

Response Acts in Chinese Conversation: the Coding Scheme and Analysis

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Abstract

Speech act is an important means of transmitting and understanding intention in conversational interaction. In this paper, we outline the updated coding scheme for responses in terms of their lexico-grammatical forms and communicative functions toward question-response system in Chinese conversations. We obtained the distributional patterns of the responses based on 1171 conversations from 4 scenarios (15 domains) in corpus of DISCOURSE-CASS. In terms of response forms across 4 scenarios, phrases and words account for 65~88%; in terms of response functions, at least 35% responses are transformative responses or no answers. The results indicate that dominated syntactic form is minor phrase, and the intentions should be inferred from context including contextual prosody.

Index Terms: question-response system, coding scheme, dialogue act, Chinese conversation

1. Introduction

In intelligent speech interaction, recognizing and identifying question-response act is key in building dialogues and understanding speakers' communicative intentions. In discourse analysis, it is generally believed that questions could both constrain and guide recipients, so the questioners are in the position of controlling the dialogue. Question recipients typically abide by the constraints questioners imposed on them, however, they frequently resist those constraints by giving the "transformative answer" [5]. Transformative answer can be divided into two categories, term-transformation and agenda-transformation. In terms of the question design and the agenda organization, the former violates the design of question, while the latter violates both of them.

[8] has detailed a question-response coding scheme, which categorized question and response behavior in two dimensions, namely, lexico-grammatical action and social action. The scheme has been applied in multimodal dialogues of 10 languages except Chinese.

There is a lack of research on question-response system from the perspectives of semantics and pragmatics in Chinese. For example, Shao [4] studied the structure and function attributions of interrogatives. Xie [1] outlined a detailed question-response system from the perspective of interactive linguistics.

In previous studies, we have proposed a dialogue act annotation convention which described the question-answer system in a multi-dimensional way, including segmental, supra-segmental, lexico-morpho-syntactic, semantic and pragmatic ones [2]. We also conducted the analysis of questions from perspectives of syntactic functions and speech acts [2][3]. The present paper will focus on refining the coding scheme for responses, and unlike the other schemes, we will integrate both prosodic and syntactic information in the

scheme. Furthermore, we will report the distributional patterns of the form and function of responses based on the 1171 annotated conversations in four scenarios.

2. A Revised Coding Scheme for Responses

We revise the coding scheme from the aspects of form (prosody-morph-syntax) and function (direct or transformative answer) of the response, based on the classification of responses by Xie [1] and cross-linguistic theories [5-18].

In the following example conversations "[LA]" means laughter; "~" is the link between the speech acts [2][3] and the code of responses proposed in this paper; "@" is the link between the form and function of the response; "xx" indicates the unclear speech voice; and "-" is the connector for speech act.

2.1. Forms of Response

Responses can be classified into three categories based on their syntactic and prosodic forms, *word response*, *phrase response* and *clause response* (see Table 1 for details). Usually, a *word response* contains one or more intonation phrases (IPs), a *phrase response* includes one IP, and a *clause response* may consist of two or more IPs.

Table 1: *Forms of responses and the corresponding symbols.*

Syntactic Forms	Prosodic Forms	Symbols	Description
Word	one or more IPs	wrd	Discourse markers and Y/N judgment words (including their combination) One sentence or phrase (abnormal pauses and reversed utterances are generally integrated into one clause)
Phrase	one IP	phra	Complex sentences of two or more clauses
Clause	more than one IPs	clau	

2.1.1. Word Response ~wrd

Word response is the response to Y/N questions by using Y/N judgment word, denoted by "~wrd". Word response often consists of one word and hence one intonation phrase; however, if there appear repeated response words, the word response may contain more than one IPs. The judgment word indicating positive response can be "是/对", "好/不错", "行/可以", "嗯", "ah" and so on, while the negative response includes "no", "not good", "no way", "um", "ah" and so on. Among them, discourse markers, such as "um" and "ah", can express either a positive or a negative response, which can be reflected on their intonation patterns, as shown in Figure 1. The positive answer in example (1) shows a declining F0 pattern, while the negative one presents a rising and falling pattern. If a response consists of multiple Y/N judgment words, it is still categorized as one word response, such as "Um, OK" and so on.

(1) A: 明天去看话剧吧?

B: 好呀。 $s^{aa}\sim wrd$ (s^{aa} refers to the declarative sentence for approval)

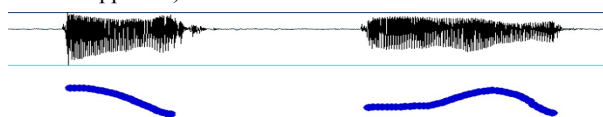


Figure 1: Different intonation patterns of "啊/a" and the waveforms. (a) for positive response, (b) for negative response.

2.1.2. Phrase Response $\sim phra$

Phrase response refers to a single sentence serving as a response, and it generally consists of one intonation phrase, denoted by " $\sim phra$ ". In (2) the intonation phrase includes four prosodic phrases, as shown in Figure 2.

(2) A: 今年人艺的《茶馆》里，主演都是谁啊？

B: 梁冠华、濮存昕、杨立新、吴刚他们几个。 $s^e\sim phra$ (s^e refers to declarative sentence for explicating details)

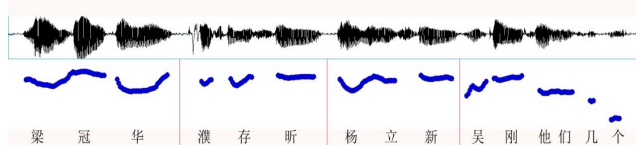


Figure 2: Waveform and F0 curve of phrase response (2)B with 4 prosodic phrases. "|" denotes the boundary.

2.1.3. Clause Response $\sim clau$

Clause response consists of complex sentences with multiple clauses, thus it normally contains more than one IPs, denoted by " $\sim clau$ " in example (3).

(3) A: 你来干什么？

B: 来给您请安来了。我在门口儿站了半天。我看见大爷在跟您打架，我就没敢进。 $s^{df}\sim clau$

2.2. Function of Response

According to the semantic function towards question-response sequence, a question may either have a response or none.

In many situations dialogue occurs as the face-to-face multi-modal interaction, so the response can either be verbal or nonverbal, with the latter including physical behaviors, facial expressions and so on.

Table 2: Function of Response and Coding Symbols.

		Function Category	Symbol
Answer Response	Term-transformation	Typical Response	typrp
		degree term-transformation response	degrp
		information term-transformation response	infrp
		word-changing term-transformation response	chwrp
		rectified term-transformation response	reprp
	Agenda-transformation	focus agenda-transformation response	focrp
		bias agenda-transformation response	biarp
		presupposition agenda-transformation response	prsrp
	Non-answer Response	Uncertain Response	unrp
Other Elicited Response		othrerp	
Refusing Response		refrp	

The response discussed in this paper specifically refers to the speech response that excludes body movement and facial expressions. While non response refers to the situational response without words (silent response).

Response can be divided into two categories, "answer-type" response and "non-answer-type" response. The former includes both typical response and transformation response. A typical response means that the questioner can directly get the unmarked response of the desired answer, which is regarded as the prototypical answer. Transformation response shows some resistance to the question's terms or agenda, which can be further divided into "term-transformation" and "agenda-transformation". The non-answer-type response includes "uncertain response", "other elicited response" and "refusing response" (see Table 2 for details).

2.2.1 Answer-type Response

Answer-type response includes typical response and transformation response.

2.2.1.1 Typical Response (typrp)

Typical response refers to unmarked response from which the questioner can directly get the answer. There are many types of interrogative sentences, such as Wh-question, yes/no question, A-not-A question, tag question, alternative question and declarative question, etc. Answers to these questions are likely to be direct ones, and so these responses belong to the category of typical response as in case (4).

(4) A: 我能用你的伞吗？

B: 可以。 $s^{aa}\sim wrd @ typrp$

2.2.1.2 Term-transformation Response

Upon the proposal of questions, certain constraints would be laid on their answers. Whether the respondent cooperates with the questioner depends on the respondent's resistance to the question setting, while which transformation is adopted depends on the degree of resistance. Transformation response comprises *term-transformation* and *agenda-transformation*, both of which are indirect responses. Term-transformation is mainly categorized into *degree term-transformation*, *information term-transformation*, and *word-changing term-transformation*.

Degree Term-transformation Response

Degree term-transformation response appears when the respondent considers the term describing the degree insufficient or overused, and hence corrects the degree of deviation in response as in (5) B.

(5) A: 哦，离你现在住的地方近不近？

B: 一点儿都不近。 $s^{nd}\sim phra @ drgrp$ (s^{nd} : declarative sentence as negative answer)

Information Term-transformation Response (infrp)

The respondent may sometimes add more information to the question; or instead of giving a certain answer, the respondent lets the questioner to infer necessary information from the response. Such kind of response is called information term-transformation response.

(6) B: 你看给我现在看，有没有其他的航班呢？

A: 呃，因为我现在看了一下后面有票的话，就得到下午的三点钟，这个天津到大连才有航班有票的，因为早一点的一个时间段的我看到显示机票是已经售完，没有。 $s^{na}\sim clau @ infrp$ (s^{na} : declarative sentence as positive answer)

The background of the dialogue (6) is that passenger B anxiously asks the customer service staff to check the boarding information and asks if any other flight is available. The customer service staff A does not answer directly, but

attempts to provide the customer with flight details in order to make a decision. It can be seen that the questioner needs a thinking process to judge what the respondent has expressed. Therefore, we call such response an information-term-transformation response.

Word-changing Term-transformation Response (chwrp)

Replacement of words often symbolizes the respondent's strong resistance to the question. For word-changing term-transformation response, the respondent gives the answer by replacing certain words or phrases of the question in order to express their precise meaning in response.

(7) A: 哎呀, 这这这魔兽……这个 xx

B: 嗯, 有点儿接受不了是吗?

A: 是啊, *s^aa~wrđ@typrp* 女孩子也可以玩儿, 太难以想象了! *es^df~clau@chwrp* (*es^df*: exclamative sentence as explanation)

In case (7), it is clear that the respondent cannot agree with the phrasing of the question by revising certain words of the question in his answer. Despite the transformation of agenda, the respondent has answered the question by alternating certain words to precise the meaning. And such kind of answer is the word-changing term-transformation response.

2.2.1.3 Agenda-transformation Response

Different from term-transformation, agenda-transformation reflects a relatively strong resistance to the question setting instead of a complete resistance. Term-transformation answers the question by putting forward a new question, while agenda-transformation evades the question by transforming the focus, presupposition or offering specific numbers. Agenda-transformations are categorized into *focus agenda-transformation*, *presupposition agenda-transformation*, and *bias agenda-transformation*.

Focus Agenda-transformation Response (focrp)

Focus agenda-transformation response transforms the focus in the question by offering new information in the answer. Though strongly resistant to the question setting, the respondent tries to answer the question in turn taking. Focus agenda-transformation response usually occurs in media interviews or court hearings.

(8) A: 中午去超市了, 是吗?

B: 今天超市搞活动。 *s^df~phra@focrp*

In case (8), the answer transformed the focus of the question into an indirect speech act, a declarative sentence as positive answer.

Presupposition agenda-transformation Response (toprp)

Presupposition agenda-transformation response well reflects respondents' resistance to the question setting, which is manifested in a euphemistic answer through transforming presuppositions.

(9) A: 中午去超市了, 是吗?

B: 我中午去了趟邮局。 *s^e~phra@prsrp*

The presupposition in the question is “B 去了超市”. The answer in case (9) transformed the presupposition into “邮局”. B evaded the question, but offered the indirect answer that he did not go to the supermarket.

bias agenda-transformation response ~ biarp

Bias agenda-transformation response refers to the situation when the questioner expects a subjective assessment, but the respondent offers an objective answer with specific numbers.

(10) A: 你们酒店离机场远吗?

B: 开车 40 分钟, 不堵的话。 *s^e~clau@biarp*

In case (10), the respondent answers the questions with a specific number endowed with specific meanings in certain contexts, providing answers indirectly with transformation.

2.2.2 Non-answer-type Response

2.2.2.1 Uncertain Response (unrp)

An uncertain response shows the inability or unwillingness of the respondent to answer questions, which can make the topic difficult to continue or finish in dialogues. It also reflects the non-cooperation and resistance of the respondent to the question. There are two scenarios in which the topic is difficult to continue with the answer. One is an intention to dodge the question, and thus respond with vague word. The other is the inability to answer the question due to the lack of information.

(11) B: 没想到他们这么快借结婚了, 是奉子成婚吧?

A: [LA] 那谁知道啊? *qh^phra@unrp* (*qh*: rhetorical question)

In (11), the response shows the respondent's unwillingness and non-cooperation by giving an uncertain response.

2.2.2.2 Others-elicited Response (othrerp)

Others-elicited response is used when the respondent has difficulty in understanding the question posed by the questioner, and thereby asks a question about it, forming a new dialogue sequence.

(12) A: 欸, 那你从深圳回来带点儿荔枝回来吃? ?

B: 啊? 带荔枝? *qy^raf~clau@othrerp* (*qy^raf*: yes/no question as affirmation)

2.2.2.3 Rejection Response (refrp)

Rejection response belongs to non-answer-type response. If the typical response is a direct answer, the transformation response is an indirect answer, and thus the rejection response is a direct refusal to answering the question.

(13) Hai: 发生什么事了?

Gui: 不要你管啊。 *is^co~phra@refrp*

3. Annotation and Analysis

3.1. Corpus Annotation

The annotated materials include 53-hour spontaneous conversations and 2.47-hours performing conversations in four scenarios of *Drama*, *Face-to-Face*, *Online Chat* and *11 Call-center Services* (such as insurance, airport, taxi, restaurant, travel, etc.).

Six graduate students majored in phonetics took part in the annotation. They were trained by a professional annotator and had passed a consistency test before annotation, and the annotated data were double checked. All the following analysis is based on the 1171 annotated conversations.

3.2. Form of Response

Table 3: *Forms of Response in Each Scenario.*

Scenario		Clau	Phra	Wrd
Online and phone chat	Num.	464	872	457
	Per.	25.88%	48.63%	25.49%
Drama	Num.	163	217	73
	Per.	35.98%	47.90%	16.11%
Service Sector	Num.	1495	5917	4674
	Per.	12.37%	48.96%	38.67%
Face-to-face conversation	Num.	24	75	65
	Per.	14.63%	45.73%	39.63%

As indicated in Table 3, phrase response occupies the highest proportion, reaching 50% in each scenario. In the scenario of drama, clause response occupies a higher

proportion than word response. In the scenarios of online and phone chat, the proportions of clause and word responses are both around 25%. In the scenarios of face-to-face conversation and service sector, the proportions of word response (39.63% and 38.67% respectively) is higher than those of clause response (14.63% and 12.37%, respectively).

3.3. Function of Response

Table 4: Distribution of Functions of Response (%)

Function	Drama	F-to-F	Online chat	Service	ave%
tyrpr	56.73	68.90	58.51	75.06	64.80
degrp	0.88	0.61	2.12	0.25	18.83
infrp	16.34	20.12	20.80	10.01	
chwrp	0.44	0.00	0.67	0.29	
regrp	0.66	0.00	0.89	1.25	
focrp	4.19	0.00	2.29	0.47	10.37
biarp	0.00	0.00	0.61	0.09	
prsrp	3.97	1.22	1.51	0.63	15.60
othrp	9.27	1.22	7.42	8.57	
unrp	3.53	7.93	4.85	3.00	
refrp	3.97	0.00	0.33	0.37	

As indicated in Table 4 on the distribution of the response functions, among transformation responses, informative term-transformation, focus agenda-transformation and presupposition agenda-transformation are the most common ones. In the four scenarios, the proportions of informative term-transformation response range between 10% and 20%, reaching 20% in the scenarios of face-to-face conversation as well as online and phone chat. The atmosphere of face-to-face conversation is usually more relaxed than in other scenarios, which might help to introduce new topics; whereas in online and phone chat, it is necessary to provide detailed information to compensate for the lack of auxiliary information offered by facial expressions and behaviors, which could account for the higher proportions of informative term-transformation response in the two scenarios. The proportions of focus agenda-transformation response and presupposition agenda-transformation response are 1.74% and 1.83%, respectively. The two responses are differentiated with the degrees of respondents' resistance to questions. These kinds of transformation help to express attitudes in a euphemistic and acceptable way, thus achieving effective communication.

Typical response accounts for 64.80% of all the responses, transformation response accounts for 29.20%, and non-answer accounts for 5.60%. The service sector occupies the highest proportion in typical responses (75%), while the drama scenario occupies the lowest (56%). The main purpose of putting forward a question is to search for an answer, so a direct and effective response conforms to the original intention, which is confirmed in the statistical results. In the service sector, solving problems is the main purpose of conversation, and typical response can solve problems more efficiently, saving both time and cost. Typical response occupies the lowest proportion in the scenario of drama, which could seek explanation in the nature of drama as a form of literature. The function of question-response in drama is to highlight the plot (especially the contradiction), not to solve problems.

Among non-answer responses in the four scenarios, others elicited response (6.62%) and uncertain response (4.83%) occupy a higher proportion. Others elicited response accounts for the highest proportion in both service sector (8.57%) and drama (9.27%), while uncertain response accounts for the highest proportion in face-to-face conversation (7.93%).

Others elicited response occurs when the respondent is doubtful about the question, and puts forward another question for clarification, while uncertain response occurs when the respondent is unable to answer the question, or politely declines to answer the question. In the service sector, the customer service sometimes repeats the question for confirmation, which would increase the proportion of other elicited response; whereas in drama, others elicited response can be used to highlight the contradiction. Different from the refusing response, uncertainty response more frequently occurs in polite face-to-face conversation. The proportions of refusing response are relatively low in scenarios other than drama. Distinguished from the daily communication, drama conversation would highlight the personality of each individual for characterization, and focus on contradictions with the advance of the plot, which might account for the proportion of refusing response in the scenario of drama.

4. SUMMARY

This study aims to improve the annotation scheme of Chinese response acts from the perspective of form and function of responses. The preliminary results have shown the relations between the distribution patterns and the interactive scenes, indicating the dominated syntactic form of responses is Minor Phrase (word or phrase) rather than full sentence.

We observed that when a question has been raised, it might be properly answered. A smooth question-response procedure plays an important role in effective communication. However, in real speech interaction, due to pragmatic and cognitive factors, it happens at times that the respondents give indirect answers with transformation. The type of transformation directly reflects the cooperation between the questioner and the respondent, for example, the cooperation level of agenda transformation is weaker than that of term transformation. When the respondent refuses to answer a question, the turn is interrupted, which further leads to the failure of the conversation. The cooperation level is shown from weak to strong in Table 5.

Table 5: the level of question-answer cooperation

strongly cooperative ← weakly cooperative → not cooperative			
Direct response	Indirect response		Non-answer response
	term transformation	agenda transformation	

It is also found that indirect response is most likely to produce indirect speech acts. For example, with rectified response in term transformation, the respondents intend to express the refusal by directly correcting the improper setting of the question. In addition, indirect speech acts can also be observed in focus, presupposition and bias responses in agenda transformation. There is no one-on-one correlation between indirect speech acts of focus transformation and presupposition transformation. Transforming the focus or responding with a complete answer might not be an indirect speech act. As for the bias transformation, whether the answers produce indirect speech act is context-dependent. Intention should be inferred from context including contextual prosody.

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