

Presupposition Projection from the Scope of Quantifiers in Mandarin Chinese

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Abstract: Quantifiers, words that indicate the quantity of the object, have been proven to alter the presupposition readings in a statement. This paper aims at examining the effect of quantifiers on the presupposition readings, namely universal, existential, and nonpresuppositional readings, in Chinese settings by surveying native Chinese speakers. This paper finds out that “all” usually has a universal reading and “some” usually has a existential reading, while “all” and “none of” have simialr percentage of non-presuppositional readings.

Keywords: Presupposition, Quantifier.

1. Introduction

Presuppositions have an important function in conversations since they assume that some part of the information must be already shared between both the speaker and the listener. The effect of quantifiers, words that specify the quantity of the object, on presuppositions projection is controversial [1] [2] [3] [4]. This paper investigates how presuppositions project from the scope of three Mandarin Chinese quantifier: 所有(suoyou, ‘all’), 有些(youxie, ‘some’), and 没有(meiyou, ‘none of’)¹. To do so, I created a survey to analyze the effect of those three quantifiers on presupposition projection. In this paper, section 2 introduces some background on presuppositions, section 3 reviews previous studies, section 4 explains the design of the paper, section 5 examines the results. The last section is a conclusion of the paper and the results. One appendix of the survey is included at the end of the paper.

2. Background on Presuppositions

When people assume that part of their statements are already known by both the receiver and the sender of the message, people intendedly not say the assumed fact, which is called a presupposition. In other words, a presupposition is an implicit assumption about the world or background belief relating to an utterance whose truth is taken for granted in discourse. Although they are not directly said, there are various triggers for presuppositions. For example, the verb "score over" is such a trigger. The sentence (1A) infers the statement (1B). (1B) is the presupposition of (1A).

(1) A. John scored over 90 in the math test.

B. John took a test of Math.

¹In this paper, all the Mandarin Chinese examples and quantifiers are presented first using Chinese characters. Then, the Pinyin (Pronunciation of Chinese characters) notation and English translations are provided in the parenthesis.

In (1A), the speaker does not mention that John took test of Math, but the listener understands that John takes the test, because one cannot score in test without doing it first. “Score,” in this case, is a trigger for the presupposition that John takes a test of Math.

(2) A. John knows that Smith is hungry.

B. Smith is hungry.

When people hear (2A), people do not know that Smith is hungry. No one has previously told them anything about Smith. However, people naturally believe that Smith is hungry, because if someone knows something, the thing must be true. (2B) is the presupposition coming with (2A). and 'know' is the trigger of this presupposition.

To diagnose the presence of presuppositions, there exists a couple of well-known tests. Two of them are the question test and the negation test.

Question test

(3) A. John knows that Smith is hungry.

B. Smith is hungry.

C. Does John know that Smith is hungry?

We have proposed that (2a) has the presupposition in (2b) above, but we also need to confirm that “know” is a trigger word. In example (3), a question test examines the trigger word’s validity. (3A) is the sentence to be tested, and as we already know, “know” can be a trigger word. (3B) is the presupposition reading behind (3A). Question (3C) is the test. If (3C) presupposes (3B), then the presupposition of (3A) is indeed (3B).

Negation test

(4) A. John won the game.

B. John participated in the game.

C. John did not win the game.

In (4), “won” is the trigger of “participated”. By our common sense, we know that one generally cannot win a game without participating in it. The fact is globally understood so there is no need to restate it. The negation test examines whether the presupposition is still present when the sentence containing "won" is negated. In (3C), John did not win the game, but people still have the sense that John participated in the game.

When presuppositions occur under the scope of quantifiers, they may project in several ways. Examples involving three quantifiers are provided below:

(5) A. Some people eat.

B. All people eat.

C. None of the people eat.

There are the two types of presupposition projections to be specifically analyzed in this paper, which are Universal and Existential. Universal readings suggest that the statement contains an indication that is true for all situations. Existential readings suggest that the statement contains an indication that is true for some but not all situations. However, even though the statement seems to have a presupposition, sometimes it may not contain a presupposition. Presuppositionless reading refers to the more basic understanding of the statement, which is that the presupposition from the beginning does not exist.

In the example (6) below, “some” is the quantifier and “score” is the trigger word for took. What will be tested is which, (6A), (6B) or (6C), is communicated While (6A) represents universal reading, as it represents all, (6B) represents the existential reading, which means not everyone took the test. When the quantifiers also contain negative indications, the presupposition also varies. (7) is an example including a statement containing none of as the quantifier in the statement. It has the same trigger word. In example (8), all is the quantifier.

(6) Some students scored over 10.

- A. Universal reading: All of the students took the test (some of them scored over 10)
- B. Existential reading: Some of the students took the test. (Some others do not even take the test, and the students who took it scored over 10.)
- C. Presuppositionless reading: Some of the students took the test and they scored over 10.
- (7) None of the students scored over 10.
- A. Universal reading: All of the students took the test (but none of them scored over 10).
- B. Existential reading: Some of the students took the test (but none of them scored over 10).
- C. Presuppositionless reading: None of the students took the test and none of them scored over 10.
- (8) All of the students scored over 10.
- A. Universal Reading: all of the students took the test. (All of them scored over 10.
- B. Existential reading: some of the students took the test. (Some did not take the test, but the students who took scored over 10.)
- C. Presuppositionless reading: All of the students took the test and they scored over 10.

3. Previous Studies

A few previous studies have already investigated experimentally presuppositions projections across quantifier but mostly in English [1] [2] [3] [4]. In this section, we will closely examine three papers and their results.

While [1] performed the experiment with directly asking people's preference, other have experiments that ask participants to choose between options, each of which indicates a preference. Chemla employs a method of grade judgment. Figure 1 below shows the diagram they used. It provides the participants to judgment the statement to the extent to which they think is correct. One picture of the experiment is shown below. Participants can choose their degree of agreement with the statement in the experiment by clicking on the red bar. Choosing the left end means that the participant thinks that the statement is not true, vice versa.

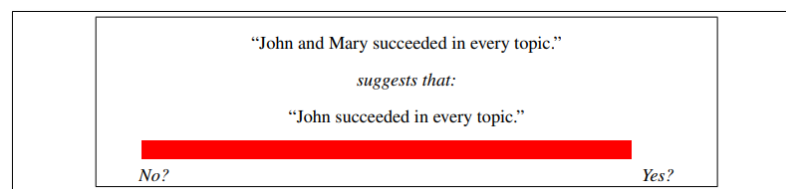


Figure 1: Grade judgment diagram used by Chemla.

In this example, John and Mary succeeded in every topic. Although there is no particular trigger word in this sentence, we could still think that John also succeeded in every topic because of the “and” in the statement. The example judges the extent to which this is true for the participants.

In [3] they design an experiment that asks if the picture below is consistent with the statement that contains a presupposition. Figure 2 below is the experiment they used.

(11) Target Statement:

None of these three circles have the same color as both of the squares
in their own cell.

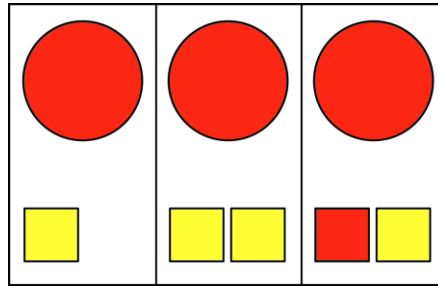


Figure 2: The target item diagram used in [2]’s paper.

The trigger word in here is “both” . Hearing “both of” , people instinctively understand that there are exactly two squares in the same cell with the circle. In cell 1, there is only one square with a different color. Cell 2 satisfies the requirement in the statement, but cell 3, though it has two squares, has one that is the same color with the circle. These make the graph inconsistent with the statement.

[2] presents a survey that checks for three different similar examples. Figure 3 below shows the diagram they used to check.

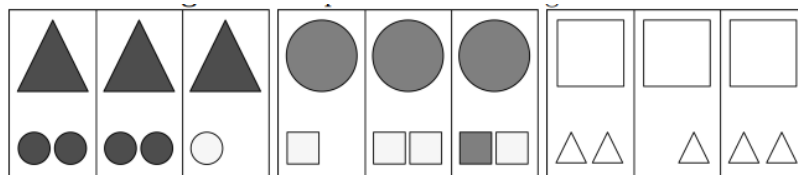


Figure 3: The overt pictures used in.

These are the overt pictures in the survey. Participants are asked one question for each of the group of shapes. For example:

- Some of these three triangles have the same color as both of the circles in their own cell.
- None of these three circles have the same color as both of the squares in their own cell.
- Do any of these three squares have the same color as both of the triangles in their own cell?

When the participants believe the statement is correct, they choose the overt picture, or else they choose the partially covered pictures.

The results of [2] reveals that 60 participants, the group with the largest number of participants, believes that all three statements fit into the three pictures, showing a high rate of existential-universal reading for some, none and questions with any. Importantly, with the third statement, which is a question with any, although participants believe that some can be existential, near 100 participants choose the overt picture for the first one but the covered picture for the third one. It does not have an existential but a more presuppositionless reading.

[2] did a similar experiment with similar motives with balls of different colors connecting with each other.

[4] also takes a similar approach in determining the type of presupposition in a statement but also accounting for the existence of a non-presuppositional statement with a trigger word. [4] use a variant of Covered Box Paradigm to test which type of presupposition reading is true for a quantifier. They design a survey with each question containing two similar pictures and a cut of an audio that says a statement. The second picture is blocked. Participants choose the one that best fits the statement above from the two pictures. Example (12) and Figure 4 are one complete example of what the participants will see in the experiment.

(12) Target statement:

[None of the bears won the afternoon race.] (audio)

UNIVERSAL: All the bears participated but no bear won
 EXISTENTIAL: At least one bear participated but no bear won
 PRESUPPOSITIONLESS: None of the bears both participated and won



Figure 4: The testing item and the blocked item options in [4].

[4] also include a false control, which has the photo that all bears participated and one bear won the race, a clearly wrong answer to the statement. The results in the end show that nearly 100% of the participants chose the blanked image on the right for the false control. The existential reading accounts for around 14% of the choice of the image. For existential-universal reading only and presuppositionless only reading, the choice of the image with full information are around 20% and 35% respectively. Quantifier None has the presuppositionless reading more likely than the two other presupposition readings.

This paper will continue to examine the presupposition projection across quantifiers, but in Mandarin Chinese. By surveying a group of Mandarin Chinese adults, this paper intends to test whether presuppositions project across Mandarin Chinese quantifiers as in English.

4. Experiment

4.1. Method and Design

The survey contains an introduction on the front page in which clear instructions are provided for the participants. On each page of the survey, there is a possible daily situation, in *italic*, and a key statement, in **bold**, related to the scene. The key statement includes both a quantifier and a presupposition trigger. The quantifier can only be one of “所有(suoyou, ‘all’),” “有些(youxie, ‘some’),” or “没有(meiyou, ‘none of’).” Under the text, there are two tables. The first one is a table with full data. Some data in the second table, however, is blocked. The participants have the chance to think what is in the blocked area in the second table. If they believe the table with full data is wrong, they can choose the second table. According to their own natural speaking habits, they choose which table is the best for the situation. Each choice reflects a specific intuition of the reading the sentence containing the presupposition trigger has. There are a total of three major themes in the survey, each of which has three different target items for each of the three quantifiers. The first one is about a teacher grading students’ exam. The second one is about a game in which people score points. The third one is about the first ten question in the exam. A total of 9 questions are in each major theme. An example involving the quantifier “all” and the presupposition trigger “score” is provided in (13). Figure 5 and 6 are the two example tables that are used to provide context for the participants. All the other experiment sentences can be found in the appendix at the end of the paper.

(13) 老师批完了学生们的考试

Laoshi piwanle xueshengmen de kaoshi

Teacher graded students’ tests

The teacher has finished grading students’ tests.

在前十道题当中，所有学生都得了 10 分以上

Zai qianshidaoti dangzhong, suoyou xuesheng dou dele 10 fen yishang.

at first ten questions in, all students all score 10 points more

‘In the first ten questions, all students score over 10.’

Student Number/Scores	1-10	11-20	21-30
1	N/A	N/A	N/A
2	10	9	8
3	10	10	9
4	10	5	1
5	10	3	2
6	10	1	0
7	N/A	N/A	N/A
8	10	5	4

Figure 5: The overt table that indicates a specific type of reading.

Student Number/Scores	1-10	11-20	21-30
1		8	8
2		9	8
3		10	9
4		5	1
5		3	2
6		1	0
7		1	0
8		5	4

Figure 6: The blocked table.

The picture is an example of one of the major questions. The context is in italic, and the target item is in bold. The target item has the quantifier “所有(*suoyou*, ‘all’)” . Trigger word “得了” (*dele*, ‘score’) should have the indication that the students take the exam beforehand due to common sense. Example (14) shows each type of reading in this scenario.

(14) In the first ten questions, all students score over 10

A. Universal reading: All of the students took the test (and all of them scored over 10).

B. Existential reading: Some of the students took the test (and all of them scored over 10).

C. Presuppositionless reading: All of the students took the test and they scored over 10.

Two records in table 1 are not available. If Participants believe that the presupposition project across the quantifier 'all' in such way as to get a universal reading, it means that in the first ten questions, all student participated and scored ten. If it is existential, it means that only some did the first ten questions, but all of them scored 10. If it is presuppositionless, it means that all of the students scored over ten. Choosing table 1, in this case, will mean that the participant believes in existential reading, since not all students took the exam. Choosing table 2 will mean that it is participants either have a universal or a presuppositionless reading.

To avoid participants realizing the pattern of the experiment and to avoid careless responses, the experiment also contains 10 fillers. Fillers are designed specifically so that participants choose 6 table 1s and 6 table 2s. The fillers are similar to the regular questions, but they do not involve quantifiers or presupposition triggers. For half of the fillers, the target sentence was not compatible with Table 1 and thus participants were supposed to choose Table 2.

(15) 甲的电脑现在没有电了

Jia de diannao xianzai mei you dian le

Jia’s computer now not has power (already).

Jia’s computer is now out of power.

他的电脑只有不到 10% 的电。

Tade diannao zhiyou bu dao 10% de dian.

His computer only has not reached 10% of battery.

His computer now has no more than 10% of the battery.

Percentage Battery	State
8%	Not Charging

Figure 7: The overt table (True control).

Percentage Battery	State
	Not Charging

Figure 8: The blocked table (False control).

This is an example of a filler. The key statement says that it contains no more than 10% of the battery. Table 1 shows 8%, which contradicts the key statement. Participants are expected to choose table 2.

4.2. Participants and Procedure

All of 41 participants are adults whose native language is Mandarin Chinese and are currently living in China. They agree to participate in the survey and have no former knowledge on the topic. They are asked to follow their instinct in speaking Mandarin Chinese when they are filling the survey.

The data were collected using a Mandarin Chinese questionnaire generator website ². The link ³ to the questionnaire [6] is sent through Mandarin Chinese social media Wechat. The experiment takes less than 10 minutes to complete. All the participants are required to agree the instructions on the front page in order to finish the rest of the survey.

The 41 participants completed the survey. In order to see whether participants followed the instructions and were paying attention to the task, I examined their response for the fillers in detail. Participants who chose Table 1 for all fillers and those who chose Table 2 for all fillers were excluded from the Results.

5. Results

I have first examined participants' responses to the filler questions. Some responses with answers of either all table 1 or table 2 are excluded from the analysis. Responses with a filler score of lower than 75%, are also excluded because there is a chance of misunderstanding the requirements or they randomly choose the answer. 17 responses are excluded, and 27 responses remained are proved to be valid.

² <https://www.wjx.cn/>

³ <https://www.wjx.cn/vj/wpKoe0P.aspx>

I have run a mean analysis for all the target item data I collected. The table 1 for each question has only one possible type of presupposition reading. I calculate the mean of the probability of choosing table 1 for each question.

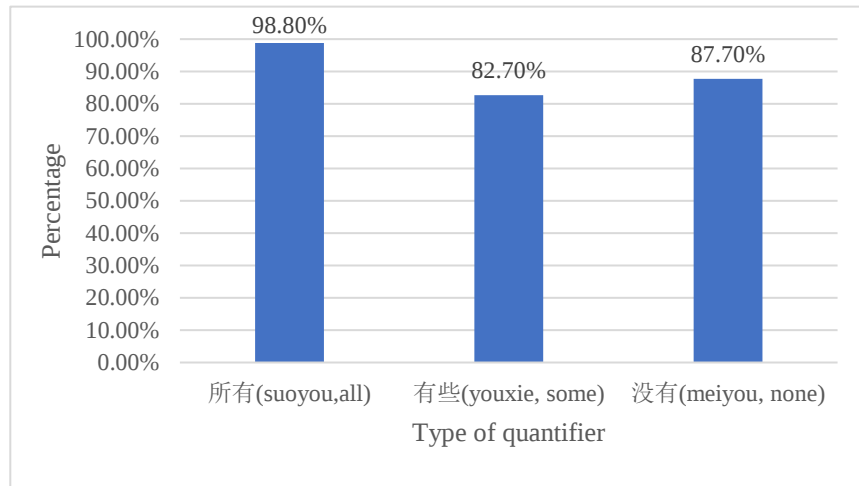


Figure 9: Graph of existential-universal reading.

The probability of choosing table 1 for existential-universal is 89.73% reading in total regardless of the quantifiers, the highest among the three types of presupposition reading. Figure 1 shows that for existential-universal only presupposition reading, quantifier “所有(all)” has a mean of 98.80% probability of being chosen. “有些(some)” has a mean of 82.70% probability and “没有(none)” has a mean of 87.70%.

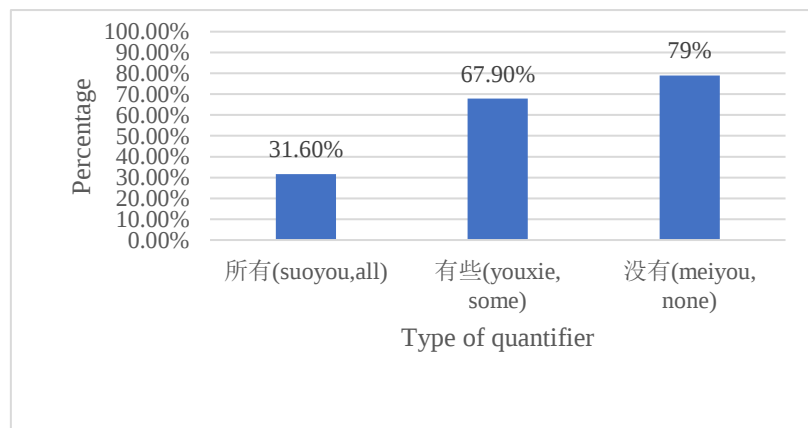


Figure 10: Graph of existential reading.

The probability of choosing table 1 for existential is 59.85% reading in total regardless of the quantifiers. Figure 2 shows that for existential only presupposition reading, quantifier “所有(all)” has a mean of 31.6-% probability of being chosen. “有些(some)” has a mean of 67.90% probability and “没有(none)” has a mean of 79.90%.

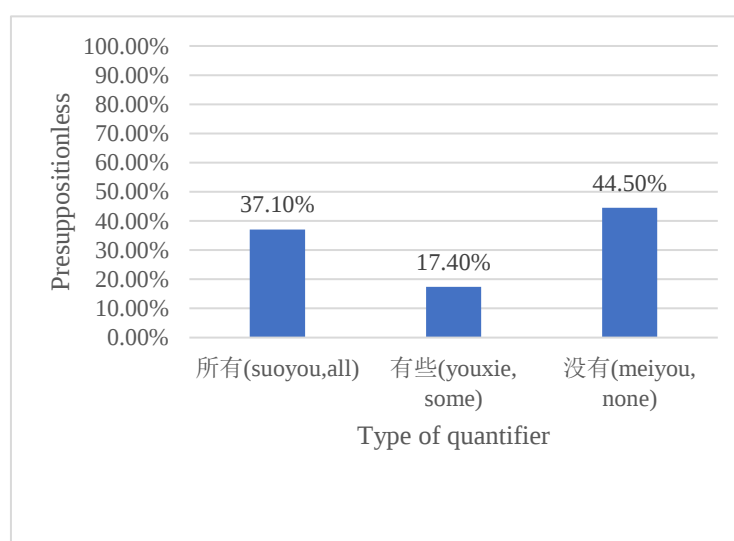


Figure 11: Graph of presuppositionless reading.

The probability of choosing table 1 for presuppositionless reading in total regardless of the quantifiers is 33.00%. Figure 3 shows that for the questions with expected no presupposition readings, the average probability of choosing table 1 for “所有(all)” is 37.10%, for “有些(some)” is 17.40%, and for “没有(none of/no)” is 44.50%.

6. Discussion

The survey intends to investigate the tendency of presuppositions readings for Mandarin Chinese quantifiers “所有(all),” “有些(some),” and “没有(none of/ no)”. The table 1 in each question has a specific indication of a type of presupposition. By looking at the correlation between the quantifier and the mean possibility of choosing table 1 in each target item question, we can set up experimentally that some quantifiers are highly indicative for a certain type of presupposition.

In the experiment, when the presupposition control is existential-universal, the participants are more likely to choose table 1, while the presupposition control is presuppositionless, participants are more likely to choose table 2. It means that the target items in the survey are considered as more presuppositional.

Interestingly, even though “所有(all)” has an incredibly high percentage of 98.80% in existential-universal presupposition reading situations, but only has around 30 to 40 percent in other for other two presupposition projection types. It can be concluded that “所有(all)” is inherently more correlated to presuppositions with true for all situations. “所有(all)”, in fact, is the most restrictively used one in the three quantifiers I have investigated.

“有些(some)” shows a relatively high percentage of being chosen in existential-universal and existential presupposition projection. However, it has an extremely low measure of 17.40% in presuppositionless reading. It shows that it is more applicable in existential-universal and existential presupposition scenarios. Whether it is more intended to project an existential or existential-universal reading may need further more controlled test. The data in my experiment shows that it is more intended to project an existential-universal presupposition.

The results from my experiment largely correspond with [4] experimental results, with the “all” presupposition showing a very high percentage of indication in universal-existential presupposition reading but low in others.

It is also very surprising to see that 11 out of more than 40 participant responses were excluded from data analysis. They do not seem to take the survey very seriously but choose all table 1 or 2 or choose randomly. One of the possible reasons is that people are not sure of the blank tables' meaning. They choose table 1 because they do not understand the point that I ask for.

7. Conclusion

This study carefully examined the influence of Mandarin Chinese quantifiers on Mandarin Chinese presuppositions, mainly existential-universal, universal, and non-presuppositional. We learn through the three most commonly used Mandarin Chinese quantifiers, 所有(suoyou, 'all'), 有些(youxie, 'some'), and 没有(meiyou, 'none of'). Through examining the real habit of general very normal adults, we conclude that the Mandarin Chinese quantifiers indeed have a very similar presupposition projection change as those in English.

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