五颜六色	10	Ec
书记	50	Ae	彼此	10	Dd
伍子胥	10	Aa	雨点	10	Bf
倔强	10	Ee	古人	50	Ai
一切	60	Eb	恐惧	20	Ga
人群	10	Aa	哪个	10	Aa
伊	20	Aa	人家	80	Di
显贵	10	Af	徽宗	10	Aa
实践	10	Hi	那	50	Ed
华老栓	10	Aa	屏上	10	Cb
太阳能	10	Dd	一个	10	Ed
家	10	Di	汉武帝	10	Aa

3. **The Corresponding Relations between the Lexical Semantic Categories and the Semantic Roles.** Words of different semantic categories differ in their capacity of filling the semantic roles. This is true of the words of the same semantic category. Based on the information from the semantic category and semantic roles, we studied their corresponding relations between. See the table below for details (SC stands for the Semantic Category, and SR for the Semantic Role):

SC / SR	A	B	C	D	E	F	G	H	I	J	K	L
agent	11937	2550	293	1413	258	38	26	119	37	37	10	5
patient	140	4007	40	3707	27	110	85	364	67	43	8	0
theme	4260	2215	472	2420	1060	20	69	161	101	22	31	2
possessor	498	219	39	282	42	1	2	12	7	5	0	0
comitative	159	56	3	57	8	0	1	7	4	0	0	0
objective	640	1128	197	1904	301	23	164	186	98	47	9	0
relative	761	935	235	1273	253	7	51	123	58	23	33	0
dative	956	77	39	165	18	2	4	18	14	5	0	0
result	5	106	9	168	12	0	2	5	1	1	0	0

causer	8	24	3	19	2	0	2	1	0	0	0	0
partitive	1	27	1	3	8	0	0	0	0	0	0	0
manner	11	61	11	116	87	7	11	24	18	3	213	0
reason	5	4	0	21	35	8	20	24	29	13	7	0
aim	11	11	1	10	13	1	3	19	8	2	0	0
material	0	35	0	7	0	0	0	0	0	0	0	0
location	19	963	2153	411	0	0	0	0	0	0	0	0
time	0	0	2927	30	11	0	1	0	0	1	42	0
quantity	0	37	29	396	9	1	0	0	2	0	0	0
comparison	109	154	42	66	16	10	4	26	8	4	0	0
direction	24	30	200	5	0	0	0	0	1	0	0	0
source	2	63	91	2	23	9	22	11	20	1	5	0
range	69	48	16	318	23	3	9	28	9	1	4	0
total	19615	12750	6801	12793	2206	240	476	1128	482	208	362	7

Based on the data above, we conducted a statistical analysis of the different semantic categories filling the semantic roles. In the following inequations the number in the bracket shows the percentage that the semantic roles occupy.

3.1. **Analysis of Semantic Category A [human beings].**

Semantic category A:

agent(60.68)>theme(21.72)>dative(4.87)>relative(3.88)>objective(3.26)> possessor(2.54)>comitative(0.81)>object(0.71)>comparison(0.56)>range(0.35)>direction(0.12)>location(0.10)>manner(0.06)=aim(0.06)>causer(0.04)>result(0.03)=reason(0.03)> partitive(0.01)=origin(0.01).The absent sematic roles are material, time and quantity.

As we can see, Category A mainly fills the semantic roles of agent and theme. Most of Category A serves as agents, accounting for 60.86 percent of the total roles. This is because we define the agent as the sender of the action who has agentiveness and initiativeness in an event. Category A means “human” which accords with the feature. For example, “[刘和珍]S 生前就很爱看先生的文章”（《纪念刘和珍君》）.

Since Category A first fulfills the role of agent because of the obvious agentiveness, why is there still 21.7 percent playing the part of theme? Zhou Minghai summarized that theme reveals such lexical semantic features as pre-existence, automaticity, perceptibility, variability, relevance, uncontrollability , topicality and so on in *the Lexical Semantic Constraints on the Syntactic Realization of Core Semantic Roles.* [5] In this case, Category A doesn’t show its agentivenss, but acting as theme for its perceptibility, relevance, characteristic, uncontrollability and topicality[4], such as “[我们]D 现在早已无福消受了”（《荷塘月色》）. Besides, Category A refers to “human” which can’t serve as material, time or quantity, so the absent semantic roles are material, time and quantity.

3.2. **Analysis of Semantic Category B[object].**

Semantic Category B:

patient(3.43)>agent(20.00)>theme(17.37)>objective(8.85)>location(7.55)>relative(7.33)>possessor(1.72)>comparison(1.21)>result(0.83)>dative(0.60)>manner(0.48)>source(0.49)>comitative(0.44)>range(0.38)>quantity(0.29)>material(0.27)>direction(0.24)>partitive(0.21)>causer(0.19)>aim(0.19)>reason(0.03). The absent sematic role is time.

We can see that Category mainly fills the semantic roles of patient, agent and theme. In most cases Category B serves as patient, accounting for 31.43 percent of the total roles. This is because we define patient as the direct object involved in the action in an event, which is opposite to agent, full of passivity. Category B which refers to "object" just accords with the feature. For example, "她才始来听[我的讲义]O"（《纪念刘和珍君》）. Category B serving as agent accounts for 20% of the total roles. This is because in addition to being "human", the agent can also be animals, such as "忽然[一只小狗]S 从人丛中跑出来"（《小狗包弟》）, or some sound, such as "[这种叫声]S 会把抄‘四旧’的红卫兵引到我家里来"（《小狗包弟》）, or even a part of the body, such as "[眼睛]S 向上一翻"(《记梁任公先生的一次演讲》), and so on. And these correspond to Bi (animals), Bg (natural objects) and Bk (body), as a result, some of Category B act as agent. Category B can serve as theme for it accords with the semantic feature of theme, such as pre-existence, automaticity, variability, and so on. For example, "[这棵树]D 使小屋给予人另一种印象"（《我的空中楼阁》）. Yet Category B refers to "object", which can't play the role of time, so the semantic role time is absent.

3.3. **Analysis of Semantic Category C[time and space].**

Semantic Category C:

time(43.04)>location(31.66)>theme(6.94)>agent(4.31)>relative(3.64)>direction(2.94)>objective(2.90)>source(1.34)>comparison(0.62)>patient(0.59)>possessor(0.57)=dative(0.57)>quantity(0.43)>range(0.24)>manner(0.16)>result(0.13)>comitative(0.04)=causer(0.04)>partitive(0.01)=aim(0.01). The absent sematic roles are reason and material.

As we can see, Category C mainly fills the semantic roles of time and location, which has something to do with fact that Category C refers to "time and space". Category C can serve the role of time, for example, "金先生讲了[半天]H"（《金岳霖先生》）. It can also serve the role of location, for instance, "每天蹬着它到[王府井一带]P 转一大圈"（《金岳霖先生》）. Category C refers to "time and space", which cannot fulfill the role of reason or material, so the absent semantic roles are reason and material.

3.4. **Analysis of Semantic Category D[abstract things].**

Semantic Category D:

patient(28.98)>theme(18.92)>objective(14.88)>agent(11.05)>relative(9.95)>location(3.21)>quantity(3.10)>range(2.49)>possessor(2.20)>result(1.31)>dative(1.29)>manner(0.91)>comparison(0.52)>comitative(0.45)>time(0.23)>reason(0.16)>causer(0.15)>aim(0.08)>material(0.05)>direction(0.04)>partitive(0.02)=source(0.02).

We can see that Category C mainly fills the semantic roles of patient, theme, objective,

agent and relative. This has much to do with the fact that it refers to abstract things. The object of direct action can play the role of patient, such as the“旅游业”which belongs to Di (society, politics and law) in “许多年前[旅游业]O 还没有开展”（《我与地坛》）. The subject of non-spontaneous action and behavior can serve as theme, such as the“结果”which belongs to Db (reason and logic) in“我要是老呆在家里[结果]D 会更糟”（《我与地坛》). The direct object of non-spontaneous action and behavior can work as objective, such as the “答案”which belongs to Dk (culture and education*)* in “因为她自己心里也没有[答案]K”（《我与地坛》）. The subject of spontaneous action can act as agent, such as the “命运” which belongs to Da (things and conditions) in “他被[命运]S 击昏了头”（《我与地坛》). When Category D works as relative, it's mostly about categorizing things, such as“这当然是[非常复杂细致的任务]X”（《语言是人类最重要的交际工具》）.

3.5. **Analysis of Semantic Category E[features].**

Semantic Category E:

theme(48.05)>objective(13.64)>agent(11.70)>relative(11.47)>manner(3.94)>possessor(1.90)>reason(1.59)>patient(1.22)>source(1.04)=range(1.04)>dative(0.82)>comparison(0.73)>aim(0.59)>result(0.54)>time(0.50)>quantity(0.41)>comitative(0.36)=partitive (0.36)>causer(0.09). The absent sematic roles are material, location and direction.

From the above, we can see that Category E mainly fills the semantic roles of theme, objective, agent and relative. In most cases Category E serves as theme, accounting for 48.05 percent of the total roles. This is because that Category E not only includes adjectives but also some nouns as well. At the same time, we tag such quantitative phrases“这个”“那个”以及“一个”“一本”as the second-level of Ed, because of its role of reference[5] .For example,“[我们现在要说的这一个]D 正是这样”(《项链》). At the same time, the words in the second-level of Eb are mostly pronouns. The words in the second-level of Ec (color, taste*)* are mostly color words whose part of speech has always been controversial. In this study we regard them as noun. The words in Ee (morality and talents) and Ef (situation) are adnouns, and their function is similar to that of nouns. The situation that Category E fills the role of objective is similar to that of acting as theme. It is because that we tagged phrases like “一个”“一本”as the second-level of Ed. The words in the“N 的 V”structure we tagged as objective are mostly adjective, but they show the nature of noun at the syntactic level[5], such as“树的美在于[姿势的{清健}@或{挺拔}@、{苗条}@和{婀娜}@]K”(《我的空中楼阁》).There is an example where Category E works as agent, such as“[母亲的{苦难}@与{伟大}@]S 才在我心中渗透得深彻”（《我与地坛》）, in this case, Category E shows topicality, which is the object of the description, so the words “伟大”show the nature of noun. Category E serves as relative for in most cases what precedes it is copula , such as“小灯笼先是[绿色]X”（《我与地坛》）. Category E refers to “feature”, including appearance, color, etc, which can’t play the role of material, location or direction, so the three sematic roles are absent.

3.6. **Analysis of Semantic Category F[movement].**

Semantic Category F:

patient（45.83）>agent（15.83）>objective（9.58）>theme（8.33）>comparison（4.17）>reason（3.33）>relative（2.92）=manner（2.92）>range（1.25）=source（1.25）>dative（0.83）>possessor（0.42）=aim（0.42）= quantity（0.42）, the absent sematic roles are comitative, result, causer, partitive, material, location and time.

As we can see, Category F mainly fills the semantic roles of patient, agent, objective and theme. Category F mostly serves as patient, accounting for 48.83 percent of the total roles. For example,“便不管[四叔的皱眉]O”（《祝福》）. Category F serves the semantic role of agent, for example,“[他的踢打]S 猛的朝他的脸撞去”（《老人与海》）. The semantic role of objective is mainly filled by gerund under Category F or verbs at the lexical level yet showing the nature of the noun at the syntax level, for example,“作为身体动作的一种状态，区别于[O{立}@、{卧}@]K 等等”（《语言的演变》）. The number of theme served by Category F is relatively small, accounting for 8.33 percent of the total. This is largely because it is in the subject position, being the object of the following predicate and the topic. For example,“[采莲]D 是江南的旧俗”（《荷塘月色》）. Category F means “movement”, including upper limb movements, lower limb movements, head movements and body movements. “Movement” itself refers to a certain action or behavior, It cannot be a participant of a common action, and therefore cannot fulfill the role of comitative. The semantic role of result refers to a process or a result resulting from nothing, “Movement” does not accord with this feature, and therefore cannot act as the semantic role of result. The semantic role “causer” refers to the change of the original character of object due to some movements or behaviors. The “movement” can only be a behavior, but not a character that results from the behavior, and thus it cannot act as the semantic role of causer. The semantic role of partitive is part of possessor and the things cannot serve as the possessor of “movement”, so movement cannot fill the role of partitive. “Movement” is not material, location or time therefore it cannot fill the roles of material, location and time. As a result, the absent semantic role are comitative, result, causer, partitive, material, location and time.

3.7. **Analysis of Semantic Category G[psychological activity].**

Semantic Category G:

objective（29.55）>patient（17.86）>theme（14.50）> relative（10.71）> agent（5.46）> source（4.62）> reason（4.20）> manner（2.31）> range（1.89）> dative（0.84）=comparison（0.84）>aim（0.63）>possessor（0.42）= result（0.42）= causer（0.42）>comitative（0.21）=time（0.21）, the absent sematic roles are partitive, material, location, quantity and direction.

As we can see, Category G mainly fills the semantic roles of objective, patient, theme and relative. Category G mostly serves as objective, accounting for 29.55 percent of the total roles. Its role as objective is similar to that of Category F. This is because verbs may show the nature of a noun at the syntactic level, for example,“充满[决心]K，但并不抱着[多少希望]K”（《老人与海》）。Category G also acts as patient, for example, “可是

他倘不是那样夸大[他的悲哀]O”（《哈姆雷特》）. The role of theme served by Category G is similar to that of Category F, and it is the object of the following predicate and the topic, accounting for 14.50 percent of the total roles. Here is an example,“[我们一切情感，理智和意志上的{追求}@或{企图}@]D 不过是灵魂的思家病”（《谈中国诗》）. The role of relative served by Category G is similar to that of Category E, for what precedes it is copula, for example,“母亲这话实际上是[自我安慰]X”（《我与地坛》）. Category G consisting of psychological state, psychological activity and willingness cannot be used as part of possessor, and therefore it cannot act as partitive. Such psychological activity itself cannot represent material, location, quantity and direction, and thus cannot serve the roles of material, location, quantity and direction.

3.8. **Analysis of Semantic Category H[activity].**

Semantic Category H:

patient（32.27）>objective（16.49）>theme（14.27）>relative（10.90）>agent（10.55）>range（2.48）>comparison（2.30）>manner（2.13）=reason（2.13）> aim（1.68）>dative（1.60）>possessor（1.06）>source（0.98）>comitative（0.62）>result（0.44）>causer（0.09），the absent sematic roles are partitive, material, location, time, quantity and direction.

As we can see, Category H mainly fills the semantic roles of patient, objective, theme and relative. Category H mostly serves as patient, accounting for 32.27 percent of the total roles. For example, “逻辑课的前一半讲[{归纳}@ {演绎}@]O”（《金岳霖先生》）. Category H also acts as objective, accounting for 16.49 percent of the total roles, its role as objective is similar to that of Category F and G. This is because verbs may show the nature of a noun at the syntactic level, for example,“所以她们根本就没有‘做’或者‘不做’的自由]K”（《包身工》）. The role of theme served by Category H is similar to that of Category F and G, and it is the object of the following predicate and the topic, accounting for 14.27 percent of the total roles. Here is an example, “[试验]D，意思是试验有没有工作的能力”（《包身工》）. Category H also fills the semantic role of relative, for example, “比如惟一一件的古美术作品，成了[美的启迪]X”（《花未眠》）in which “启迪” (enlightenment) has the nature of a noun. Category H refers to “activity”, including political activities, military activities, administrative management, production, etc. Such “activities” cannot be part of possessor, therefore they cannot act as partitive. Of course, they donot convey the meaning of material, location, time, quantity and direction, so the semantic roles Category H fails to assume are partitive, material, location, time, quantity and direction.

3.9. **Analysis of Semantic Category I [phenomenon and state].**

Semantic Category I:

theme（20.95）>objective（20.33）>patient（13.90）>relative（12.03）>agent（7.68）>reason（6.02）>source（4.17）>manner（3.73）>dative（2.90）>range（1.87）>comparison（1.66）=aim（1.66）>possessor（1.45）>partitive（0.83）> quantity（0.41）>result

（0.21）=direction（0.21），the absent sematic roles are causer, partitive, material, location and time.

As we can see, Category I mainly fulfills the semantic roles of theme, objective, patient and relative. Category I mostly serves as theme, accounting for 20.95 percent of the total roles. The role of theme served by Category I is similar to that of Category F, G and H, and it is the object of the following predicate and the topic. For example, “[地上的每一个坎坷]D 都被映照得灿烂”（《我与地坛》）. Category I also acts as objective, accounting for 20.33 percent of the total roles. Its role as objective is similar to that of Category F, G and H. This is because verbs may show the nature of noun at the syntactic level, for example, “猛听得[一声雷响]K，油然云起”（《庄周买水》）. The number of patient served by Category I accounts for 13.90 percent of the total roles, for example,“怎样经历[变异]O 而达到它们的极其完善的构造和相互适应”（《〈物种起源〉导言》）. Category I fills the semantic role of relative just because of the copular “是”（be） , for example,“事物好不容易如愿表现出来的时候，也就是[死亡]X”（《花未眠》）。The semantic role “causer” is defined as the object that undergoes the change of the original character due to some movements or behaviors. Category I refers to “phenomenon and state” instead of some kind of objects, so it cannot act as causer. Nor can it act as possessor for “phenomenon and state” cannot be part of possessor. “Phenomenon and state” is not material, location and time, so Category I cannot serve the semantic roles of material, location or time. So the semantic roles Category I fails to fill are causer, partitive, material, location and time.

3.10. **Analysis of Semantic Category J[relevance].**

Semantic Category J:

objective（22.60）>patient（20.67）>agent（17.79）>relative（11.06）>theme（10.58）>reason（6.25）>possessor（2.40）=dative（2.40）>comparison（1.92）>manner（1.44）>aim（0.96）>result（0.48）=time（0.48）=source（0.48）=range（0.48），the absent sematic roles are comitative, causer, partitive, material, location, quantity and direction.

As we can see, Category J mainly fills the semantic roles of objective, patient, agent, relative and theme. Category J mostly serves as objective, accounting for 22.60 percent of the total roles. The role of objective served by Category J is similar to that of Category F, G, H and I, This is mainly because verbs may show the nature of noun at the syntactic level, for example,“没有[一点新奇的意味]K”（《咬文嚼字》）. Followed by its act as object, 20.67 overall, for example,“去游说[那些无力‘饲养’可又不忍让他们的儿女饿死的同乡]O”(《包身工》). Category J also fills the semantic roles of patient, accounting for 17.79 percent of the total roles. For example,“[波澜壮阔{吐故纳新}@和{现代化建设}@]S，为全国各族青年展示才华，实现志向，提供了广大的舞台”（《在庆祝北京大学建校一百周年大会上的讲话》). In addition, Category J also serves the semantic role of relative. For example, in“亿万受难的人们都是[同乡]X”（《我的呼吁》）,“是”is a copula，so“同乡”fills the semantic role of relative. The role of theme served by Category J is similar to that of Category F, G, H and I, being the object of the following predicate and the topic, accounting for 10.58 percent of the total roles. Here is an example, “[人人之间]D

生而平等”（《我有一个梦想》）。As Category J means “relevance”, including relation, similarities and differences, coordination, existence and influence. It represents a kind of relationship, therefore it cannot be a participant involved in an event, nor can it act as comitative. Meanwhile, Category J cannot be the object that undergoes the change of the original character due to some movements or behaviors, so it cannot act as causer. Nor can it act as partitive for it is not part of possessor. “Relevance” does have the meaning of material, location, quantity and direction, so it cannot fill the semantic roles of material, location, quantity and direction. So, the semantic roles Category J fail to fill are comitative, causer, partitive, material, location, quantity and direction.

3.11. **Analysis of Semantic Category K[expletive].**

Semantic Category K:

manner（58.84）>time（11.60）>relative（9.12）>theme（8.56）>agent（2.76）>objective（2.49）>patient（2.21>reason（1.93）>source（1.38）>range（1.10），the absent sematic roles are possessor, comitative, dative, result, causer, partitive, aim, material, location, quantity, comparison and direction.

As we can see, Category K mainly fills the semantic roles of manner, time, relative and theme. Category K mostly serves the role of manner, accounting for 58.84 percent of the total roles. Manner is featured by its markedness. Category K can act as manner for it means “expletive” and mainly includes adverbs like “along” and “through”, which happen to fulfill the marking function of manner. For example, in“每逢[经过当局批准]Q，城里开了一个戏剧俱乐部”（《装在套子里的人》）,“经过”is a marker. For the same reason, Category K also fills the role of time. For example, in“使得自己[在今年夏天的星期日里]，可以和几个打猎的朋友们到南兑尔那一带平原地方去打鸟”（《项链》）,“在……里”is a marker of time. Category K mainly fills the semantic role of relative because of copula. For example, in“这是[什么]X”（《罗密欧与朱丽叶》）,“什么”fills the semantic role of relative, because what precedes it is copula “是”. The role of theme served by Category K is similar to that of Category F, G, H, I and J, being the object of the following predicate and the topic. For example, “[什么]D 是知识?”（《墙上的斑点》）. Whether it is Ka（degree）exemplified by “几乎” and “独自”, or Kb（preposition）exemplified by “依靠” and “针对”，or Kc (connective) exemplified by “否则” and “另外”, or Kd (modal particle) exemplified by “呢” and “了”, or Ke(interjection) exemplified by “喂” and “嗯”, or Kf(onomatopoeia) exemplified by “沙沙” and “丁丁”, Category K cannot be a subject of possessive relationship, nor can it be part of possessor, thus it cannot serve as possessor or partitive. Category K cannot act as comitative either for it cannot be a participant involved in an event. Nor can it serve as dative for it cannot be the object aimed at by some action or behavior. Category K cannot serve as result for it cannot be some sort of outcome resulting from some actions or behaviors that start from nothing. Besides, Category K cannot be the object that undergoes the change of the original character due to some movements or behaviors, so it cannot act as causer. Such “expletive” cannot mean material, location, quantity, comparison, direction and aim, and therefore cannot fulfill the semantic

roles of material, location, quantity, comparison, direction and aim. So the semantic roles Category K fail to fill are possessor, comitative, dative, result, causer, partitive, aim, material, location, quantity, comparison and direction.

3.12. **Analysis of Semantic Category L[honorific].**

Semantic Category L:

agent(71.43)>patient(28.57), Category L means *"*honorific*"*. Its typical expressions are "赏光""过奖""劳驾". Since they are rarely used in the corpus, so we will not analyze it in detail.

4. **The Characteristics of Corresponding Relations between the Lexical Semantic Categories and the Semantic Roles.** Based on the information on whether a lexical semantic category can fill a semantic role and how many semantic roles it fills, we classified the lexical semantic categories into the following types:

4.1. **Completely covered type.** The completely covered type means that the semantic category can fulfill all the semantic roles mentioned in the paper. Only Category D (abstraction*)* belongs to this type.

4.2. **Mostly covered type.** The mostly covered type means that the lexical semantic category can fulfill most of the semantic roles mentioned in the paper. This type includes Category A (human), Category B (object), Category C (time and space), Category E (characteristic), Category F (movement), Category G (psychological activity), Category H (activity), Category I (phenomenon and state) and Category J(relevance).

4.3. **Less covered type.** The less covered type means that the lexical semantic category can only fulfill a few semantic roles mentioned in the paper. Category K(expletive) and Category L (honorific) belongs to this type.

5. **Conclusion.** This study is mainly based on the data collected from Chinese teaching materials of full-time high school. Due to the limited data and narrow coverage, the statistical data were sparse and the statistical results may have some limitations. The study is expected to be furthered by enlarging the quantity and coverage of experimental corpus.

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