THE NOMINATIVE/GENITIVE ALTERNATION IN MULTIPLE NOMINATIVE CONSTRUCTIONS IN JAPANESE: A PRELIMINARY STATISTICAL STUDY*

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1. Introduction

In Japanese, there is a Case alternation phenomenon called the Nominative/Genitive alternation. This takes place in sentential modifiers of nouns, but not in independent sentences, as shown in (1a) and (1b).

(1) a. John-ga/ *-no kita.
-NOM/-GEN came.

'John came.'

b. [John-ga/ -no kita] wake.
-NOM/-GEN came reason
'the reason why John came.'

The purpose of this paper is to investigate the availability of Case alternation in multiple Nominative constructions in Japanese, and to uncover what is actually taking place in the alternation. For this purpose, we showed examples such as (2) to 22 informants, who were either graduate students of linguistics, or graduates of a linguistics program, and asked them to judge the grammaticality of the examples on the three level scale (to be shown in (9)). We then provided a statistical analysis of the data.

(2) a. John-ga eego -ga wakaru wake.
-NOM English -NOM understand reason
'the reason why John understands English.'

* An earlier version of this paper was presented at the 72nd Southeastern Conference on Linguistics held at the Sheraton Capitol Center in Raleigh, North Carolina on April 9, 2005 (Maki and Morishima (2005)). We would like to thank the audience at the meeting, as well as the following people: Ronald Craig, Stanley Dubinsky, Jessica Dunton, Noriko Imanishi, Nobuhiro Kaga, Yoichi Miyamoto, Mamoru Mukaiyama, Fumikazu Niinuma, Masao Ochi, Kaoru Sato, Shigeki Taguchi, Michiyo Takai, Asako Uchibori, and Michiyo Yamamoto for their helpful comments and/or data collection. All errors are our own. The research of the first author was supported by Center for Linguistics, Nanzan University, of which he is an adjunct researcher (from June 1, 2004 to March 31, 2006).

b. John-no eego -ga wakaru wake.
-GEN English -NOM understand reason

'the reason why John understands English.'

Through the analysis, we found that there was no statistically significant difference in grammaticality judgments between (3a) and (3b), but there was between (4) and each of (5a-c), and between (6) and each of (7a-c).

(3) a. [NP-NOM predicate] N
b. [NP-GEN predicate] N

(4) [NP-NOM NP-NOM stative predicate] N

(5) a. [NP-GEN NP-NOM stative predicate] N
b. [NP-NOM NP-GEN stative predicate] N
c. [NP-GEN NP-GEN stative predicate] N

(6) [adverb NP-NOM NP-NOM stative predicate] N

(7) a. [adverb NP-GEN NP-NOM stative predicate] N
b. [adverb NP-NOM NP-GEN stative predicate] N
c. [adverb NP-GEN NP-GEN stative predicate] N

Based on the findings, we argue that the Nominative/Genitive alternation in multiple Nominative constructions is only an illusion, and Genitive Case is not actually licensed within the constructions. We claim that the NP marked with Genitive Case is base-generated in DP SPEC, where it is licensed.

The organization of this paper is as follows. Section 2 introduces the materials and methodology to be used in this research. Section 3 statistically analyzes the collected data, and Section 4 summarizes the results of the analysis. Section 5 discusses the implications of the findings, and Section 6 concludes the paper.

2. Materials and Methodology

This research was started in June of 2004, and all the data were collected by the end of November of 2004. In this study, we obtained 22 samples of data from either graduate students of linguistics, or graduates of a linguistics program, who had been trained to judge the grammaticality of data based on minimal pairs. The informants (14 men and 8 women, average age 26 years old) consisted of 20 graduate students from the Graduate School of the University of Tokyo (11), the Graduate School of Osaka University (5), the Graduate School of the University of Tsukuba (2), the Graduate School of Gifu University (1), and the Graduate School of the University of Connecticut (1), and 2 college instructors who had

already graduated from a doctorate program of linguistics. Below, we will show the materials and methodology of this research.

2.1. Materials

In this study, we examined three environments where the Nominative/Genitive alternation can potentially take place, as shown in (8a-c), respectively.

(8) a. [[NP predicate] N]
b. [[NP1 NP2 stative predicate] N]
c. [[adverb NP1 NP2 stative predicate] N]

Note that for (8b), stative predicates such as *wakaru* 'to understand' and *sukina* 'to like' may take two NPs marked Nominative. We used the two stative predicates *wakaru* 'to understand' and *sukina* 'to like' in this study, as it was relatively easy to construct the relevant examples that conform to both the structures in (8b) and (8c).

In the questionnaire, we asked each participant to indicate the degree to which s/he would judge each of the examples on the three level scale shown in (9).

(9) The Scale
1 totally ungrammatical
2 not perfectly grammatical
3 perfectly grammatical

We used the scale in (9), following the statistical work on the Nominative/Genitive alternation in Japanese by Harada (1976).

2.2. Methodology

In this study, we used a t-Test: Paired Two Sample for Means (hereafter, t-Test) to analyze the data. As illustration, let us consider the result of the t-Test of Q1 and Q2.

Q1. Hato -ga iru kooen.
pigeon-NOM be park
'the park where pigeons are.'

Q2. Hato -no iru kooen.
pigeon-GEN be park
'the park where pigeons are.'

We use the data that scored a 3 (perfectly grammatical) and a 1 (totally ungrammatical) on the scale in the following discussion, and the level of statistical significance is $p < .05$. Observe (10).

(10) The Result of the t-Test (Q1 and Q2)

	Q1 (3)	Q2 (3)
Mean	1	0.954545
Observations	22	22
t Stat	**1**	
P(T<=t) two-tail	0.328695	
t Critical two tail	2.079614	

In the first line, Q1 (3) and Q2 (3) indicate the data that scored a 3 on the scale in these examples. In the second line, the mean is 1 for Q1 (3) and about .95 for Q2 (3). This means that 100% of the entire group of participants judged Q1 perfectly grammatical, and about 95% of the same group of participants judged Q2 perfectly grammatical. We would like to know if there is a statistically significant difference between the two sets of data. For this purpose, we need to look at the last line (t Critical two tail (about 2.1)) and the third line from the bottom (t Stat (about 1)). If the absolute value of t Stat is larger than t Critical two tail, it means that there is a statistically significant difference between the two sets of data. Therefore, (10) shows that there is not a statistically significant difference between those who judge Q1 perfectly grammatical and those who judge Q2 perfectly grammatical.

A note is in order on how to interpret the statistical results. It is not true that a statistically significant difference between those who judge Example X perfectly grammatical, and those who judge Example Y which constitutes a minimal pair with Example X, perfectly grammatical, means that either of the examples is linguistically ungrammatical. This is because a statistically significant difference between the two sets of data may be observed, when 100% of the entire group of informants judge Example X perfectly grammatical, and 80% of the same group of informants judge Example Y perfectly grammatical. In this paper, as a guideline for the grammaticality of the examples under examination, we assume that Example X is considered to be "not grammatical," if there is a statistically significant difference between those who judge Example X perfectly grammatical/totally ungrammatical and those who judge Example Y that constitutes a minimal pair with Example X perfectly grammatical/totally ungrammatical, and less than 50% of the entire group of informants judge Example X perfectly grammatical.

3. Analysis

In this section, we analyze the collected data. We examine the data that were marked 3 (perfectly grammatical) in 3.1., and the data that were marked 1 (totally ungrammatical) in 3.2. We see the data from two points of view (the scale of perfect grammaticality and the scale of total ungrammaticality), in order not to become biased by the results based on one particular point of view. Within each subsection, we examine (1) the bottom line data which only

contain one NP, (2) the data with multiple NPs, and (3) the data with a sentence-initial adverb and multiple NPs.

3.1. The Data Marked 3 (Perfectly Grammatical)

3.1.1. The Bottom Line Data

First, we analyze the data in Questions 3 and 4 using a t-Test. The result of the t-Test is shown in (11).

Q3. Yuki-ga futta hi.
snow-NOM fell day
'the day it snowed.'

Q4. Yuki-no futta hi.
snow-GEN fell day
'the day it snowed.'

(11) The Result of the t-Test (Q3 and Q4)

	Q3 (3)	Q4 (3)
Mean	1	0.909091
Observations	22	22
t Stat	**1.449138**	
P(T<=t) two-tail	0.162069	
t Critical two tail	2.079614	

In (11), the absolute value of t Stat (about 1.4) is smaller than t Critical two tail (about 2.1). Therefore, (11) shows that there is not a statistically significant difference between those who judge Q3 perfectly grammatical and those who judge Q4 perfectly grammatical.

Second, we analyze the data in Questions 5 and 6 using a t-Test. The result of the t-Test is shown in (12).

Q5. Jikan-ga aru hito -wa, kite kudasai.
time -NOM have person -Top come please

'Those who have time, please come.'

Q6. Jikan-no aru hito -wa, kite kudasai.
time -GEN have person -Top come please

'Those who have time, please come.'

(12) The Result of the t-Test (Q5 and Q6)

	Q5 (3)	Q6 (3)
Mean	1	0.863636
Observations	22	22
t Stat	**1.820931**	
P(T<=t) two-tail	0.082898	
t Critical two tail	2.079614	

In (12), the absolute value of t Stat (about 1.8) is smaller than t Critical two tail (about 2.1). Therefore, (12) shows that there is not a statistically significant difference between those who judge Q5 perfectly grammatical and those who judge Q6 perfectly grammatical.

In the following discussion, as the number of the samples and t Critical two tail are 22 and about 2.1, respectively, we do not include them in the charts.

3.1.2. The Data with Multiple NPs

Let us then turn to the data with multiple NPs. First, we analyze the data in Questions 7 and 8 using a t-Test. In Question 8, the order of the two NPs is NP-GEN and NP-NOM. The result of the t-Test is shown in (13).

Q7. Shinjoo -ga, eego -ga wakaru wake.
-NOM English-NOM understand reason

'the reason why Shinjo understands English.'

Q8 Shinjoo-no, eego -ga wakaru wake.
-GEN English-NOM understand reason

'the reason why Shinjo understands English.'

(13) The Result of the t-Test (Q7 and Q8)

	Q7 (3)	Q8 (3)
Mean	0.863636	0.363636
t Stat	**3.924283**	
P(T<=t) two-tail	0.000778	

In (13), the absolute value of t Stat (about 3.9) is larger than t Critical two tail (about 2.1). Therefore, (13) shows that there is a statistically significant difference between those who judge Q7 perfectly grammatical and those who judge Q8 perfectly grammatical.

Second, we analyze the data in Questions 9 and 10 using a t-Test. In Question 10, the order of the two NPs is NP-NOM and NP-GEN. The result of the t-Test is shown in (14).

Q9. Shinjoo-ga, eego -ga wakaru wake.
-NOM English-NOM understand reason

'the reason why Shinjo understands English.'

Q10. Shinjoo-ga, eego -no wakaru wake.
-NOM English-GEN understand reason

'the reason why Shinjo understands English.'

(14) The Result of the t-Test (Q9 and Q10)

	Q9 (3)	Q10 (3)
Mean	0.818182	0.363636
t Stat	**3.177445**	
P(T<=t) two-tail	0.004535	

In (14), the absolute value of t Stat (about 3.2) is larger than t Critical two tail (about 2.1). Therefore, (14) shows that there is a statistically significant difference between those who judge Q9 perfectly grammatical and those who judge Q10 perfectly grammatical.

Third, we analyze the data in Questions 11 and 12 using a t-Test. In Question 12, the order of the two NPs is NP-GEN and NP-GEN. The result of the t-Test is shown in (15).

Q11. Shinjoo-ga, eego -ga wakaru wake.
-NOM English-NOM understand reason

'the reason why Shinjo understands English.'

Q12. Shinjoo-no, eego -no wakaru wake.
-GEN English-GEN understand reason

'the reason why Shinjo understands English.'

(15) The Result of the t-Test (Q11 and Q12)

	Q11 (3)	Q12 (3)
Mean	0.863636	0.409091
T Stat	**3.177445**	
P(T<=t) two-tail	0.004535	

In (15), the absolute value of t Stat (about 3.2) is larger than t Critical two tail (about 2.1). Therefore, (15) shows that there is a statistically significant difference between those who judge Q11 perfectly grammatical and those who judge Q12 perfectly grammatical.

Let us then examine the examples with the other stative predicate *sukina* 'to like.' First, we analyze the data in Questions 13 and 14 using a t-Test. In Question 14, the order of the two NPs is NP-GEN and NP-NOM. The result of the t-Test is shown in (16).

Q13. Ichiroo -ga, yakyuu -ga sukina wake.
-NOM baseball-NOM like reason

'the reason why Ichiro likes baseball.'

Q14. Ichiroo -no, yakyuu -ga sukina wake.
-GEN baseball -NOM like reason

'the reason why Ichiro likes baseball.'

(16) The Result of the t-Test (Q13 and Q14)

	Q13 (3)	Q14 (3)
Mean	1	0.727273
t Stat	**2.806243**	
P(T<=t) two-tail	0.01058	

In (16), the absolute value of t Stat (about 2.8) is larger than t Critical two tail (about 2.1). Therefore, (16) shows that there is a statistically significant difference between those who judge Q13 perfectly grammatical and those who judge Q14 perfectly grammatical.

Note, however, that 100% of the entire group of informants judged Q13 perfectly grammatical, and about 73% of the same group of informants judged Q14 perfectly grammatical, although there was a statistically significant difference between the two groups. Based on the guideline for the grammaticality of the examples under examination in this study, we must admit that Q14 is not considered "not grammatical," and its grammaticality status needs to be explained, which we will come back to later.

Second, we analyze the data in Questions 15 and 16 using a t-Test. In Question 16, the order of the two NPs is NP-NOM and NP-GEN. The result of the t-Test is shown in (17).

Q15. Ichiroo -ga, yakyuu -ga sukina wake.
-NOM baseball -NOM like reason

'the reason why Ichiro likes baseball.'

Q16. Ichiroo -ga, yakyuu -no sukina wake.
-NOM baseball -GEN like reason

'the reason why Ichiro likes baseball.'

(17) The Result of the t-Test (Q15 and Q16)

	Q15 (3)	Q16 (3)
Mean	1	0.318182
t Stat	**6.708204**	
P(T<=t) two-tail	1.23E-06	

In (17), the absolute value of t Stat (about 6.7) is larger than t Critical two tail (about 2.1). Therefore, (17) shows that there is a statistically significant difference between those who judge Q15 perfectly grammatical and those who judge Q16 perfectly grammatical.

Third, we analyze the data in Questions 17 and 18 using a t-Test. In Question 18, the order of the two NPs is NP-GEN and NP-GEN. The result of the t-Test is shown in (18).

Q17. Ichiroo -ga, yakyuu -ga sukina wake.
-NOM baseball -NOM like reason

'the reason why Ichiro likes baseball.'

Q18. Ichiroo -no, yakyuu -no sukina wake.
-GEN baseball -GEN like reason

'the reason why Ichiro likes baseball.'

(18) The Result of the t-Test (Q17 and Q18)

	Q17 (3)	Q18 (3)
Mean	0.954545	0.545455
t Stat	**3.812933**	
P(T<=t) two-tail	0.001015	

In (18), the absolute value of t Stat (about 3.8) is larger than t Critical two tail (about 2.1). Therefore, (18) shows that there is a statistically significant difference between those who judge Q17 perfectly grammatical and those who judge Q18 perfectly grammatical.

Note, again, that about 95% of the entire group of informants judged Q17 perfectly grammatical, and about 55% of the same group of informants judged Q18 perfectly grammatical, although there was a statistically significant difference between the two groups. Given the guideline for the grammaticality of the examples under examination in this study, Q18 is not "not grammatical." The grammaticality of this example needs to be explained, which we will come back to later.

3.1.3. The Data with a Sentence-Initial Adverb and Multiple NPs

Let us then examine the data with a sentence-initial adverb and multiple NPs. First, we analyze the data in Questions 19 and 20 using a t-Test. In Question 20, the order of the two NPs is NP-GEN and NP-NOM. The result of the t-Test is shown in (19).

Q19. Ichiroo yori, Shinjoo-ga, eego -ga wakaru wake.
than -NOM English-NOM understand reason

'the reason why Shinjo understands English more than Ichiro.'

Q20. Ichiroo yori, Shinjoo-no, eego -ga wakaru wake.
than -GEN English-NOM understand reason

'the reason why Shinjo understands English more than Ichiro.'

(19) The Result of the t-Test (Q19 and Q20)

	Q19 (3)	Q20 (3)
Mean	0.863636	0.136364
t Stat	**6.196773**	
P(T<=t) two-tail	3.79E-06	

In (19), the absolute value of t Stat (about 6.2) is larger than t Critical two tail (about 2.1). Therefore, (19) shows that there is a statistically significant difference between those who judge Q19 perfectly grammatical and those who judge Q20 perfectly grammatical.

Second, we analyze the data in Questions 21 and 22 using a t-Test. In Question 22, the order of the two NPs is NP-NOM and NP-GEN. The result of the t-Test is shown in (20).

Q21. Ichiroo yori, Shinjoo-ga, eego -ga wakaru wake.
than -NOM English -NOM understand reason

'the reason why Shinjo understands English more than Ichiro.'

Q22. Ichiroo yori, Shinjoo-ga, eego -no wakaru wake.
than -NOM English-GEN understand reason

'the reason why Shinjo understands English more than Ichiro.'

(20) The Result of the t-Test (Q21 and Q22)

	Q21 (3)	Q22 (3)
Mean	0.818182	0.363636
t Stat	**3.177445**	
P(T<=t) two-tail	0.004535	

In (20), the absolute value of t Stat (about 3.2) is larger than t Critical two tail (about 2.1). Therefore, (20) shows that there is a statistically significant difference between those who judge Q21 perfectly grammatical and those who judge Q22 perfectly grammatical.

Third, we analyze the data in Questions 23 and 24 using a t-Test. In Question 24, the order of the two NPs is NP-GEN and NP-GEN. The result of the t-Test is shown in (21).

Q23. Ichiroo yori, Shinjoo-ga, eego -ga wakaru wake.
than -NOM English -NOM understand reason

'the reason why Shinjo understands English more than Ichiro.'

Q24. Ichiroo yori, Shinjoo-no, eego -no wakaru wake.
than -GEN English-GEN understand reason

'the reason why Shinjo understands English more than Ichiro.'

(21) The Result of the t-Test (Q23 and Q24)

	Q23 (3)	Q24 (3)
Mean	0.863636	0.409091
t Stat	**3.177445**	
P(T<=t) two-tail	0.004535	

In (21), the absolute value of t Stat (about 3.2) is larger than t Critical two tail (about 2.1). Therefore, (21) shows that there is a statistically significant difference between those who judge Q23 perfectly grammatical and those who judge Q24 perfectly grammatical.

Let us then examine the examples with the other stative predicate *sukina* 'to like.' First, we analyze the data in Questions 25 and 26 using a t-Test. In Question 26, the order of the two NPs is NP-GEN and NP-NOM. The result of the t-Test is shown in (22).

Q25. Shinjoo yori, Ichiroo-ga, yakyuu -ga sukina wake.
than -NOM baseball -NOM like reason

'the reason why Ichiro likes baseball more than Shinjo.'

Q26. Shinjoo yori, Ichiroo-no, yakyuu -ga sukina wake.
than -GEN baseball-NOM like reason

'the reason why Ichiro likes baseball more than Shinjo.'

(22) The Result of the t-Test (Q25 and Q26)

	Q25 (3)	Q26 (3)
Mean	0.909091	0.136364
t Stat	**6.859046**	
P(T<=t) two-tail	8.84E-07	

In (22), the absolute value of t Stat (about 6.9) is larger than t Critical two tail (about 2.1). Therefore, (22) shows that there is a statistically significant difference between those who judge Q25 perfectly grammatical and those who judge Q26 perfectly grammatical.

Second, we analyze the data in Questions 27 and 28 using a t-Test. In Question 28, the order of the two NPs is NP-NOM and NP-GEN. The result of the t-Test is shown in (23).

Q27. Shinjoo yori, Ichiroo-ga, yakyuu -ga sukina wake.
than -NOM baseball -NOM like reason

'the reason why Ichiro likes baseball more than Shinjo.'

Q28. Shinjoo yori, Ichiroo-ga, yakyuu -no sukina wake.
than -NOM baseball-GEN like reason

'the reason why Ichiro likes baseball more than Shinjo.'

(23) The Result of the t-Test (Q27 and Q28)

	Q27 (3)	Q28 (3)
Mean	0.863636	0.363636
t Stat	**3.924283**	
P(T<=t) two-tail	0.000778	

In (23), the absolute value of t Stat (about 3.9) is larger than t Critical two tail (about 2.1). Therefore, (23) shows that there is a statistically significant difference between those who judge Q27 perfectly grammatical and those who judge Q28 perfectly grammatical.

Third, we analyze the data in Questions 29 and 30 using a t-Test. In Question 30, the order of the two NPs is NP-GEN and NP-GEN. The result of the t-Test is shown in (24).

Q29. Shinjoo yori, Ichiroo-ga, yakyuu -ga sukina wake.
than -NOM baseball -NOM like reason

'the reason why Ichiro likes baseball more than Shinjo.'

Q30. Shinjoo yori, Ichiroo-no, yakyuu -no sukina wake.
than -GEN baseball-GEN like reason

'the reason why Ichiro likes baseball more than Shinjo.'

(24) The Result of the t-Test (Q29 and Q30)

	Q29 (3)	Q30 (3)
Mean	0.863636	0.272727
t Stat	**4.695048**	
P(T<=t) two-tail	0.000124	

In (24), the absolute value of t Stat (about 4.7) is larger than t Critical two tail (about 2.1). Therefore, (24) shows that there is a statistically significant difference between those who judge Q29 perfectly grammatical and those who judge Q30 perfectly grammatical.

3.2. The Data Marked 1 (Totally Ungrammatical)

In this subsection, we examine the same examples from a different perspective. To be precise, we examine the data that were marked 1 (totally ungrammatical), to see if there is a statistically significant difference between the two examples in each minimal pair.

3.2.1. The Bottom Line Data

First, we analyze the data in Questions 3 and 4 using a t-Test. The result of the t-Test is shown in (25).

Q3. Yuki -ga futta hi.
snow-NOM fell day

'the day it snowed.'

Q4. Yuki -no futta hi.
snow-GEN fell day

'the day it snowed.'

(25) The Result of the t-Test (Q3 and Q4)

	Q3 (1)	Q4 (1)
Mean	0	0
t Stat	**#DIV/0!**	
P(T<=t) two-tail	#DIV/0!	

In (25), the absolute value of t Stat (#DIV/0!) is not determined, as there were no informants who marked Q3 and Q4 1 (totally ungrammatical). This indicates that there is not a statistically significant difference between those who judge Q3 totally ungrammatical and those who judge Q4 totally ungrammatical

Second, we analyze the data in Questions 5 and 6 using a t-Test. The result of the t-Test is shown in (26).

Q5. Jikan-ga aru hito -wa, kite kudasai.
time -NOM have person-Top come please

'Those who have time, please come.'

Q6. Jikan-no aru hito -wa, kite kudasai.
time -GEN have person-Top come please

'Those who have time, please come.'

(26) The Result of the t-Test (Q5 and Q6)

	Q5 (1)	Q6 (1)
Mean	0	0
t Stat	**#DIV/0!**	
P(T<=t) two-tail	#DIV/0!	

Just as in (25), in (26), the absolute value of t Stat (#DIV/0!) is not determined, as there were no informants who marked Q5 and Q6 1 (totally ungrammatical). Therefore, there is not a statistically significant difference between those who judge Q5 totally ungrammatical and those who judge Q6 totally ungrammatical.

3.2.2. The Data with Multiple NPs

Let us then examine the data with multiple NPs. First, we analyze the data in Questions 7 and 8 using a t-Test. In Question 8, the order of the two NPs is NP-NOM and NP-GEN. The result of the t-Test is shown in (29).

Q7. Shinjoo-ga, eego -ga wakaru wake.
-NOM English-NOM understand reason

'the reason why Shinjo understands English.'

Q8. Shinjoo-no, eego -ga wakaru wake.
-GEN English-NOM understand reason

'the reason why Shinjo understands English.'

(27) The Result of the t-Test (Q7 and Q8)

	Q7 (1)	Q8 (1)
Mean	0	0.272727
t Stat	**-2.80624**	
P(T<=t) two-tail	0.01058	

In (27), the absolute value of t Stat (about 2.8) is larger than t Critical two tail (about 2.1). Therefore, there is a statistically significant difference between those who judge Q7 totally ungrammatical and those who judge Q8 totally ungrammatical.

Second, we analyze the data in Questions 9 and 10 using a t-Test. In Question 10, the order of the two NPs is NP-NOM and NP-GEN. The result of the t-Test is shown in (28).

Q9. Shinjoo-ga, eego -ga wakaru wake.
-NOM English-NOM understand reason

'the reason why Shinjo understands English.'

Q10. Shinjoo-ga, eego -no wakaru wake.
-NOM English-GEN understand reason

'the reason why Shinjo understands English.'

(28) The Result of the t-Test (Q9 and Q10)

	Q9 (1)	Q10 (1)
Mean	0	0.227273
t Stat	**-2.48525**	
P(T<=t) two-tail	0.02145	

In (28), the absolute value of t Stat (about 2.5) is larger than t Critical two tail (about 2.1). Therefore, there is a statistically significant difference between those who judge Q9 totally ungrammatical and those who judge Q10 totally ungrammatical.

Third, we analyze the data in Questions 11 and 12 using a t-Test. In Question 12, the order of the two NPs is NP-GEN and NP-GEN. The result of the t-Test is shown in (29).

Q11. Shinjoo-ga, eego -ga wakaru wake.
-NOM English-NOM understand reason

'the reason why Shinjo understands English.'

Q12. Shinjoo-no, eego -no wakaru wake.
-GEN English-GEN understand reason

'the reason why Shinjo understands English.'

(29) The Result of the t-Test (Q11 and Q12)

	Q11 (1)	Q12 (1)
Mean	0	0.090909
t Stat	**-1.44914**	
P(T<=t) two-tail	0.162069	

In (29), the absolute value of t Stat (about 1.4) is not larger than t Critical two tail (about 2.1). Therefore, there is not a statistically significant difference between those who judge Q11 totally ungrammatical and those who judge Q12 totally ungrammatical. Given the guideline for the grammaticality of the examples under examination, this result indicates that Q12 is not "not grammatical." We will come back to this point later.

Let us then examine the examples with the other stative predicate *sukina* 'to like.' First, we analyze the data in Questions 13 and 14 using a t-Test. In Question 14, the order of the two NPs is NP-GEN and NP-NOM. The result of the t-Test is shown in (30).

Q13. Ichiroo-ga, yakyuu -ga sukina wake.
-NOM baseball-NOM like reason

'the reason why Ichiro likes baseball.'

Q14. Ichiroo-no, yakyuu -ga sukina wake.
-GEN baseball -NOM like reason

'the reason why Ichiro likes baseball.'

(30) The Result of the t-Test (Q13 and Q14)

	Q13 (1)	Q14 (1)
Mean	0	0.090909
t Stat	**-1.44914**	
P(T<=t) two-tail	0.162069	

In (30), again, the absolute value of t Stat (about 1.4) is not larger than t Critical two tail (about 2.1). Therefore, there is not a statistically significant difference between those who judge Q13 totally ungrammatical and those who judge Q14 totally ungrammatical. Given the guideline for the grammaticality of the examples under examination, this result indicates that Q14 is not "not grammatical." We will come back to this point later.

Second, we analyze the data in Questions 15 and 16 using a t-Test. In Question 16, the order of the two NPs is NP-NOM and NP-GEN. The result of the t-Test is shown in (31).

Q15. Ichiroo-ga, yakyuu -ga sukina wake.
-NOM baseball-NOM like reason

'the reason why Ichiro likes baseball.'

Q16. Ichiroo-ga, yakyuu -no sukina wake.
-NOM baseball-GEN like reason

'the reason why Ichiro likes baseball.'

(31) The Result of the t-Test (Q15 and Q16)

	Q15 (1)	Q16 (1)
Mean	0	0.227273
t Stat	**-2.48525**	
P(T<=t) two-tail	0.02145	

In (31), the absolute value of t Stat (about 2.5) is larger than t Critical two tail (about 2.1). Therefore, there is a statistically significant difference between those who judge Q15 totally ungrammatical and those who judge Q16 totally ungrammatical.

Third, we analyze the data in Questions 17 and 18 using a t-Test. In Question 18, the order of the two NPs is NP-GEN and NP-GEN. The result of the t-Test is shown in (32).

Q17. Ichiroo-ga, yakyuu -ga sukina wake.
-NOM baseball-NOM like reason

'the reason why Ichiro likes baseball.'

Q18. Ichiroo-no, yakyuu -no sukina wake.
-GEN baseball-GEN like reason

'the reason why Ichiro likes baseball.'

(32) The Result of the t-Test (Q17 and Q18)

	Q17 (1)	Q18 (1)
Mean	0	0.181818
t Stat	**-2.16025**	
P(T<=t) two-tail	0.042463	

In (32), the absolute value of t Stat (about 2.2) is larger than t Critical two tail (about 2.1). Therefore, there is a statistically significant difference between those who judge Q17 totally ungrammatical and those who judge Q18 totally ungrammatical.

3.2.3. The Data with a Sentence-Initial Adverb and Multiple NPs

Let us finally examine the data with a sentence-initial adverb and multiple NPs. First, we analyze the data in Questions 19 and 20 using a t-Test. The result of the t-Test is shown in (33).

Q19. Ichiroo yori, Shinjoo-ga, eego -ga wakaru wake.
than -NOM English-NOM understand reason

'the reason why Shinjo understands English more than Ichiro.'

Q20. Ichiroo yori, Shinjoo-no, eego -ga wakaru wake.
than -GEN English-NOM understand reason

'the reason why Shinjo understands English more than Ichiro.'

(33) The Result of the t-Test (Q19 and Q20)

	Q19 (1)	Q20 (1)
Mean	0	0.409091
t Stat	**-3.81293**	
P(T<=t) two-tail	0.001015	

In (33), the absolute value of t Stat (about 3.9) is larger than t Critical two tail (about 2.1). Therefore, (33) shows that there is a statistically significant difference between those who judge Q19 totally ungrammatical and those who judge Q20 totally ungrammatical.

Second, we analyze the data in Questions 21 and 22 using a t-Test. In Question 22, the order of the two NPs is NP-NOM and NP-GEN. The result of the t-Test is shown in (34).

Q21. Ichiroo yori, Shinjoo-ga, eego -ga wakaru wake.
than -NOM English-NOM understand reason

'the reason why Shinjo understands English more than Ichiro.'

Q22. Ichiroo yori, Shinjoo-ga, eego -no wakaru wake.
than -NOM English-GEN understand reason

'the reason why Shinjo understands English more than Ichiro.'

(34) The Result of the t-Test (Q21 and Q22)

	Q21 (1)	Q22 (1)
Mean	0	0.136364
t Stat	**-1.82093**	
P(T<=t) two-tail	0.082898	

In (34), the absolute value of t Stat (about 1.8) is not larger than t Critical two tail (about 2.1). Therefore, (34) shows that there is not a statistically significant difference between those who judge Q21 totally ungrammatical and those who judge Q22 totally ungrammatical. Given the guideline for the grammaticality of the examples under examination, this result indicates that Q22 is not "not grammatical." We will come back to this point later.

Third, we analyze the data in Questions 23 and 24 using a t-Test. In Question 24, the order of the two NPs is NP-GEN and NP-GEN. The result of the t-Test is shown in (35).

Q23. Ichiroo yori, Shinjoo-ga, eego -ga wakaru wake.
than -NOM English-NOM understand reason

'the reason why Shinjo understands English more than Ichiro.'

Q24. Ichiroo yori, Shinjoo-no, eego -no wakaru wake.
than -GEN English-GEN understand reason

'the reason why Shinjo understands English more than Ichiro.'

(35) The Result of the t-Test (Q23 and Q24)

	Q23 (1)	Q24 (1)
Mean	0	0.409091
t Stat	**-3.81293**	
P(T<=t) two-tail	0.001015	

In (35), the absolute value of t Stat (about 3.8) is larger than t Critical two tail (about 2.1). Therefore, (35) shows that there is a statistically significant difference between those who judge Q23 totally ungrammatical and those who judge Q24 totally ungrammatical.

Let us then examine the examples with the other stative predicate *sukina* 'to like.' First, we analyze the data in Questions 25 and 26 using a t-Test. In Question 26, the order of the two NPs is NP-GEN and NP-NOM. The result of the t-Test is shown in (36).

Q25. Shinjoo yori, Ichiroo-ga, yakyuu -ga sukina wake.
than -NOM baseball -NOM like reason

'the reason why Ichiro likes baseball more than Shinjo.'

Q26. Shinjoo yori, Ichiroo-no, yakyuu -ga sukina wake.
than -GEN baseball-NOM like reason

'the reason why Ichiro likes baseball more than Shinjo.'

(36) The Result of the t-Test (Q25 and Q26)

	Q25 (1)	Q26 (1)
Mean	0	0.363636
t Stat	**-3.4641**	
P(T<=t) two-tail	0.002321	

In (36), the absolute value of t Stat (about 3.5) is larger than t Critical two tail (about 2.1). Therefore, there is a statistically significant difference between those who judge Q25 totally ungrammatical and those who judge Q26 totally ungrammatical.

Second, we analyze the data in Questions 27 and 28 using a t-Test. In Question 28, the order of the two NPs is NP-NOM and NP-GEN. The result of the t-Test is shown in (37).

Q27. Shinjoo yori, Ichiroo-ga, yakyuu -ga sukina wake.
than -NOM baseball -NOM like reason

'the reason why Ichiro likes baseball more than Shinjo.'

Q28. Shinjoo yori, Ichiroo-ga, yakyuu -no sukina wake.
than -NOM baseball-GEN like reason

'the reason why Ichiro likes baseball more than Shinjo.'

(37) The Result of the t-Test (Q27 and Q28)

	Q27 (1)	Q28 (1)
Mean	0	0.363636
t Stat	**-3.4641**	
P(T<=t) two-tail	0.002321	

In (37), the absolute value of t Stat (about 3.5) is larger than t Critical two tail (about 2.1). Therefore, there is a statistically significant difference between those who judge Q27 totally ungrammatical and those who judge Q28 totally ungrammatical.

Third, and finally, we analyze the data in Questions 29 and 30 using a t-Test. In Question 30, the order of the two NPs is NP-GEN and NP-GEN. The result of the t-Test is shown in (38).

Q29. Shinjoo yori, Ichiroo-ga, yakyuu -ga sukina wake.
than -NOM baseball -NOM like reason

'the reason why Ichiro likes baseball more than Shinjo.'

Q30. Shinjoo yori, Ichiroo-no, yakyuu -no sukina wake.
than -GEN baseball-GEN like reason

'the reason why Ichiro likes baseball more than Shinjo.'

(38) The Result of the t-Test (Q29 and Q30)

	Q29 (1)	Q30 (1)
Mean	0	0.409091
T Stat	**-3.81293**	
P(T<=t) two-tail	0.001015	

In (38), the absolute value of t Stat (about 3.8) is larger than t Critical two tail (about 2.1). Therefore, (38) shows that there is a statistically significant difference between those who judge Q29 totally ungrammatical and those who judge Q30 totally ungrammatical.

4. Results

The results of the analysis are summarized below. First, as for the data marked 3, there was a statistically significant difference between those who judged Example X perfectly grammatical and those who judged Example Y that constitutes a minimal pair with Example X perfectly grammatical, except the bottom line data. Under the guideline for the grammaticality of the examples under examination, where Example X is considered to be "not grammatical," if there is a statistically significant difference between those who judge Example X perfectly grammatical/totally ungrammatical and those who judge Example Y that constitutes a minimal pair with Example X perfectly grammatical/totally ungrammatical, and less than 50% of the entire group of informants judge Example X perfectly grammatical, all the examples with a Genitive argument were considered "not grammatical," except the bottom line data, Q14, and Q18. The latter two are reproduced below.

Q14. Ichiroo-no, yakyuu -ga sukina wake.
-GEN baseball-NOM like reason

'the reason why Ichiro likes baseball.'

Q18. Ichiroo-no, yakyuu -no sukina wake.
-GEN baseball-GEN like reason

'the reason why Ichiro likes baseball.'

We will consider why this is so in the next section.

Second, as for the data marked 1, there was a statistically significant difference between those who judged Example X totally ungrammatical and those who judged Example Y that constitutes a minimal pair with Example X totally ungrammatical, except the bottom line data and the three minimal pairs reproduced below.

Q11. Shinjoo-ga, eego -ga wakaru wake.
-NOM English-NOM understand reason

'the reason why Shinjo understands English.'

Q12. Shinjoo-no, eego -no wakaru wake.
-GEN English-GEN understand reason

'the reason why Shinjo understands English.'

Q13. Ichiroo-ga, yakyuu - ga sukina wake.
-NOM baseball-NOM like reason

'the reason why Ichiro likes baseball.'

Q14. Ichiroo-no, yakyuu -ga sukina wake.
-GEN baseball -NOM like reason

'the reason why Ichiro likes baseball.'

Q21. Ichiroo yori, Shinjoo-ga, eego -ga wakaru wake.
than -NOM English-NOM understand reason

'the reason why Shinjo understands English more than Ichiro.'

Q22. Ichiroo yori, Shinjoo-ga, eego -no wakaru wake.
than -NOM English-GEN understand reason

'the reason why Shinjo understands English more than Ichiro.'

Given the guideline for the grammaticality of the examples under examination, all the examples with a Genitive argument were considered "not grammatical," except the bottom line data, Q12, Q14, and Q22.

Therefore, among the examples with a Genitive argument, Q12, Q14, Q18, and Q22, along with the bottom line data, were not considered "not grammatical." We will consider what these facts suggest in the next section.

5. Discussion

The most striking finding in this study is the fact that with the exception of Q12, Q14, and Q18, a Genitive argument cannot appear in multiple Nominative constructions shown in (8b).

(8) a. [[NP predicate] N]
b. [[NP1 NP2 stative predicate] N]
c. [[adverb NP1 NP2 stative predicate] N]

Furthermore, occurrence of a Genitive argument is totally prohibited in (8c), where an adverb is placed in the sentence-initial position, with the exception of Q22. If a Genitive argument were licensed in situ by a nominal head in terms of Agree (Chomsky (2000)), it would be able to freely appear in (8c). The fact that this is not the case suggests that a Genitive argument cannot be licensed in situ within the sentential modifier.

Alternatively, one could argue that a Genitive argument in (8a-c) may move to the SPEC of D, which takes the NP. However, as Ochi (2001) argues, a relative clause is an adjunct, and movement of the Genitive argument into DP SPEC in overt syntax would lead to a violation of the Condition on Extraction Domain (CED) proposed by Huang (1982). Note that the hypothesis that a Genitive argument may move into DP SPEC (or the Genitive Case feature may move to D) in covert syntax (Miyagawa (1993)) would lead to overgeneration, under the assumption that a relative clause is transparent for covert movement (Huang (1982)).

Furthermore, in the structure in (8b), when the Genitive argument is not placed in the sentence-initial position, the example is considered to be "not grammatical." Compare Q14 and Q18 on one hand, and Q16 on the other.

Q14. Ichiroo-no, yakyuu -ga sukina wake.
-GEN baseball-NOM like reason

'the reason why Ichiro likes baseball.'

Q18. Ichiroo-no, yakyuu -no sukina wake.
-GEN baseball-GEN like reason

'the reason why Ichiro likes baseball.'

Q16. Ichiroo-ga, yakyuu -no sukina wake.
-NOM baseball-GEN like reason

'the reason why Ichiro likes baseball.'

We saw that while 73% of the informants judged Q14 perfectly grammatical, and 55% of the informants judged Q18 perfectly grammatical, only 32% of the same informants judged Q16 perfectly grammatical.

Based on the above arguments, we suggest that a Genitive argument, if the sentence with it is grammatical, is base-generated in DP SPEC, functioning as a modifier of the noun, rather than as a subject of the sentential modifier, and there is a (covert) pronoun that refers to it in the prenominal sentential modifier, as shown in (39).

(39) [DP NP-GEN$_i$ [[...pro$_i$...] N] D]

The claim that NP-GEN functions as a modifier of the noun is supported by the fact that Q14, for instance, and (40) can have the same interpretation.

Q14. Ichiroo-no, yakyuu -ga sukina wake.
-GEN baseball -NOM like reason

'the reason why Ichiro likes baseball.'

(40) Ichiroo$_i$-nitsuite-no, yatsu$_i$-ga /pro$_i$ yakyuu -ga sukina wake.
-about -GEN he -NOM baseball -NOM like reason

'the reason, about Ichiro, why he likes baseball.'

In (40), the [NP-about-GEN] is in DP SPEC, and functions as a modifier of the noun. Given the fact that Q14 and (40) can have the same interpretation, it is plausible to hypothesize that in Q14, NP-GEN is in DP SPEC, functioning as a modifier of the noun.

The base-generation hypothesis, which was originally due to Bedell (1972), accounts for the fact that most of the examples containing the multiple Nominative construction are considered to be "not grammatical." This is because the Genitive argument is within the sentential modifier in the computation by the subjects, and thus, it is not licensed by D.

The base-generation hypothesis also accounts for the other fact that Q12, Q14, and Q18 are not considered to be "not grammatical." In Q12 and Q14, the Genitive argument is placed in the sentence-initial position, and in Q18, one Genitive argument, which is directly followed by another Genitive argument, is placed in the sentence-initial position. Therefore, it is possible for the Genitive argument(s) to be base-generated in DP SPEC in the computation by the subjects, which explains why Q12, Q14, and Q18 are not considered to be "not grammatical."

Finally, let us comment on Q22. The base-generation hypothesis would predict that Q22 is ungrammatical, because the Genitive argument, which is not placed in the sentence-initial position, cannot be base-generated at DP SPEC. However, there was not a statistically significant difference between those who judged Q21 totally ungrammatical and those who judged Q22 totally ungrammatical. With our present understanding, we cannot account for this fact. However, we know that there was a statistically significant difference between those who judged Q21 perfectly grammatical (82%) and those who judged Q22 perfectly grammatical (36%). In order to fully understand why there was not a statistically significant difference between those who judged Q21 totally ungrammatical and those who judged Q22 totally ungrammatical, it is necessary to collect more data. We will leave this for future research.

6. Conclusion

In this study, we found that there was no statistically significant difference in grammaticality judgments between (41a) and (41b), but there was between (42) and each of (43a-c), and between (44) and each of (45a-c).

(41) a. [NP-NOM predicate] N
b. [NP-GEN predicate] N

(42) [NP-NOM NP-NOM stative predicate] N

(43) a. [NP-GEN NP-NOM stative predicate] N
b. [NP-NOM NP-GEN stative predicate] N
c. [NP-GEN NP-GEN stative predicate] N

(44) [adverb NP-NOM NP-NOM stative predicate] N

(45) a. [adverb NP-GEN NP-NOM stative predicate] N
b. [adverb NP-NOM NP-GEN stative predicate] N
c. [adverb NP-GEN NP-GEN stative predicate] N

We argued that these findings suggest that the Nominative/Genitive alternation in multiple Nominative constructions is only an illusion, and the NP marked with Genitive Case is licensed, when it is base-generated in DP SPEC.

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