Ongoing Change of Nominative/Genitive Alternation in Japanese

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Abstract

Using a quantitative perspective, this article examines an ongoing change in Japanese called Nominative/Genitive alternation. Based on a corpus analysis, Nambu (2007) claims that the variation is experiencing a change in progress, but the results from another corpus provide counter-evidence (Nambu, to appear). This article discusses whether or not NGA is experiencing ongoing change based on the data from two spontaneous speech corpora, while also addressing the issues of motive and directionality of the change. I conducted a logistic regression analysis that takes into consideration the effects of gender and inter-speaker variation, in addition to other factors in the previous analyses. The results suggest that there exists an ongoing change heading towards loss of the variation, tracing the Korean alternation whose change has already completed. Moreover, the observed change is compatible with the historical path of the distributions of the variants, representing that the change is towards their complementary distribution.

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To elucidate the dynamic mechanism of language change, much research has been conducted on language variation (Chambers, 2002). During the process of analyzing language change, several issues have been raised in previous studies, such as actuation problem (Labov, 2010; Weinreich, Labov & Herzog, 1968) and directionality of change (e.g., Givón, 1979). Using a quantitative perspective, this article examines an ongoing change within a syntactic variation called Nominative/Genitive Alternation (henceforth, NGA) in Japanese, which is known as Ga/No Conversion (Harada, 1971). This article discusses whether or not NGA is experiencing ongoing change based on the data from two spontaneous speech corpora, while also addressing the issues of motive and directionality of the change. Further, the effects of gender and inter-speaker variation are investigated in addition to other factors that have been previously examined, in order to discern whether or not NGA is a case of language change. Based on the findings of this study, I conclude that there exists a change that is slowly heading toward loss of the variation, as in the case of Korean that used to allow the alternation but not anymore after the completion of the change (e.g., Sohn, 2004).

NGA represents a case alternation between the nominative case marker ga and the

genitive no in certain embedded clauses such as adnominal clauses (1); and it cannot occur in main clauses (2).[1]

(1) [kinoo Ken-**ga/no** yonda] hon
yesterday Ken-Nom/Gen read book
'the book that Ken read yesterday'

(2) Ken-**ga**/*__no__ hon-o yonda.
Ken-Nom/Gen book-Acc read
'Ken read the book.'

Based on his grammaticality judgment test, Harada (1971) claims that there is an ongoing change, whereby the speakers of Tokyo Japanese increasingly prefer the nominative ga to the genitive no in relevant environments. To test this language change hypothesis, Nambu (2007), Nambu and Matsuda (2007), and Nambu (to appear a) conducted a real time investigation of the phenomenon using two corpora: 'the Minutes of the Japanese Diet' (hereafter MJD) (c.f., Matsuda, 2004, 2008) and 'the Corpus of Spontaneous Japanese' (CSJ) (c.f., Maekawa, 2003). However, their findings are inconclusive. Nambu (to appear a) found that there is a discrepancy between the results from the MJD and CSJ data with respect to ongoing change. In Nambu's (to appear a) analysis, the CSJ data do not show any change in NGA, in contrast to the MJD data, which show a change in progress.

I would like to reinvestigate the data from the two corpora through a logistic regression analysis including two language external factors, gender and inter-speaker variation, to examine whether there actually exists a change in progress in NGA. Nambu (to appear a) observed a stylistic effect on NGA, comparing the two corpora and also between different speech styles within the CSJ corpus. The results suggest that a degree of formality affects NGA. However, Nambu (to appear a) did not address possible gender effects. The analysis of the variation should include gender effects, since females prefer to use formal expressions more than males in Japanese (c.f., Ide, 1999). In addition, following Johnson (2008), this study investigates an effect of inter-speaker variation, adopting a mixed-effect regression analysis. As in Johnson's (2008) reanalysis of some previous studies about language variation, such as a study of loanword stress shift in Hønefoss Norwegian by Hilton (2007), some factors that showed statistically significant effects in a regression model could be irrelevant to the variation in question as demonstrated by including inter-speaker variation in the model. Thus, it is worth reinvestigating the data with a regression model including inter-speaker variation to reconsider an ongoing change. In the analysis, I also included factors that have been argued in previous studies to avoid their unwanted effects.

This article is organized as follows. First, I begin by introducing syntactic aspects of NGA from a perspective of envelope of variation. Second, I explain the data set. Third, the observation of uses of the variants over the years is presented. Fourth, factors included in a logistic regression analysis are briefly explained and the results of the analysis are provided. Finally, giving plausible scenarios and conducting an additional regression analysis, I reconsider the question of a change in progress and address the issues of motive and directionality of the change.

Envelope of Variation

The environments where the variation is possible are delineated to obtain the data in this study, and the use of the nominative ga and the genitive no as NGA in the corpora were counted when they appear in the relevant environments. Syntactic aspects of NGA have been examined in almost every grammatical paradigm proposed to date (Harada, 1971; Hiraiwa, 2005; Inoue, 1976; Kikuta, 2002; Maki & Uchibori, 2008; Miyagawa, to appear; Shibatani, 1975; Ura, 1993; Watanabe, 1996). As is well established, not every embedded clause allows the genitive no as NGA, and therefore, the issue at stake in the literature is to identify conditions where the variation can appear (i.e., where the genitive no is acceptable). Previous studies take adnominal clauses as the canonical environments, as shown below.

(3) Ken-wa [kinoo musuko-**ga/no** yonda] hon-o katazuketa.
Ken-Top yesterday son-Nom/Gen read book-Acc cleaned.up
'Ken cleaned up the books which his son read yesterday.'

The genitive no as NGA does not have a possessive interpretation but functions as a subject marker, which is the same as the nominative ga, although the surface structure is similar to the possessive marker no (i.e., the genitive no as NGA prefers nominal environments such as adnominal clauses). Recent studies argue that NGA might appear in subordinate clauses other than adnominal clauses (Hiraiwa, 2005; Miyagawa, to appear; Yoshimura & Nishina, 2008). Therefore, in addition to adnominal clauses, the data I used includes other environments that have been raised in the literature. One environment is subordinate clauses headed by made 'until' and yori 'than' (Hiraiwa, 2005; Kikuta, 2002; Watanabe, 1996). Another environment is apposition clauses headed by to-yuu or to-no (Inoue, 1976; Ura, 1993). The examples are as follows, showing uses of the nominative ga for variation.

(4) Made or yori subordinate clauses
a. [Basu-ga kuru] **made** suwatte iyooka.
bus-Nom come until sit be
'Let's sit until the bus comes.'
b. [Kyaku-ga kuru] **yori** hayaku nimotsu-ga tsuita.
customers-Nom come than early luggage-Nom arrived
'The luggage arrived before the customer came.'

(Kikuta, 2002)

(5) To-yuu/to-no apposition clauses
[karera-ga buzi-datta] **to-yuu/to-no** sirase
they-Nom safe-were COMP news
'the news that they were safe'

(Inoue, 1976)

There are two phenomena that I do not treat as examples of NGA, even though we can observe the alternation between the nominative ga and the genitive no. One phenomenon is a multiple nominative construction as in (6) (e.g., Kuno, 1973; Tateishi, 1994).

(6) Taro-**ga/no** inu-ga ookii.
Taro-Nom/Gen dog-Nom big
'Taro's dog is big.'

It differs from NGA in that the genitive no can function as a possessive marker in that construction. In addition to this observation, Tateishi (1994) provides a syntactic analysis that is quite different from the one for NGA (e.g, Hiraiwa, 2005; Miyagawa, to appear). Given the above differences between this phenomenon and NGA, I excluded multiple nominative constructions from the data in this study.

Another environment where ga and no can alter is shown below (e.g., Hasegawa, 1991; Iida, 1987; Kageyama, 1993).

(7) Taro-**ga/no** siken-tyuu-ni, jiko-ga okotta.
Taro-Nom/Gen exam-during-to accident-Nom happened
'During Taro's exam, the accident happened.'

The previous analyses account for this phenomenon, assuming that siken 'exam' in (7) is some kind of predicate and takes the subject Taro as its argument. I do not count this alternation in NGA, since there is no overt tense in the construction, in contrast to NGA.

Corpus

This article uses the data extracted from the MJD and CSJ corpora. The MJD corpus store records of Diet (Congress) members' speeches from every meeting in the Diet that are close to verbatim, and the data are publically available (http://kokkai.ndl.go.jp/) (c.f., Matsuda, 2004, 2008). The most prominent feature of the MJD is that the corpus contains speech data spanning almost 60 years starting from 1947 (with respect to speakers' birth year, over 100 years), and as such it provides with an ideal dataset to investigate the variation that might be experiencing ongoing change. The CSJ contains 661 hours of spontaneous speech collected from 1999 to 2003, which corresponds to approximately 7 million words (c.f., Maekawa, 2003). The CSJ has information of speakers' birth years and their hometowns as the MJD does, but the birth years in the CSJ are given in 5-year intervals. The CSJ has a variety of speech styles, consisting of spontaneous monologues (95% of the corpus) and dialogues and readings (5%). The speech of spontaneous monologues consists of academic presentation speech, simulated public speaking, and other speech. The variety of speech styles is useful for investigating a stylistic effect on NGA.

Data

The variants ga and no of NGA were extracted from speech by all Diet members in the MJD corpus, who are native speakers of Tokyo Japanese. I restricted the data only by Tokyo Japanese speakers in order to investigate Harada's (1971) language change hypothesis that focuses on Tokyo Japanese. There are 180 speakers of Tokyo Japanese in the MJD corpus (c.f., Nambu, 2007), and I sampled one speaker from each birth year to create a dataset with chronologically equal proportions. This yields 76 speakers whose birth years range over almost 100 years (1876 to 1970). Unfortunately, only one female was included in the data, and thus, an analysis of gender is not available for the MJD data. The data in the corpus were downloaded from the website as text files. For each speaker, I took 100 tokens of the variable. For the CSJ data, the uses of ga and no were extracted from speech by all native speakers of Tokyo Japanese in the corpus (80 speakers, 36 females, 44 males), obtaining all tokens of the variants available from the speakers.[2] Due to the small size of the raw speech data in dialogues and readings in the CSJ corpus, only the dominant variant (i.e., the nominative ga) appeared in most of the speeches; therefore, I did not include them into my data. Thus, the CSJ data contain only the data from spontaneous monologues. For both of the MJD and CSJ datasets, I manually searched and extracted the variants in the speech data. The distributions of ga and no in each corpus are given in Table 1.

Table1: Distributions of ga and no in the two corpora

	MJD	CSJ
ga	77.5% (6,662/7,600)	91.8% (4,540/4,945)
no	12.5% (938/7,600)	8.2% (405/4,945)

Ongoing Change

To determine whether there exists a change in progress, Figure 1 from the MJD data and Figure 2 from the CSJ data demonstrate a transition of the use of the genitive case marker no through frequencies of the variants in speech over time. Figure 1 presents the rate of no from 1870 to 1970 with respect to speakers' birth years. In Figure 1, each point represents each speaker, which contains 100 tokens of the variants. The gradual decline of the overall trend is fairly clear, with speakers gradually switching from no to ga. The logistic regression line ($Y=1/(1+e(-(29.239-0.0162X)))$, pseudo $R^2=0.4876$) given in Figure 1 supports this impression statistically, and thus, Figure 1 provides evidence that Harada's (1971) language change hypothesis was correct. Figure 2 from the CSJ data, on the other hand, does not display ongoing change. It does not show a decrease of the genitive use but show more consistent use over time. Although this speculation of the discrepancy between the two datasets is based on an impression at this point, we can take into consideration the following three points as possible causes of the discrepancy; first, as I explained earlier, the MJD data cover a wider range of time period than the CSJ data. If we take a closer look at the region from 1925-1970 in Figure 1, which roughly corresponds to the range of the CSJ data in Figure 2, the dots in the region in Figure 1 are more aggregated in the lower area than the ones before the period. In addition, I provide Figure 3 to show the impression in the region independently, which is extracted from the MJD data from 1920-1970. The decline of the use of the genitive no in Figure 3 is not

sharp as much as the one in Figure 1. Thus, the different time ranges covered by the two datasets might explain the different results. I will pursue this point later in this paper. Second, it is difficult to compare the results from the two datasets through the scatter plots, because the speakers' birth years in the CSJ are given in 5-year intervals. Third, the raw frequencies for the dots in Figure 2 are not uniform, in contrast to the ones in Figure 1. The rates of the genitive use are generated from unequal frequencies of the variable (see footnote 2), and thus, Figure 2 might not carry sufficient information to discuss an ongoing change. Therefore, I adopted a logistic regression analysis to consider the transition of the use of the variants through speakers' birth years that is not biased by the different frequencies of the variants in the two datasets. In addition, the logistic regression analysis can exclude effects of other language internal/external factors on the use of the variants; and thus, it allows us to examine the transition more precisely.

Figure 1: Scatter plot of the rate of no in the MJD corpus

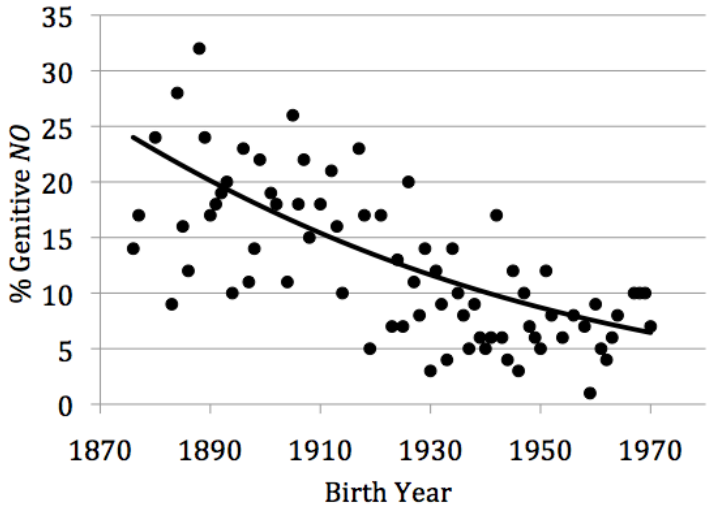


Figure 2: Scatter plot of the rate of no in the CSJ corpus

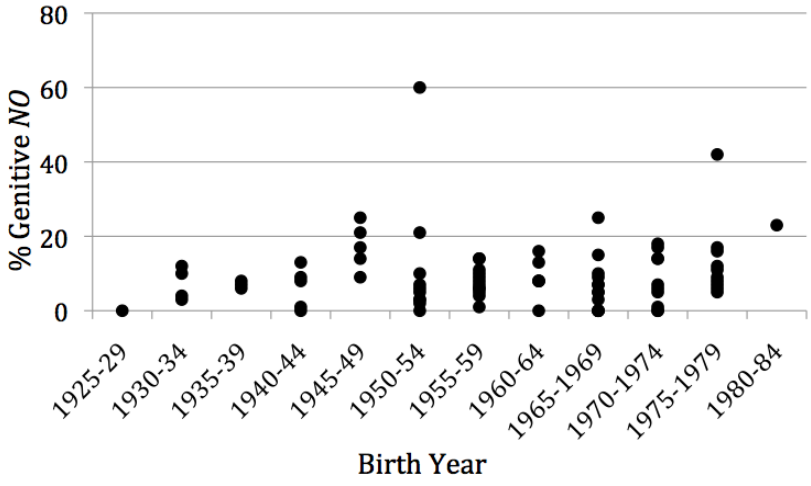
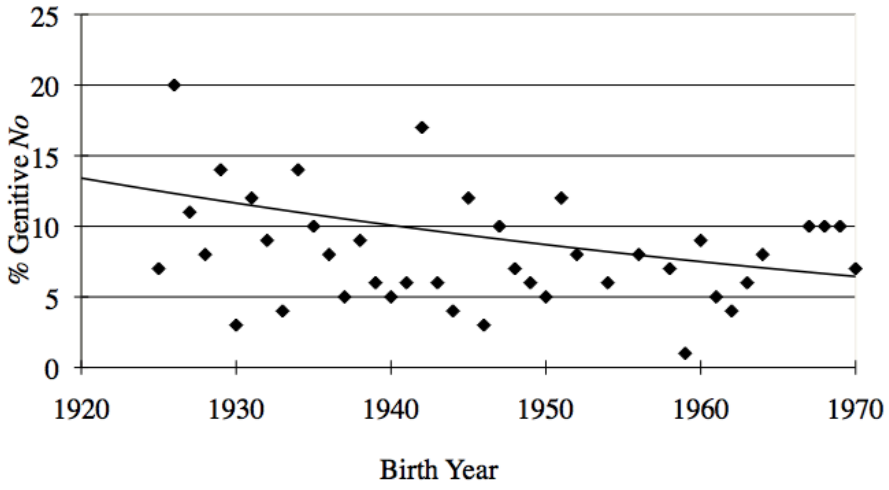


Figure 3: Scatter plot of the rate of no in the MJD data in the range 1920-1970



Logistic Regression Analysis

I adopted a logistic regression analysis in order to further explore whether or not there is an ongoing change, taking into account the different distributions of the datasets from the two corpora while also excluding plausible effects of other language external/internal factors. In addition, I conducted a mixed-effect analysis including individual speaker as a random factor in Rbrul (Johnson, 2008) to examine whether or not individual speaker affects the regression model of the variation. Before conducting a logistic regression analysis, I excluded knockout factors from the analysis, which is an independent variable that contains a value yielding only one fixed value for the dependent variable (c.f., Paolillo, 2002). In the case of NGA, transitivity restriction falls into this category. Transitivity restriction states that if a direct object exists as an argument of the predicate in the embedded clause, irrelevant to the word order, the genitive no as a subject marker cannot appear in the same embedded clause as follows (Watanabe, 1996).

(8) a. [Ken-**ga**/*__no__ hon-o katta] mise
Ken-Nom/Gen book-Acc bought store
'the store where Ken bought a book'
b. [hon-o Ken-**ga**/*__no__ katta] mise
book-Acc Ken-Nom/Gen bought store
'the store where Ken bought a book'

As this restriction predicts, the data in this article do not show any use of the genitive no as NGA with a direct object in the same embedded clause. Therefore, I excluded this environment from the data for the logistic regression analysis. Also, to-no, made, and yori clauses were not included as independent variables for the analysis, since their frequencies are very low (the total token from both of the corpora; to-no=8 made=33, yori=6). Another example of the knockout factors is "no precedence environment", which I will explain in the next section, in the CSJ data; there is only the use of ga in the environment. After excluding the tokens related to knockout factors, the total token in the MJD data is 6,293 (ga=5,357, no=936) and 2,964 (ga=2,559, no=405) in the CSJ data.[3] In

the following section, I will briefly introduce factors that are included in the analysis. Other than gender and the individual speaker, the factors are the same as those adopted in Nambu (2007, to appear a). Table 2 is a summary of the independent variables and their values for the analysis. As is shown in the next section, since the factors "subject NP type" and "no precedence environment" are about a subject NP with ga/no, I combined them into one factor "Suject NP type & no precedence environment".[4] The combined factor is only for the MJD data, since "no precedence environment" is a knockout factor in the CSJ data, and therefore, the CSJ data have a single factor "subject NP type".

Table 2: Independent Variables in the Logistic Regression Analysis

Independent Variables	Categories/values
Individual speaker (as a random effecdt)	76 speakers in the MJD, 80 speakers in the CSJ
Birth Year	numerical (5-year intervals)
Style	main session, committee session for the MJD data SPS, APS, OS for the CSJ data
Gender (only for the CSJ data)	male, female
Adjacency	adjacent, non-adjacent
Stativity (realized as predicate type)	adjective, nominal adjective, verb, existential verb, copula
Subject NP Type	lexical nouns, pronouns, clauses
To-yuu apposition clause	with/without to-yuu
Nominal Head	koto, no, wake, mono, tokoro, yoo, others
No Precedence Environment (only for the MJD data)	NP ending with/without no

Language External/Internal Factors

Birth Year

Birth year is used as a time scale. Including it as an independent variable, a logistic regression analysis computes its effect so that we can confirm the existence of the change in NGA. I converted the speakers' birth years in the MJD data into numerical values in 5-year intervals to make the data comparable with the CSJ's 5-year intervals.

Speech Style

Although he does not specify the detail of the effect, Nakagawa (1987) states that there is a style difference between ga and no, and it is intuitively assumed that the written form and formal speech promote the use of no rather than ga. Using the CSJ corpus, Nambu (to

appear a) found that the stylistic difference affects NGA. The categories of speech style in the CSJ are divided into simulated public speaking (SPS), academic presentation speech (APS), and other speech (OS). Nambu (to appear a) concludes that the more formal speech style induces a higher frequency of the genitive no, as previously predicted. As for the MJD data, I included the type of session (i.e., main/committee session) to investigate the effect of style, because the main session might be more formal than the committee session.

No Precedence Environment

"No precedence environment" refers to an instance when ga/no follows an NP that has no at the end of the word, as shown in (9). If the NP is marked by the genitive no, the sound concatenation becomes no-no. It can be expected that the sequence of identical sounds no-no would be avoided in speech if there were an alternative form. Nambu (2007, to appear a) found that when the NP ends with no, the nominative ga is likely to appear.

(9) ookii **mono**-ga/no aru mise
big thing-Nom/Gen exist shop
'the shop that has big things'

Apposition Clauses

As discussed earlier in this paper, there has been an argument whether or not NGA occurs in to-yuu and to-no clauses. The results in Nambu (2007, to appear a) show that the genitive no rarely appears in to-yuu and to-no apposition clauses as predicted by the syntactic analysis (Hiraiwa, 2005; Miyagawa, to appear); the use of the genitive no is obstructed when there is an overt C head such as to-yuu and to-no.

Nominal Head

The nominal head of the embedded clauses where NGA occurs can be categorized as either a formal noun, such as 'koto' (10), or other nouns (11).

(10) [Taro-ga kita] koto
Taro-Nom came thing
'the thing that Taro came'

(11) [Taro-ga kaita] hon
Taro-Nom wrote book
'the book that Taro wrote'

Masuoka and Takubo (1992) state that formal nouns are derived by bleaching their original meanings as content words, and they function as grammatical placeholder such as nominalizers or complementizers. If a formal noun is a complementizer as a syntactic property rather than a nominal head, the expected result is that the use of the genitive no with formal nouns is lower than that with other nouns. This is because the nominal property of clausal heads is crucial for NGA (Miyagawa, to appear; Yoshimura & Nishina, 2008). The nouns koto, no, tokoro, yoo, and wake are examples of formal nouns for the regression analysis, following Nambu (2007, to appear a), which found that the

type of nominal heads have a statistically significant effect on NGA.

Subject NP type

The variable accusative case markers (o/zero) in Tokyo Japanese are partially determined by the object NP type (Matsuda, 1995). Because both this phenomenon and NGA are variations of case markers, it can be inferred that NGA would also have preference for the NP type. Nambu (to appear b) found that the NP type affects NGA, which suggests that there is a relationship between NGA and information status of the subject NP. Nambu (to appear b) shows that in both the MJD and CSJ data, the frequency of the genitive no is from highest to lowest as pronouns > lexical words > nominal clauses > wh-phrases. The results indicate that when the NP is informationally non-given (e.g., Lambrecht, 1994), it tends to take the nominative ga.

Stativity of Predicate

Nambu (2007, to appear a) analyzed the effect of stativity with respect to predicate type, dividing predicates into adjective, nominal adjective, existential verb, verb, and copula. Nambu (2007, to appear a) found an effect of stativity; the frequency of no is adjective > existential verb > nominal adjective > verb (from highest to lowest). This shows that the more stative the predicate, the higher the use of the genitive no. The preference of stative environments by the genitive no is compatible with preference of use of no in nominal environments such as adnominal clauses, in contrast to verbal/clausal environments.

Adjacency

Harada (1971) states that the existence of intervening elements between the subject NP and its predicate obstructs the use of the genitive no. The examples of adjacent and non-adjacent cases are given in (12).

(12) a. Adjacent environment
[watasi-**ga**/**no** itta] koto
I-Nom/Gen said thing
'the thing that I said'
b. Non-adjacent environment
[watasi-**ga**/**no** sonotoki itta] koto
I-Nom/Gen then said thing
'the thing that I said at that time'

Nambu's (2007, to appear a) analyses show that the genitive no is less likely to appear when there is an intervening element. In addition, both the MJD and CSJ data do not contain any use of the genitive no with more than one intervening elements.

The preference of adjacent environments by the genitive no is a complicated aspect of NGA. A linear distance has nothing to do with assigning Case in syntax, which is contrary to a structural distance, such as a strict adjacency condition for verb and object in English (e.g., 'John studied English hard' vs. '*John studied hard English'). In addition, in contrast to the English relative clause dependency issue (i.e., a dependency between a filler/antecedent and a gap) (c.f., Guy & Bayley, 1995; Hawkins, 2003), the genitive no does not have such a dependency with respect to processing. Although

several factors have been proposed as the cause of adjacency effect in syntax and processing (e.g., Miyagawa, to appear; Shibatani, 1975), further work is needed to untangle factors of the adjacency effect.

Gender
As mentioned earlier in this paper, females tend to use formal variants more often than males in Japanese (Ide, 1999). Based on Nambu's (to appear a) data that show more frequent use of the genitive no in formal speech, we predict that females use the genitive no more often than males. Note that we can investigate the effect of gender only with the CSJ data, since the MJD data contain only one female.

Individual Speaker
I included individual speaker as a random factor in the analysis, following Johnson (2008), since there is a concern that inter-speaker variation might affect the use of the variants and obscure the genuine effects of other factors.

Results

(13) and (14) show the results of the logistic regression analysis using Rbrul with the MJD and CSJ data. The models include factors that have a statistically significant effect on NGA (see the Appendix for the weight and other information of each factor).

(13) Rbrul's best step-up/down model with the MJD data
nominal head (4.35e-170) + to-yuu (1.93e-81) + adjacency (9.89e-71) + stativity (6.69e-31) + birth year (6.32e-28) + subject NP type_no precedence (1.09e-14)

(14) Rbrul's best step-up/down model with the CSJ data
nominal head (4.6e-76) + adjacency (2.38e-42) + to-yuu (5.36e-31) + stativity (1.52e-24) + subject NP type (1.1e-10) + gender (9.35e-05) + style (0.00322)

The factor gender was investigated with the CSJ data, and (14) shows that the effect of gender is statistically significant (the weight of the gender effect, male: 0.425, female: 0.575, see the Appendix). As shown in (13) for the MJD data, the factor birth year was included in the model, which indicates that NGA is experiencing an ongoing change. As provided in the Appendix, the Rbrul results give log odds to represent the effect of birth year, which is -0.085 (the genitive no is an application value for the response) when birth year increases 5 years. This finding is interpreted as a decrease in the use of the genitive no over time. On the other hand, the formula in (14) for the CSJ data does not contain birth year as a statistically significant factor. Note that the factor birth year was not included in the model for the CSJ data even when I excluded the factor gender and style from the beginning in order to compare with the MJD data analysis. (15) and (16) are the results of the mixed-effect regression analysis which includes individual speaker as a random factor.

(15) Rbrul's best step-up/down model that includes individual speaker as random factor

with the MJD data
individual speaker (random) + nominal head (1.17e-174) + adjacency (2.45e-78) + to-yuu (1.4e-73) + stativity (9.57e-30) + subject NP type_no precedence (1.6e-16) + birth year (1.88e-09)

(16) Rbrul's best step-up/down model that includes individual speaker as random factor with the CSJ data
individual speaker (random) + nominal head (2.79e-61) + adjacency (4e-32) + to-yuu (1.76e-29) + stativity (1.03e-26) + subject NP type (1.96e-10) + gender (0.00171)

Here again, the results of the analysis with the MJD (15) data shows a change, in contrast to the analysis with the CSJ data (16). I would like to pursue the issue of language change further in depth in the next session.

The model (16) represents that after we include individual speaker as a random factor, style does not show a statistically significant effect, which is different from the model (14). Based on the results, can we conclude that there is no stylistic effect on NGA? One issue that needs to be addressed is the difference in formality between the MJD and the CSJ. There is no doubt that the MJD corpus is more formal than the CSJ, and as Nambu (to appear) observed, the MJD contains more use of the genitive no than the CSJ (MJD=12.3%(938/7,600), CSJ=8.2%(405/4,945)). I would like to attribute the difference between the two corpora to speech style, assuming that NGA is sensitive to speech style. If we take this assumption, the results of the current analysis can be explained as follows. There is in fact a stylistic effect but the speech categories in the CSJ are not clearly differentiated with respect to formality. Also, if the genitive no prefers more formal speech, the effect of gender can be attributed to the stylistic preference of NGA. Nevertheless, further research is needed to scrutinize the effect of style.

In the next section, I would like to shed light on the discrepancy between the two corpora with respect to language change.

Reconsideration of Change

We observed the discrepancy between the MJD and CSJ data with respect to ongoing change. The results of the logistic regression analysis using the CSJ data show that there is no change, contrary to the MJD data that provide evidence of an ongoing change. If we assume that there is no change, the effect of speakers' birth year observed in the MJD should be attributed to something else. Additional data and research is needed to explore other possible factors that I did not include in this analysis and that may have obscured the results between the two corpora.

On the other hand, under the assumption that there exists a change, we can test whether or not the discrepancy is attributed to the different range of speakers' birth years between the MJD and the CSJ data as described earlier in this paper; the range of the birth years in the CSJ is narrower than the one in the MJD (60 years in the CSJ vs. 100 years in the MJD). We can compare the MJD and CSJ data in the period from 1925 to 1970 where both of the corpora overlap. To explore this time span, I conducted a logistic

regression analysis with the MJD data from that period. The results of this analysis that does not include individual speaker as a random factor is given in (17), whereas (18) includes inter-speaker variation.[5]

(17) Rbrul's best step-up/down model with the MJD data in the range 1925-1970
nominal head (2.79e-75) + adjacency (8.67e-26) + stativity (1.6e-18) + subject NP type_no precedence (0.00374)

(18) Rbrul's best step-up/down model that includes individual speaker as a random factor with the MJD data in the range 1925-1970
individual speaker (random) + nominal head (2.13e-75) + adjacency (1.23e-26) + stativity (2.88e-18) + subject NP type_no precedence (0.00304)

The models in (17) and (18) do not contain speakers' birth year as an independent variable that has a statistically significant effect on NGA. Thus, the data in that region in the MJD data do not show a change, which is consistent with the CSJ data. Therefore, the results support our assumption that the discrepancy between the two corpora is attributable to the different range of birth years.

Based on the findings, we can propose plausible scenarios. One could speculate that the ongoing change is too slow to be observed in the short period of time. We need a corpus that contains longitudinal data spanning enough time in order to observe the change as in the MJD corpus. Nevertheless, the change is still heading towards the decrease in the use of the genitive no. This scenario is strongly supported by a cross-linguistic observation. Korean is a language that used to have the nominative/genitive alternation (e.g., Sohn, 2004; Whitman, 2006). As mentioned in Whitman (2006), Middle Korean (9^{th}-17^{th} century) allows the alternation, in contrast to Modern Korean that lost the genitive subject pattern. As an intriguing observation, Whitman (2006) argues that a transitivity restriction appeared in the course of the change in Korean, as the one in Japanese as shown earlier in this paper. Therefore, following Whitman (2006), I claim that the results of the analysis in this paper represents that NGA in Japanese is experiencing an ongoing change towards loss of the genitive no, tracing the change in the Korean alternation.

Another possibility is that the change is nearly finished. Referring to the S-curve model of language change (c.f., Denison, 2003), the logistic regression line in Figure 1 supports the impression that the change is nearly complete. Alternatively, the change is already complete and the variation has become stable during this recent time period. Therefore, NGA in the period covered by the CSJ corpus is already stable. However, we can still find the "actual" use of the genitive no as NGA in our current daily conversation.[6] It seems contradictory to the assumption that the change is (almost) over, even though this observation needs to be supported from substantial data. This implies that the decrease in the use of the genitive no in the relevant environments does not mean its complete disappearance after the change comes to an end. In the case of spoken Montréal French (Sankoff & Vincent, 1980), for instance, the negative morpheme ne seems to be disappearing but the data suggest that it has not vanished completely. Similarly, the change can end without completely ending the use of the genitive no. Therefore, finding the use of the genitive no does not contradict the assumption that the change is already completed.

Directionality and Motive of the Change

The assumption that NGA is experiencing an ongoing change is consistent with the historical development of the particles ga and no. Based on the analyses by Konoshima (1970), Doi (1982), and Matsunaga (1983), Nambu and Matsuda (2007) provide a rough summary of a historical change in the distribution of the particles ga and no which attach to nominals, as shown in Table 3.[7]

Table 3: Historical distribution of ga and no
(a black cell represents non-occurrence of the given form in the environment, and the gray cell represents the ongoing change in NGA)

	Before Kamakura / Muromachi Era (-1192)		Kamakura / Muromachi Era (1192-1573)		Present	
	GA	NO	GA	NO	GA	NO
Between Nominals						
Embedded Clauses						
Main Clauses						

In Table 3, ga and no in the environment "between nominals" do not function as a subject marker but connect two nominals. The other environments show the use of ga and no as a subject marker. The environment "embedded clauses" in Table 3 is where NGA occurs. In the course of a transition of the periods, the particles ga and no have been heading to a divorce of their distributions. As displayed as the gray cell in Table 3, the current stage shows decreasing use of the genitive no in embedded clauses, and a completion of this change will make the distribution of the two particles complementary (Nambu & Matsuda, 2007). Considering their linguistic functions in terms of economy (Haiman, 1983), it is reasonable to attribute a motive of the change in ga and no to a division of labor. In addition, two plausible motives of the change can be assumed for NGA. First, as pointed out in Kinsui (1984), there was a difference between ga and no in honorific usage; no is more honorific than ga. However, the difference disappeared in Modern Tokyo Japanese, and the disappearance of this honorific distinction brought about a more overlap of ga and no as NGA. I assume that this unification provided an impetus for the change in NGA or at least increased the speed of the change. Second, from a perspective of a diachronic syntax, Whitman (2006) argues that the genitive subjects originate in clauses headed by a C with an interpretable [N] feature, and that [N] CP used to be morphologically realized by having predicates with rentaikei 'adnominal' endings. However, the adnominal form merged with the conclusive verbal endings between the 13th and 16th century. This morphological merger caused the loss of the cue

for [N] CP, which ends up the loss of the feature [N] in C. The merger is also related to the emergence of ga as a subject marker in main clauses. Although the genitive subjects continue to appear in what used to be [N] CP contexts, the genitive subjects have been disappearing. This suggests that the morphological merger or the change of the status of C can be interpreted as a motive of the change in NGA. Further investigation of the motive for change following this syntactic analysis is necessary with more substantial evidence in future research.

As I mentioned earlier, the completion of change does not imply the complete disappearance of the genitive no as NGA. Notice that we can observe the continued use of the nominative ga in the environment "between nominals" in Modern Japanese. As discussed earlier, there are some uses of ga between nominals, which is an alternate of the genitive no such as multiple nominative construction (4) and the construction with a nominal predicate construction (5). These constructions can be counted as the residue of the usage in the old period. Nonetheless, the change in the distribution of the particles ga and no appears to have moved toward compartmentalization of use.

Conclusions

This article explored an ongoing change of NGA, conducting a logistic regression analysis that takes into consideration the effects of gender and inter-speaker variation, in addition to other factors in the previous studies. We found the effect of gender on NGA, which is attributed to the stylistic effect. As for the issue of ongoing change, I concluded that there exists a change, and that the discrepancy between the MJD and CSJ data was derived by the different range of birth year between the two data. The results of the analysis in this paper suggest that the change is slowly moving towards loss of the genitive no, tracing the Korean alternation whose change has already completed. Moreover, the observed change is compatible with the historical path of the distributions of the two particles ga and no, which represents that the change is towards their complementary distribution.

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[1] Adnominal clause includes both gapped clauses (i.e., relative clauses) and gapless clauses that modify a nominal head. An example of a gapless clause is given below.

(i) [sakana-**ga**/**no** yakeru] nioi
fish-Nom/Gen grill smell
'the smell of grilled fish'

[2] The average token of the speakers in the CSJ data is 102.3, the maximum is 479, the minimum is 19, and its standard deviation is 63.65.

[3] There are other knockout factors or values that were excluded from the data for the logistic regression analysis. From the CSJ data, 'tokoro' and 'wake' as a nominal head, and 'wh-word' as a subject NP type were excluded (see Nambu (2007, to appear a) for the details of the data).

[4] Some of subject NPs such as pronouns do not always end with no, and thus, there is an interaction between the the factor "subject NP type" and "no precedence environment".

[5] The factor to-yuu apposition clause was not included in this analysis, since it was a knockout factor. Also, I excluded 'copula' and 'clause ending with no' since they only appear with ga in this data.

[6] Here the actual use means the use of the genitive no other than the use in frozen expressions such as proverbs.

[7] As Nambu and Matsuda (2007) admitted, there was a migration of the political center from Kyoto to Tokyo (known at the time as Edo), and therefore, it is necessary to consider to what extent the change in this period had an impact to the historical change of NGA and how much is due to the shift or the mixture of dialects.

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Appendix: the results of the logistic regression analyses by Rbrul

1. Factors in the formula (13) the MJD data

$adjacency

factor	logodds	tokens	n/n+g	centered factor weight
adjacent	1.205	4759	0.189	0.769
non-adjacent	-1.205	1534	0.023	0.231

$nominal head

factor	logodds	tokens	n/n+g	centered factor weight
tokoro	1.582	151	0.550	0.83
common noun	0.734	2179	0.256	0.676
mono	0.638	200	0.285	0.654
koto	-0.076	969	0.083	0.481
yoo	-0.117	756	0.167	0.471
no	-2.762	2038	0.016	0.059

$stativity

factor	logodds	tokens	n/n+g	centered factor weight
adjective	1.371	766	0.289	0.798
existential verb	0.482	1071	0.147	0.618

nominal adjective	0.365	135	0.126	0.59
verb	-0.094	4082	0.132	0.476
copula	-2.124	239	0.008	0.107

$subjectNPtype_no precedence

factor	logodds	tokens	n/n+g	centered factor weight
pronoun	1.471	527	0.264	0.813
lexical noun	0.639	4525	0.161	0.655
clause	0.050	959	0.065	0.512
lexical noun ending with no	-0.589	195	0.026	0.357
clause ending with no	-1.572	87	0.011	0.172

$to-yuu apposition clause

factor	logodds	tokens	n/n+g	centered factor weight
non-to-yuu-clause	1.574	5139	0.179	0.828
to-yuu-clause	-1.574	1154	0.012	0.172

$birth year
continuous logodds
+1 -0.086

$misc

deviance	df	intercept	grand mean	Nagelkerke R2
3474.597	17	-3.976	0.149	0.441

2. Factors in the formula (14) the CSJ data

$gender

factor	logodds	tokens	n/n+g	centered factor weight
female	0.301	1634	0.153	0.575
male	-0.301	1330	0.117	0.425

$style

factor	logodds	tokens	n/n+g	centered factor weight
simulated public speaking	0.322	2078	0.154	0.58
academic presentation speech	0.281	642	0.104	0.57
other speech	-0.603	244	0.074	0.354

$adjacency

factor	logodds	tokens	n/n+g	centered factor weight
adjacent	1.876	2299	0.175	0.867
non-adjacent	-1.876	665	0.005	0.133

$to-yuu apposition clause

factor	logodds	tokens	n/n+g	centered factor weight

non-to-yuu-clause	2.414	2408	0.168	0.918
to-yuu-clause	-2.414	556	0.002	0.082

$stativity

factor	logodds	tokens	n/n+g	centered factor weight
adjective	0.651	583	0.257	0.657
existential verb	0.312	256	0.234	0.577
nominal adjective	-0.043	91	0.231	0.489
verb	-0.920	2034	0.086	0.285

$nominal head

factor	logodds	tokens	n/n+g	centered factor weight
common noun	1.461	1393	0.243	0.812
mono	1.047	141	0.199	0.74
koto	0.816	482	0.056	0.693
yoo	-0.282	225	0.040	0.43
no	-3.042	723	0.004	0.046

$subjectNPtype

factor	logodds	tokens	n/n+g	centered factor weight
pronoun	0.852	361	0.172	0.701
lexical noun	0.461	2213	0.151	0.613
clause	-1.313	390	0.023	0.212

$misc

deviance	df	intercept	grand mean	centered input prob	Nagelkerke R2
1500.245	15	-6.823	0.137	0.001	0.46

3. Factors in the formula (15): the MJD data which includes individual speaker as a random factor (the detailed information about the random factor)

$adjacency

factor	logodds	tokens	n/n+g	centered factor weight
adjacent	1.225	4759	0.189	0.773
non-adjacent	-1.225	1534	0.023	0.227

$nominal head

factor	logodds	tokens	n/n+g	centered factor weight
tokoro	1.654	151	0.550	0.839
common noun	0.755	2179	0.256	0.68
mono	0.635	200	0.285	0.654
yoo	-0.109	756	0.167	0.473
koto	-0.124	969	0.083	0.469
no	-2.811	2038	0.016	0.057

$stativity

factor	logodds	tokens	n/n+g	centered factor weight
adjective	1.380	766	0.289	0.799
existential verb	0.489	1071	0.147	0.62
nominal adjective	0.490	120	0.142	0.62
verb	0.097	5002	0.139	0.524
copula	-2.034	227	0.009	0.116

$subjectNPtype_no precedence

factor	logodds	tokens	n/n+g	centered factor weight
pronoun	1.527	527	0.264	0.822
lexical noun	0.626	4525	0.161	0.652
clause	-0.014	959	0.065	0.496
lexical noun ending with no	-0.629	195	0.026	0.348
clause ending with no	-1.510	87	0.011	0.181

$to-yuu apposition clause

factor	logodds	tokens	n/n+g	centered factor weight
non-to-yuu-clause	1.608	5139	0.179	0.833
to-yuu-clause	-1.608	1154	0.012	0.167

$birth year

continuous logodds

+1 -0.087

$misc

deviance	df	intercept	grand mean
3438.054	18	-4.039	0.149

4. Factors in the formula (16) the CSJ data which includes individual speaker as a random factor

$gender

factor	logodds	tokens	n/n+g	centered factor weight
female	0.311	1634	0.153	0.577
male	-0.311	1330	0.117	0.423

$adjacency

factor	logodds	tokens	n/n+g	centered factor weight
adjacent	1.87	2299	0.175	0.866
non-adjacent	-1.87	665	0.005	0.134

$to-yuu apposition clause

factor	logodds	tokens	n/n+g	centered factor weight

non-to-yuu clause	2.43	2408	0.168	0.919
to-yuu clause	-2.43	556	0.002	0.081

$stativity

factor	logodds	tokens	n/n+g	centered factor weight
adjective	0.679	583	0.257	0.664
existential	0.360	256	0.234	0.589
nominal adjective	-0.048	91	0.231	0.488
verb	-0.992	2034	0.086	0.271

$nominal head

factor	logodds	tokens	n/n+g	centered factor weight
common noun	1.532	1393	0.243	0.822
mono	1.052	141	0.199	0.741
koto	0.826	482	0.056	0.696
yoo	-0.299	225	0.040	0.426
no	-3.112	723	0.004	0.043

$subjectNPtype

factor	logodds	tokens	n/n+g	centered factor weight
pronoun	0.889	361	0.172	0.709
lexical noun	0.496	2213	0.151	0.621
clause	-1.385	390	0.023	0.2

$misc

deviance	df	intercept	grand mean centered input prob
1481.567	14	-6.656	0.137	0.001

5. Factors in the formula (17) the MJD data in the range 1925-1970

$adjacency

factor	logodds	tokens	n/n+g	centered factor weight
adjacent	1.207	1888	0.171	0.77
non-adjacent	-1.207	541	0.017	0.23

$nominal head

factor	logodds	tokens	n/n+g	centered factor weight
mono	1.212	94	0.298	0.771
tokoro	1.287	62	0.355	0.784
common noun	1.076	897	0.261	0.746
yoo	-0.136	257	0.109	0.466
koto	-0.536	209	0.057	0.369
no	-2.903	910	0.008	0.052

$stativity

factor	logodds	tokens	n/n+g	centered factor weight
adjective	1.046	254	0.350	0.74
existential verb	0.105	424	0.144	0.526
nominal adjective	-0.445	69	0.087	0.391
verb	-0.705	1682	0.104	0.331

$subjectNPtype_no precedence

factor	logodds	tokens	n/n+g	centered factor weight
pronoun	0.862	195	0.179	0.703
lexical noun	0.272	1827	0.149	0.568
clause	-0.171	315	0.070	0.457
lexical noun ending with no	-0.962	92	0.022	0.276

$misc

deviance	df	intercept	grand mean centered input prob	Nagelkerke R2
1366.103	13	-3.013	0.136	0.047	0.38

6. Factors in the formula (18) the MJD data which includes individual speaker as a random factor in the range 1925-1970

$adjacency

factor	logodds	tokens	n/n+g	centered factor weight
adjacent	1.25	1888	0.171	0.777
non-adjacent	-1.25	541	0.017	0.223

$nominal head

factor	logodds	tokens	n/n+g	centered factor weight
tokoro	1.367	62	0.355	0.797
mono	1.133	94	0.298	0.756
common noun	1.114	897	0.261	0.75
yoo	-0.169	257	0.109	0.458
koto	-0.500	209	0.057	0.377
no	-2.945	910	0.008	0.05

$stativity

factor	logodds	tokens	n/n+g	centered factor weight
adjective	1.048	254	0.350	0.74
existential verb	0.106	424	0.144	0.526
nominal adjective	-0.407	69	0.087	0.4
verb	-0.747	1682	0.104	0.322

$subjectNPtype _no precedence

factor	logodds	tokens	n/n+g	centered factor weight
pronoun	0.884	195	0.179	0.708

lexical noun	0.304	1827	0.149	0.575
clause	-0.210	315	0.070	0.448
lexical noun ending with no	-0.978	92	0.022	0.273

$misc

deviance	df	intercept	grand mean centered input prob
1353.052	14	-3.115	0.136	0.042