ChatGPT's Current Capacity for Judgment of Japanese Grammar
- Focusing Around *Wa*, *Ga* and Subordinate Phrase -

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Abstract

The purpose of this research note is to observe ChatGPT's current capacity for judgement of Japanese grammar viewed in a sentence structural perspective focusing around the most intractable particles *wa* and *ga*. Other than *wa* and *ga*, whether or not the structure of subordinate phrases that has a profound effect on determining whether the element contained in the phrase can be used or not is properly applied is examined. As the result of this inspection, it has turned out that ChatGPT is unable to stably give an accurate response, for which a detailed grammatical operation is demanded, to an abstruse grammatical question at the current moment.

Keywords: ChatGPT, Japanese grammar, *wa*, *ga*, subordinate phrase

要旨

本研究ノートでは，日本語文において，特にA類とB類の従属句の構造がその句内での使用に制限をかける成分，特に「は」と「が」及び「だろう」を取り上げ，それらによって表した非文法的な複文の文法性をChatGPTがどのように判定するかを，質問に答えさせるという方法で観察した。文法のもっとも難解な側面と予想される表現に係る文法判断をみることによって，ChatGPTの作成する複文の特徴を探るきっかけとし，今後の複文作成能力の進展における判断基準になればと考える。検査の結果，ChatGPTの複文の文法性の判定能力には明らかな誤謬が見られ，従って，そうした文法の側面に係る複文を使った文の構築にはなお課題が残ることと，現状では作成する文構造の水準にはなお一定の限界があることを示した。

1 Introduction

This report claims that ChatGPT 4, which is currently the top version of the app and hereafter is to be succinctly described as ChatGPT, is unable to make an accurate judgment particularly about the use of *wa*, *ga* and *darō* in three types of Japanese subordinate phrases; A-type, B-type and C-type. However, the current capacity for judgment of Japanese grammar pointed out in this report was measured between October and November 2023.

ChatGPT certainly seems to write Japanese sentences well properly performing in response to the request to create them including abundant information. However, the author feels those sentences, of which the structure may be fit for common use, are rather too simple or poor from a syntactic point of view to read much without growing bored with its droning flat style of writing. This is why the author decided to investigate how ChatGPT comes through with answers to abstruse Japanese grammatical questions that could be assumed quite a challenge to understand. In particular, the author examines ChatGPT's capacity for judgement concerning the proper use of distinguishing between *wa* and *ga* in subordinate phrases of arbitrarily created compound sentences under certain restrictions as to the

emergence of them. The author, however, wants to make it clear, seeing how it works out, that he does not deal with issues related to the program.

2 Inclusion Relation of Constituent Function Word and Subordinate Phrase

2.1 Semasiological and Structural Transformation Caused by *Wa* and *Ga*

As a whole, a Japanese sentence is in normal cases composed of the topic marked by *wa*, several adverbial subordinate phrases in the middle of a sentence and the predicative phrase at the end of the sentence. Adverbial phrases, however, may relatively flexibly be put not only in the middle of a sentence but also at the beginning of it, and thus such subordinate phrases, which work as adverbial components, also are put relatively flexibly at any place prior to the predicate in a sentence. However, the subordinate phrase that works adjectivally must be put directly before the modifiee. Figure 1 shows the conceptual diagram of a Japanese sentence structure.

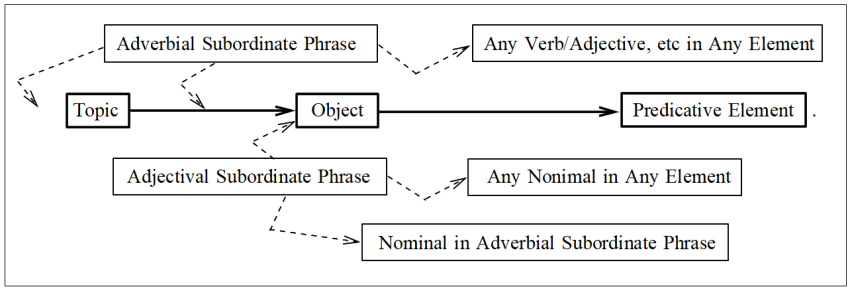

Figure 1

All in all, unlike in English, components of a Japanese sentence are continuous posteriorly on a consistent basis without progressing anteriorly as indicated by the rightward-pointing arrows in the Japanese sentence of (1a), whereas there is no way the flow of words indicated by the leftward-pointing arrows occurs in the Japanese sentence of (1b). The subordinate phrase ending with the *te*-form of a verb, which is called "*te*-subordinate phrase" hereafter for convenience sake in this paper, is in an ambiguous position in the sense that it is not clear whether the *te*-subordinate phrase modifies the subsequent verb '*karita*' or the predicative verb '*ryokō shita,*' and thus the sentence meaning can be interpreted two ways as T1 and T2 in English.

(1) a. 私は→京都に行って→借りた→車で→旅行した

watashi wa→Kyōto ni itte →karita→kuruma de→ryokō shita

I→went to Kyoto and...→(had) rented→in the car→traveled

b. 私は→*旅行した←*車で←*借りた←*京都に行って

*watashi wa→*ryokō shita←*kuruma de←*karita←*Kyōto ni itte*

T1: I went to Kyoto and I traveled in the car that I had rented.

T2: I traveled in the car that I rented when I went to Kyoto.

Unlike in T1 and T2, the phrases usually advance toward the right in Japanese, and thus where a component and a phrase have their grammatical effect is occasionally not easily visible on the surface also because there is not, for example, such a conspicuous word as a relative of English. This irreversibility of phrase order makes it more difficult to understand the context.

Particularly, however, even more troubling is the controlled structural environment where specific particles and some other types of function words are permitted to enter a specific subordinate phrase and some are not. The following *te*-subordinate phrases of (2a) and (2b) are different from each other in the structural sense though they are put at the seemingly just the same position in the sentences. The square bracket notation indicates the structural position of the *te*-subordinate phrase in the romanized Japanese sentences. The same hereafter applies to the case where there is a romanized Japanese sentence.

(2) a. 太郎は パジャマを着て 寝た。

Taro wa［*pajama wo kite*］*neta.*

Taro slept in pajamas.（*lit.* Taro put on pajamas and slept.）

b. 太郎は パジャマを脱いで 寝た。

Taro wa［*pajama wo nuide*］*neta.*

Taro removed his pajamas and slept.

The invisible difference of the above two *te*-subordinate phrases is whether or not the phrase is completely dominated by *wa*. This difference determines the meaning and structural property of each sentence as illustrated in Figure 2. The *te*-subordinate phrase of (2b) expresses an event that occurs at time 1 prior to that（at time 2）expressed by the predicative phrase, that is, his act of putting on pajamas is performed before his falling asleep, whereas the *te*-subordinate phrase of (2a) expresses an event that occurs at the same time and place as that expressed by the predicative phrase, that is, the state where Taro has pajamas in wear continues during the hours of his sleep. The type of *te*-subordinate phrase in (2a) is called "A-rui" and that in (2b) is called "B-rui" by Minami (1974, 1993), however, let A-rui and B-rui be called "A-type" and "B-type" respectively for the sake of expediency in this paper. Let the grammatical meaning that A-type as in (2a) conveys be called "simultaneously accompanying event at the same place" and that conveyed by B-type as in (2b) be called "events in succession" for convenience purposes.

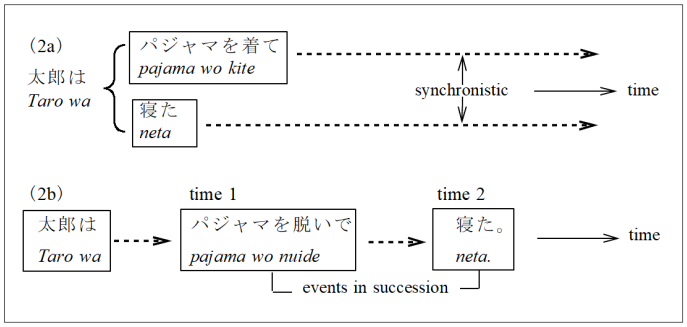

Figure 2

To further complicate matters, besides whether or not an event occurs prior to the main event in stream of time, whether or not the agent of action expressed in B-type *te*-subordinate phrase is indicated by the subject of the main clause may become problematic while the agent of action expressed in A-type cannot be other than a person that is indicated by the subject of the main clause, which may appear to be one of the drawbacks that present a barrier for ChatGPT when scrutinizing the proper use of distinguishing between *wa* and *ga*.

See the following sentence.

(3) 太郎は 服を脱いで ハンガーに掛けた。

Taro wa［*fuku wo nuide*］*hangā ni kaketa.*

Taro took off his clothes and put them on a hanger.

The *te*-subordinate phrase included in the above sentence is not A-type because the act of taking off one's clothes cannot take place concurrently with that of putting them on a hanger, and thus this *te*-subordinate phrase is B-type that expresses events in succession.

Furthermore, the person who took off his clothes and put them on a hanger should be the only person Taro, being marked by *wa*, that is the subject person of the main clause. This structural implication can be shown as below by parenthesizing with the round brackets { }, which hereafter applies to the same kind of structural part that is encompassed by the *wa*-marked topic as the subject.

(4) *Taro wa* {［*fuku wo nuide*］*hangā ni kaketa*}.

The next question is whether or not the *ga*-marked subject can be inserted into the *te*-subordinate phrase. First, look at (5) whose *wa*-marked topic assumes complete control of all the rest of the sentence outwardly in the same way as in (4).

(5) 太郎は 音楽を聴いて 勉強した。

Taro wa {[*ongaku wo kīte*] *benkyō shita*}.

Taro studied listening to music.

Remarkably, the *ga*-marked subject cannot be inserted into the *te*-subordinate phrase of (5) as below. What is the difference between (3) and (5)?

(6) 太郎は 花子*が音楽を聴いて 勉強した。

Taro wa [*Hanako *ga ongaku wo kīte*] *benkyō shita.*

Taro studied while Hanako was listening to music.

The difference does not result from the linguistic structure itself of the *te*-subordinate phrase but from the functional variation. The *te*-subordinate phrase of (6) expresses simultaneously accompanying event at the same place.

In an interesting twist, however, (3) permits the *ga*-marked subject to be inserted into the *te*-subordinate phrase as follows, that is, two persons may appear in the scene depicted by this sentence.

(7) 太郎が 服を脱いで 花子が ハンガーに掛けた。

[*Taro ga fuku wo nuide*] *Hanako ga hangā ni kaketa.*

Taro took off his clothes and Hanako put them on a hanger.

It turns out, when the *ga*-marked subject is set as above, that the person who put the clothes on a hanger should be another person other than Taro, for example, Hanako, in many cases, and thus the underlying factor is that the *te*-subordinate phrase of (7) expresses events in succession unlike in the case of (5). In the case where the speaker is stating as if he or she were watching Taro and Hanako do, it is more proper to also mark the main subject by *ga* because the main subject person's action is instantaneously started while being observed.

The use of *ga* in the above *te*-subordinate phrase results in the generation of the above interpretation. What is worth noting is that the subject *Taro* in the subordinate phrase invariably must be marked by *ga* despite the acceptability of *wa* and *ga* for marking the main subject *Hanako*. This means that the subordinate phrase may escape clutches of *wa* by containing the *ga*-marked subject *Taro*, unlike that of (3) that does not contain the *ga*-marked subject. In this way, the *ga*-marked subject functions to make the *te*-subordinate phrase with it escape clutches of *wa* from the viewpoint of who performs the action expressed by the *te*-subordinate phrase.

That is to say, which particle, *wa* or *ga*, is put prior to the B-type subordinate phrase determines the meaning of the whole sentence. And thus, the following sentence inevitably becomes construed as being structurally distorted or unsound because the reader leads to the clear recognition that the events do not occur in parallel in each place but occur in succession due to the presence of the word "*isoide*" that suggests the subsequent act of setting the table for supper is performed at the sight of Taro's taking off his clothes to eat. However, the subject of the main clause may be marked by both *wa* and *ga*.

(8) 太郎*は 服を脱いで 花子は 急いで 食事の準備をした。

[*Taro *wa fuku wo nuide*] *Hanako wa isoide shokuji no junbi wo shita.*

Taro took off his clothes and Hanako quickly set the table for supper.

The following type of sentence that looks structurally the same as the ungrammatical sentence（8）is acceptable because the function of this *te*-subordinate phrase is different in the sense that it does not express an event occurring simultaneously in parallel with the main event but a preceding event.

(9) 太郎が 服を脱いで 花子は 急いで 食事の準備をした。

[*Taro ga fuku wo nuide*] *Hanako wa isoide shokuji no junbi wo shita.*

Taro took off his clothes and Hanako quickly set the table for supper.

However, the grammaticality of the following sentence might be imperceptible even to native speakers' sense for language in terms of the use of *wa* because it might be able to be recognized not only as two events in succession but as two simultaneous events occurring in parallel in each place. If the reader leads to the clear recognition that the events occur in succession in the same way as in (9), the use of *wa* within the B-type subordinate phrase will be perceived as erroneous. This will be described later in detail.

(10) 太郎?は 服を脱いで 花子は／が ハンガーに掛けた。

［*Taro ?wa fuku wo nuide*］*Hanako wa/ga hanga ni kaketa.*

Taro took off his clothes and Hanako put them on a hanger.

And, it is possible to change the phrase order of (9) as below without altering the structural mechanism of the *te*-subordinate phrase owing to the fact that the subject contained within the *te*-subordinate phrase is not marked by *wa* but *ga*.

(11) 花子は 太郎が 服を脱いで 急いで 食事の準備をした

Hanako wa［*Taro ga fuku wo nuide*］*isoide shokuji no junbi wo shita.*

Hanako quickly set the table for supper after Taro took off his clothes.

If two events in succession are expressed as in the following sentences, that is, the reader or listener has a clear understanding of the act of hopping on a train being able to be performed only after the train's having arrived, the ungrammaticality of both the following sentences leaves no ambiguities.

(12) a. 電車*は 来て 私は すぐに 飛び乗った。

［*Densha *wa kite*］*watashi wa suguni tobinotta.*

b. 私は 電車*は 来て すぐに 飛び乗った。

Watashi wa［*densha *wa kite*］*suguni tobinotta.*

I immediately hopped on the train when it arrived.

To make matters more complicated, the following sentence created by replacing *wa* of (3) with *ga* is also grammatical in special circumstances where the use of *ga* gives the nuance of stating that the person who took off clothes and put them on is the same person Taro or the nuance of stating this sentence directly after the speaker's observing the behavior of Taro, and thus another subject like *Hanako* may not be put in the main clause. The structure can be shown as below by applying the round brackets used of *wa* to this sentence, that is, *ga* can cover all the rest of the sentence.

(13) 太郎が 服を脱いで ハンガーに掛けた。

Taro ga｛［*fuku wo nuide*］*hangā ni kaketa*｝.

Taro took off his clothes and put them on a hanger.

Therefore, only when both *wa* and *ga* can be used, being put at the same place in a sentence, as the subject marker in many cases of the main clause, the generation of such an implied semasiological nuance as stated above arises. It should be noted, however, that (13) may have two meanings; [I] Taro took off his clothes and put them on a hanger, [II] Taro took off his clothes and somebody put them on a hanger. This linguistic phenomenon occurs for a structural reason.

Accordingly, the *ga*-marked subject may be contained within the *te*-subordinate phrase as in (14a) that is structurally similar to (6), whereas the *wa*-marked subject may not as shown in (14b).

(14) a, 太郎は 花子が音楽を聴いて うるさいと叫んだ。

Taro wa｛［*Hanako ga ongaku wo kīte*］*urusai to sakenda*｝.

Taro screamed "Chill!" because Hanako put on some music.

b. 太郎は 花子*は音楽を聴いて うるさいと叫んだ。

Taro wa｛［*Hanako *wa ongaku wo kīte*］*urusai to sakenda*｝.

In (14a), the subject expressing who put on music is indicated by the *ga*-marked subject, while who screamed is by *wa*. Despite the presence of the same phrase '*ongaku wo kīte*' in (6) and (14a), why is (6) ungrammatical and (14a) grammatical?

The reason this linguistic phenomenon occurs is that (14a) expresses Taro's screaming occurred being sparked by Hanako's putting on music, and thus the *te*-subordinate phrase expresses reason, while (6) is halfway to expressing Taro's studying was occurring parallel with Hanako's listening to music. Therefore, *wa* in the *te*-subordinate phrase as in (14b) is wrong as is the case in (8).

As a reference, although the following combination of the first *wa* and the second one looks similar to

that in (8), the *wa* in the *te*-subordinate phrase is grammatically acceptable due to the fact that the two actions expressed by the *te*-subordinate phrase and by the main clause are performed contrastingly in parallel in each place, whereas the two actions expressed in (8) are performed in succession.

(15) 太郎は 服を脱いで 花子は シャワーを浴びた。
［*Taro wa fuku wo nuide*］*Hanako wa shawā wo abita.*
While Taro took off his clothes, Hanako took shower.

This type of *te*-subordinate phrase is called "C-rui（=C-type）" by Minami (1974, 1993). However, *ga* can also be used where *wa* can be used as in (16), and thus there can be such four possible combinations of *wa* and *ga* as '*wa-wa*', '*wa-ga*', '*ga-ga*' and '*ga-wa*', though the implied meaning specially alters in individual cases. Therefore, C-type *te*-subordinate phrase may not be suitable for the inspection for verification purposes in the sight of the proper use of distinguishing between *wa* and *ga*. But it might be interesting to ask ChatGPT about the nuance of those combinations.

(16) a. 太郎が 服を脱いで 花子は シャワーを浴びた。
b. 太郎は 服を脱いで 花子が シャワーを浴びた。
c. 太郎が 服を脱いで 花子が シャワーを浴びた。

2.2 Problem of Includablity of *Wa* And *Daro* in Other Subordinate Phrases

There are a number of subordinate phrases that impose restrictions on the use of particle, adverb, auxiliary verb and other type of subordinate phrase inside them, other than the *te*-subordinate phrase, as follows.

(17) 太郎は，花子*は 来ないので，参加しないつもりです。
*Taro wa, Hanako *wa konai node, sanka shinai tsumori desu.*
Taro is not going to participate because Hanako does not come.

(18) 花子*は 来なかったら，太郎は 参加しないつもりです。
*Hanako *wa konakattara, Taro wa sanka shinai tsumori desu.*
Taro is not going to participate if Hanako does not come.

(19) 太郎*は 東京に 来たとき，花子は 空港に 迎えに行った。
Taro wa Tokyo ni kita toki, Hanako wa kūkō ni mukae ni itta.
When Taro came to Tokyo, Hanako went fetch him to the airport.

(20) 花子*は 来ない*だろう ので，太郎は 行くのをやめるかもしれない。
*Hanako *wa konai *darō node, Taro wa iku no wo yameru kamoshirenai.*
Because Hanako will not come, Taro may give up going.

All the above sentences contain an error about the use of *wa*. Moreover, (20) contains another error about the use of *darō*. All the above subordinate phrases are B-type that cannot contain the *wa*-marked subject nor *darō* in that B-type has higher dependence on the main clause than C-type, and thus replacing *wa* with *ga* makes (17)-(19) grammatical or replacing *node* with *kara* in addition to the replacement of *wa* by *ga* makes (20) grammatical. The reason the phrase ending with *kara* is C-type, which permits the *wa*-marked topic and *darō* to be put in, is that the front part preceding *kara* is nearly as independent as a sentence. Therefore, the following sentence is grammatical.

(21) 花子は 来ないだろう から，太郎は 行くのをやめるかもしれない。
Hanako wa konai darō kara, Taro wa iku no wo yameru kamoshirenai.

Or, leaving *node* is grammatical if corrected as follows, since *yōna* preceding *node* is the adnominal form

that is highly dependent upon *node*.

(22) 花子が 来ないようなので，太郎は 行くのをやめるかもしれない。
Hanako ga konai yōna node, Taro wa iku no wo yameru kamoshirenai.

3 Analysis of Answers from ChatGPT

Here, tentatively, we have taken a view of only the combinations of particles（such as *wa* and *ga*）and mainly the *te*-subordinate phrase because of limited space in this paper, since there are too many controversial combinations of components like particles and subordinate phrases to be covered here.

The answers do not seem to be substantially different between ChatGPT's version 3.5 and 4 or their answers may slightly change depending upon when or how to ask, and thus it doesn't matter which version should be used. However, tentatively, the author puts fee-based ChatGPT version 4 to use in order to get answers by a possibly higher-accuracy method. When appropriate, other function words like an auxiliary verb and other types of subordinate phrases will be dealt with if they are considered to act as a useful reference.

3.1 *Te*-subordinate Phrase and the Use of *Wa* and *Ga*

We will look here at questions focusing around particles, *wa* and *ga*, and the *te*-subordinate phrase. First, look at the following figure.

Figure 3

The above questions include; "Is the sentence (3) grammatically correct?", "Who is the person that put them on a hanger?"（See the sentence of the same number in this paper as to which sentence is referred to in the question; the same applies hereafter.）ChatGPT properly explains about the sentence adding that the *te*-form expresses two actions in succession. However, in answering the second question as to who put the clothes on a hanger, ChatGPT makes false statements regarding the use of *wa* stating that it is commonly thought that who did it is Taro but that who did it can also be interpreted as anybody else depending on context, without describing detailed information on *wa*. However, switching of the subject marker from *wa* to *ga* will make ChatGPT's comment infallible. In this way, particles' differences may produce different results of structural mechanism and meaning, which is one of the deep issues in Japanese grammar.

Next, the question is "Is the sentence (6) grammatically correct?" Because the answer did not make sense, the author asked the same question again just to be certain, as shown in Figure 4.

In the below two answers, ChatGPT states that the sentence, which is ungrammatical as discussed above, is grammatically correct and that some words are necessary to make up for deficiencies in predicative phrases concerning Taro. It fills the void by speculating as in "Taro observed or knows that Hanako studied

while listening to music," that is, ChatGPT cannot create a grammatical sentence like "Taro studied while Hanako listened to music" that can be translated as "*Taro wa Hanako ga ongaku wo kiku aida benkyō shita.*" in Japanese. One thing the author can say from observing the above oscillating answers from ChatGPT is that it occasionally displays shaky judgment in interpreting the relationship between the *te*-subordinate phrase and the main clause.

Figure 4

The next question involving a touchy matter is "Is the sentence（8）grammatically correct?"

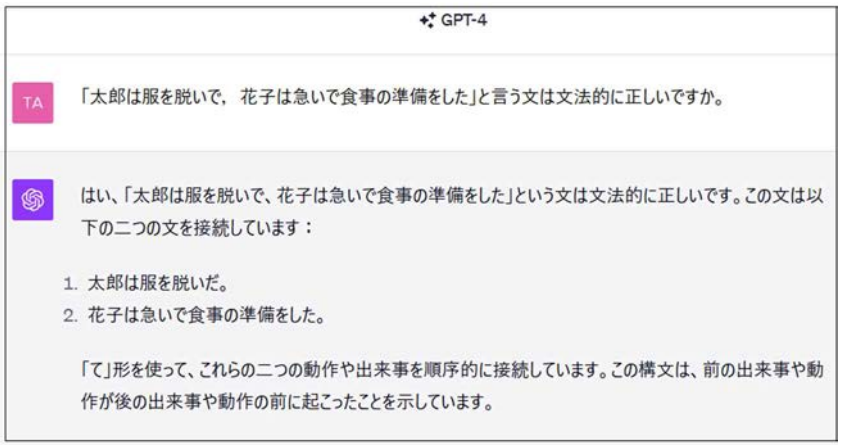

Figure 5

The answer from ChatGPT is obviously wrong because it provides a clear explanation that the sentence expresses events in succession admitting the presence of *wa*-marked subject in the *te*-subordinate phrase. Certainly, although the touchy question of this sentence might be imperceptible even to native speakers' sense for language in terms of the use of *wa*, it is grammatically proper to say as in (7) using *ga* for the subject *Taro* within the B-type *te*-subordinate phrase. A tiny variation imposes a grammatical regulations on who must be the agent of action expressed in the main phrase. This relates with what is talked over (10).

So let us take another sentence (12a), which more definitely expresses events in succession, as the next question "Is the sentence (12a) grammatically correct?" ChatGPT proves to still admit the use of *wa* in the B-type *te*-subordinate phrase despite its capacity for giving a reasonable explanation that the *te*-form is used for indicating that the act of immediately hopping on the train follows the fact of the train having

arrived in terms of time.

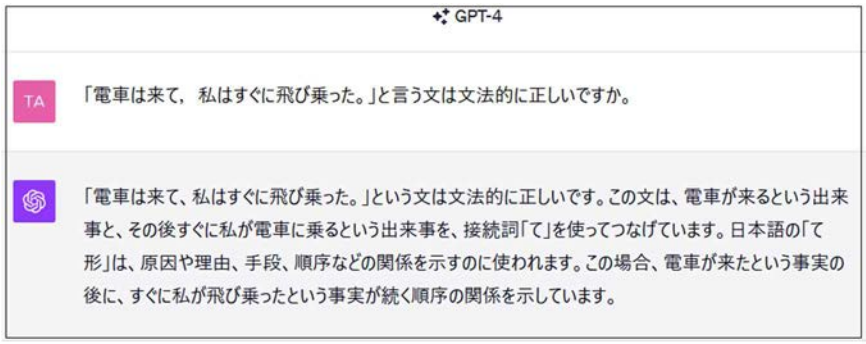

Figure 6

The next question is "Is the sentence (14a) grammatically correct?" The *te*-subordinate phrase that expresses reason for the main act of screaming "Chill!" is put in the middle of the sentence on purpose in a more complex way in order to see if ChatGPT can properly grasp the basics of the sentence structure without confusing the use of *wa* with that of *ga*.

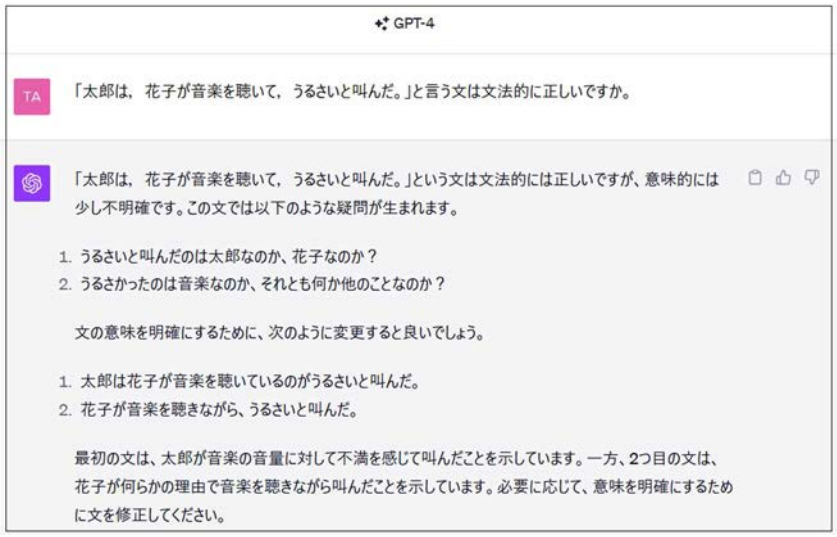

Figure 7

The sentence (14a) is interpreted in two ways by ChatGPT as in Figure 7, that is, the two agents *Taro* and *Hanako* are undifferentiated in terms of which act, putting on music or screaming, was performed by one of them. Although the first sentence rephrased by ChatGPT is reasonable, the second rephrased one unavoidably ignores the main subject *Taro* probably because the *ga*-marked subject *Hanako* is put closer to the verbs expressing the acts of listening to music and screaming. The main agent *Taro*, despite being marked by *wa*, is flicked.

Then, the author changed the question as in Figure 8 to facilitate easy comprehension of the relation of the main clause and subordinate phrase by inferring the function of the *te*-subordinate phrase from context. ChatGPT provided an accurate answer as shown in Figure 8, though the wrongly used *wa* is not revised to *ga* in Figure 9.

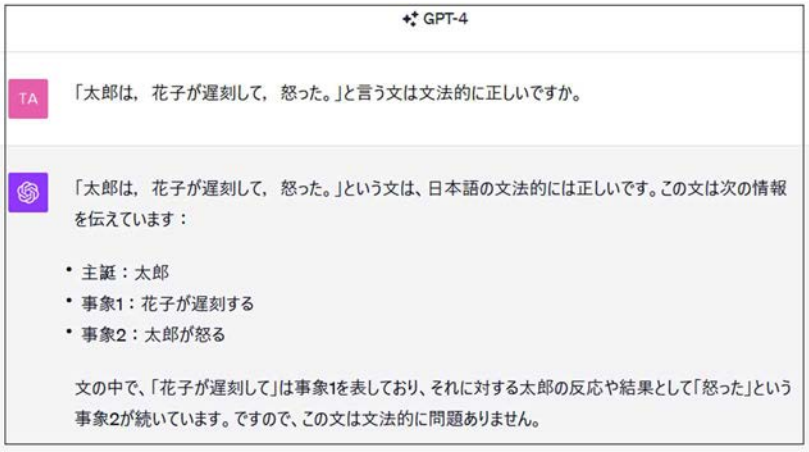

Figure 8

Interestingly, ChatGPT states, in Figure 9, that who performed the act of getting angry is not clearly known because the sentence has two subjects and that the sentence should be rephrased simply deleting the subordinate phrase as 'Taro got angry. Because Hanako was late.' without pointing out that the wrongly used *wa* in the *te*-subordinate phrase must be replaced with *ga*. This means that the grammatical relationship between the *te*-subordinate phrase and the main clause is unconsidered by ChatGPT. Seeing that the wrongly used *wa* cannot be corrected in Figure 9 despite the fact that the *te*-subordinate phrase with the *ga*-marked subject is properly interpreted in Figure 8, it follows that ChatGPT may not be able to generate a rather complex sentence that includes such a subordinate phrase as the one in question here.

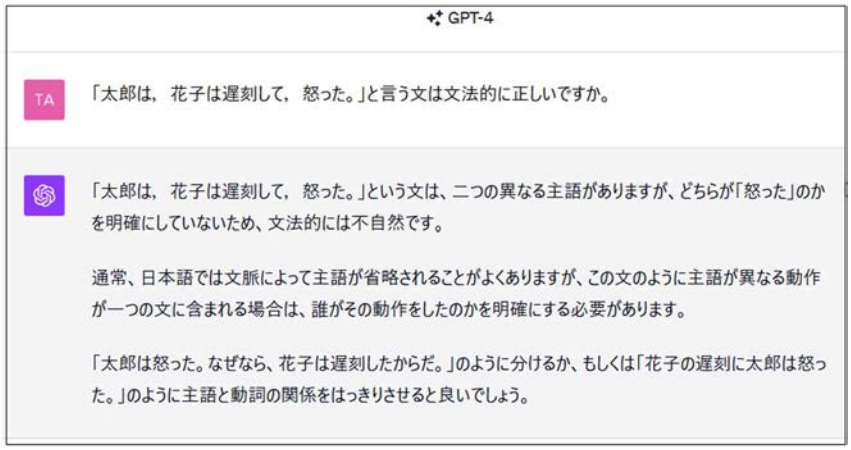

Figure 9

Contrary to the sentence structure discussed above, when the subject is put side by side with the verb in each of the subordinate phrase and the main clause, as in (15), ChatGPT is able to provide an adequate description of the structural meaning of the whole sentence as in Figure 10. The following question is "Is the sentence (15) grammatically correct?"

In the case where the subordinate phrase is not put side by side with the main predicative clause together with the subject in each but interposed between the *wa*-marked topic and the predicative clause, ChatGPT causes a problem in explaining the structural meaning of the subordinate phrase. That is, ChatGPT is expected to be able to provide rather appropriate explanations about (16a), (16b) and (16c), and thus the author cuts unnecessary details here. The above answers raise the possibility that the ungrammaticality of

wa used in the B-type *te*-subordinate phrase remains unrecognized by ChatGPT despite the awareness of what the *te*-form is used for.

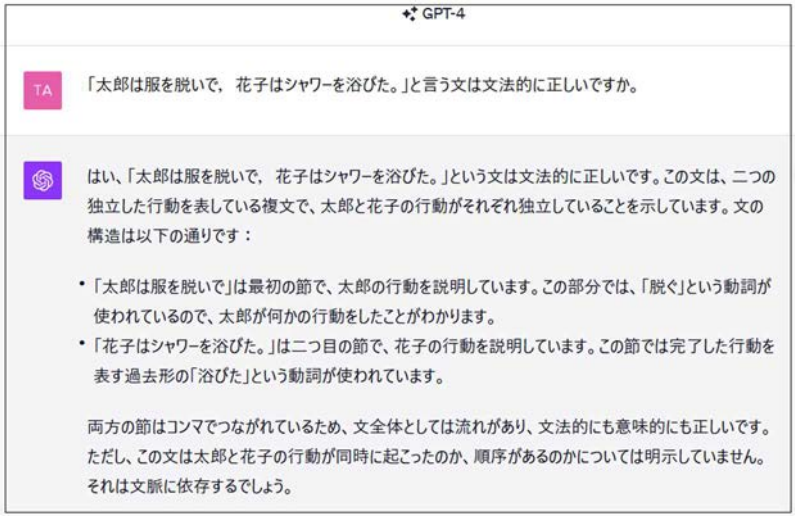

Figure 10

3.2 Conditional *S*ubordinate Phrase and the Use of *Wa* and *Ga*

The next question is "Is the sentence (17) grammatically correct?"

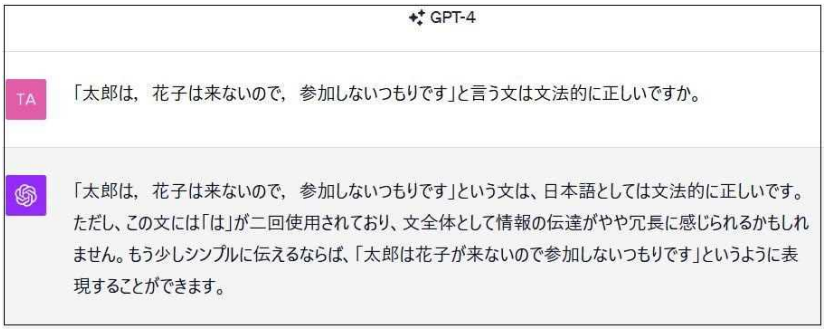

Figure 11

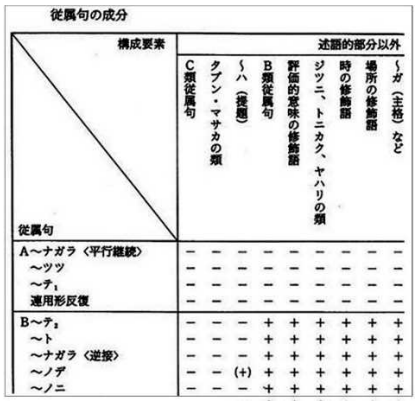

Figure 12

The *wa* in the subordinate phrase ending with *node*（Let the phrase be called "*node*-phrase" hereafter）, is grammatically unstable, which is not indicated by '−' nor '+' but by '(+)' that means it might be acceptable as the case may be in the correspondence table of Minami (1974, 1993) as shown in Figure 12 that shows

part of the original table. However, revising the *wa* to *ga* is worthy of attention even though it is explained, in Figure 11, that the reason for the revision is not the *wa* being unusable in the phrase but the prolix information caused by the *wa* used twice.

The next question is "Is the sentence (18) grammatically correct?" This sentence contains the subordinate phrase ending with *tara*, which is B-type that does not permit *wa* to be used inside.

ChatGPT' states in Figure 13 that the sentence (18) is grammatical as an incorrect answer. However, another point to notice is that ChatGPT also states, giving three rephrased expressions, that the sentence sounds a little unnatural in some cases. ChatGPT clearly shows its lack of understanding on the rule stating that the use of *wa* is inappropriate in the subordinate phrase indicating condition.

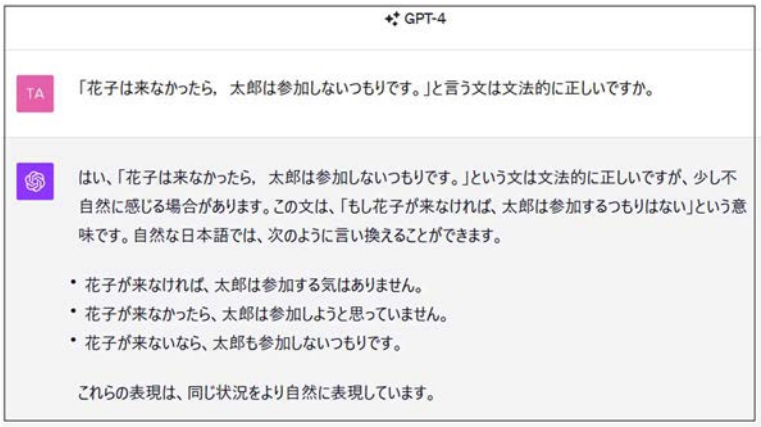

Figure 13

Although the question sentence in Figure 14 contains an obvious error in that the subordinate phrase of time is unable to contain *wa*-marked topic as the subject, ChatGPT asserts it to be grammatically correct.

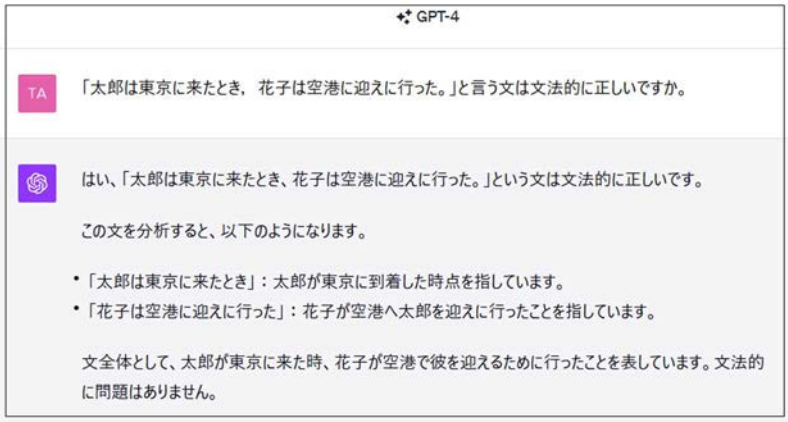

Figure 14

In order to check to be sure that ChatGPT cannot properly judge the usage of the subject marker in B-type subordinate phrase, let the question be rephrased as follows ending the phrase with another conjunctive particle *to* that expresses condition. Then, the next question is "Is the sentence (23) grammatically correct?"

(23) 花子*<u>は</u>同行しない<u>と</u>，太郎はそこに一人で行けません。
*Hanako *<u>wa</u> dōkō shinai <u>to</u>, Taro wa soko ni hitori de ikemasen.*
If Hanako does not go together, Taro cannot go there alone.

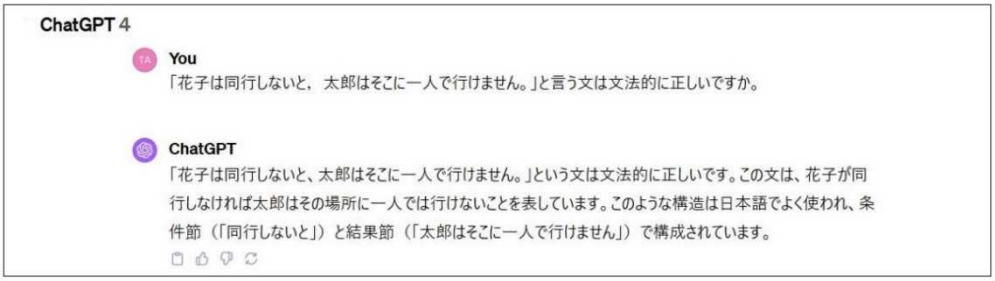

Figure 15

The subordinate phrase in the sentence (23) is B-type, which wrongly contains the *wa*-marked topic as the subject. The answer is that it is grammatically correct. Furthermore, there is a comment stating that this sentence structure is commonly used in Japanese as indicated in Figure 15, though any native speaker feels that the sentence is obviously wrong. The position of the new head caption 'ChatGPT 4' in the Figure is moved to a suitable place due to limitations of space; the same applies hereafter.

3.3 The Inclusion Relation of *Darō* and Subordinate Phrase

The last question is "Is the sentence (20) grammatically correct?" Then, ChatGPT states that (20) is grammatically appropriate on the whole providing a briefing on the use of *node* as below. The *node*-phrase contained in (20) is B-type that does not permit *wa* nor *darō* to be used internally, whereas the subordinate phrase of reason ending with *kara*, which is C-type, accepts both *wa* and *darō* for internal use because C-type has independent sentence-like properties. That is, ChatGPT does not make a definite distinction between B-type and C-type in terms of a judgment on whether or not *wa* and *darō* can be permitted to enter the subordinate phrase.

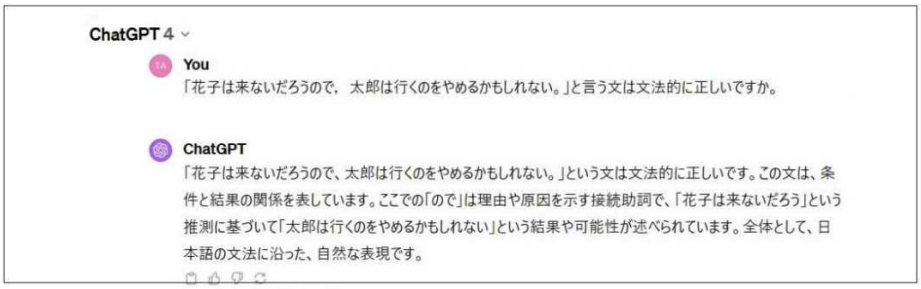

Figure 16

Interestingly, however, ChatGPT seems to make a different judgment if the position of the subordinate phrase is changed from the beginning of the sentence to the middle, which looks as if two subjects were put in succession, as indicated in Figure 17.

ChatGPT cites the continued use of the topic marker *wa*, which is perceived by ChatGPT to cause difficulty in determining which *wa* marks the main subject, as the reason for converting *wa* after *Hanako* to *ga* without referring to the limitation on the use of *wa* in B-type. And, it shifts the position of the subordinate phrase from the middle of the sentence to the beginning, which is an unnecessary work that implies the interpretation of the subordinate phrase put in the middle of the sentence is incomprehensible to ChatGPT. Furthermore, ChatGPT lets the wrongly used *darō* remain in the *node*-phrase.

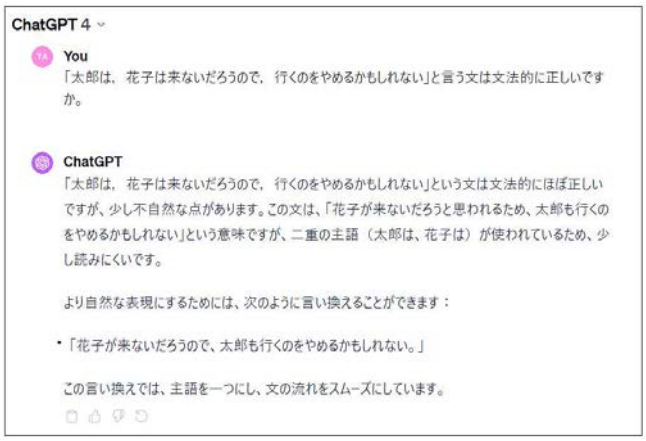

Figure 17

This means that ChatGPT does not refer to the unusableness of *wa* in B-type phrase avoiding inserting a subordinate phrase in the middle of a sentence due to the fact that it is hard for ChatGPT to make an appropriate judgment about a rather complex sentence that includes a mid-sentence subordinate phrase with structural restrictions as to whether or not *wa* can be inserted.

The following sentence rephrased by moving the main topic of (20) to the beginning of the sentence is properly judged by ChatGPT to be grammatical.

(22) 太郎は，花子は 来ないだろうから，行くのをやめるかもしれない。
Taro wa, Hanako wa konai darō kara, iku no wo yameru kamoshirenai.

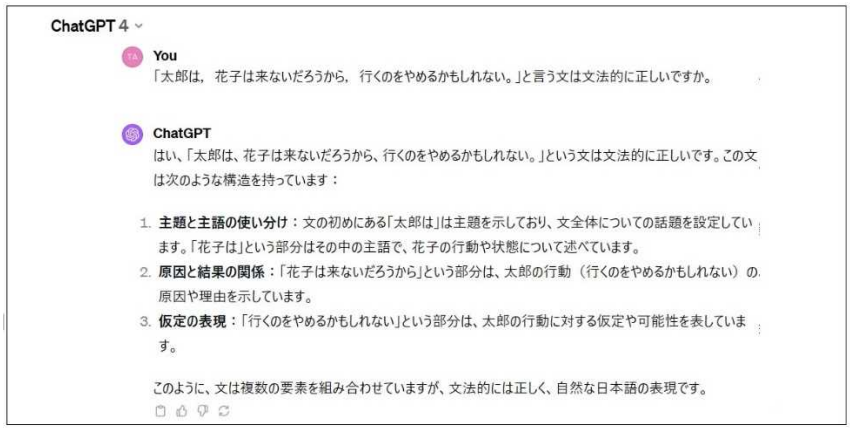

Figure 18

However, ChatGPT refers to distinguishing between the topic and the subject approving the double use of *wa* unlike in Figure 17, stating that Hanako is not the topic but the subject though the *wa*-marked element in the subordinate phrase is also a topic, without mentioning the use of distinguishing between *wa* and *ga.* That is, ChatGPT is not able to exercise an accurate judgment as to the problem, which arises from structural differences of *node*-phrase and *kara*-phrase seen in Figure 16-18, of whether or not *wa* can be inserted as shown in Figure 18.

4 Is ChatGPT Able to Create a Complicated Compound Sentence?

Incidentally, in making a request repeatedly to ChatGPT for the production of one independent

complicated compound sentence with free contents accompanied by several inserted subordinate phrases under the condition that B-type subordinate phrases should include a subject, the author happened to get, for example, such bizarre responses.

As below, ChatGPT cannot perform the task as directed since the subordinate phrases ending with *node* and *toki ni* lack a subject. In case we may miscomprehend, the author points out that the *wa*-marked subject seemingly preceding the *node*-phrase in Figure 19 is not contained inside the *node*-phrase.

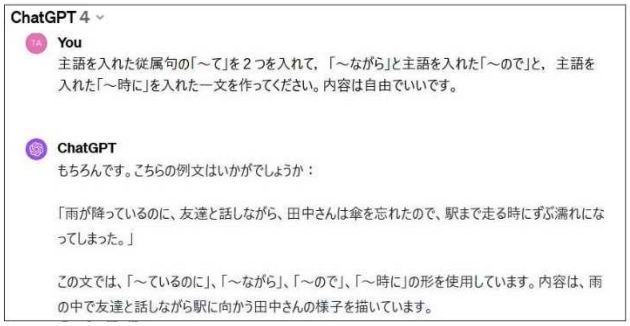

Figure 19

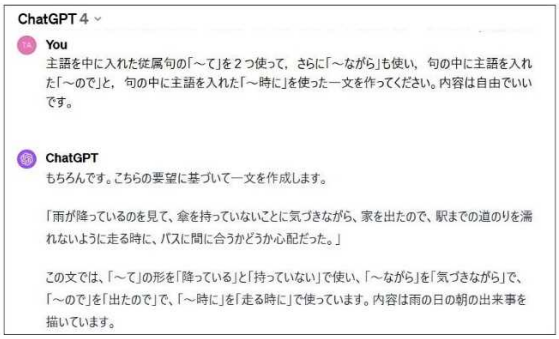

Figure 20

Next, as below, the author made a request to ChatGPT for setting the *wa*-marked topic at the beginning in order to see how properly ChatGPT may set another subject in subordinate phrases. Then, it fails to create another subject in the *te*-phrase and the *node*-phrase as in Figure 21, since the *wa*-marked topic is not the subject of each subordinate phrase but the one of the whole sentence. An error due to the misuse of *wa*-marked topic in the *nagara*-phrase in the sense that the phrase falsely means birds' flying while the sun is shining is seen in Figure 22, which implies that A-type subordinate phrase may be particularly prone to the subject setting errors.

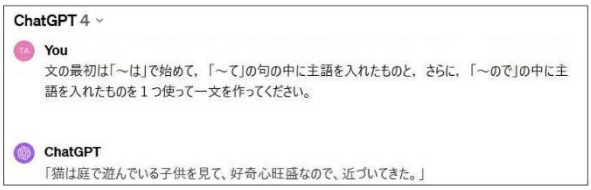

Figure 21

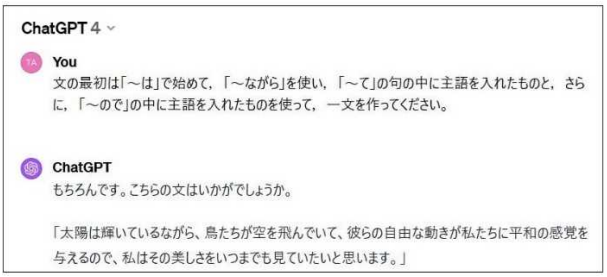

Figure 22

Furthermore, the author again made requests for the production of one independent sentence with several subordinate phrases inserted under specific conditions.

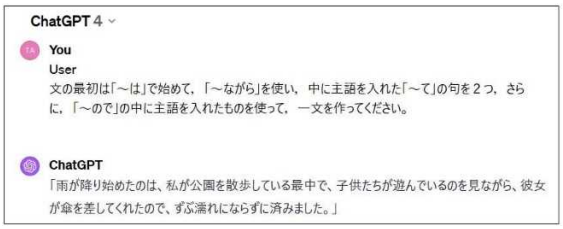

Figure 23

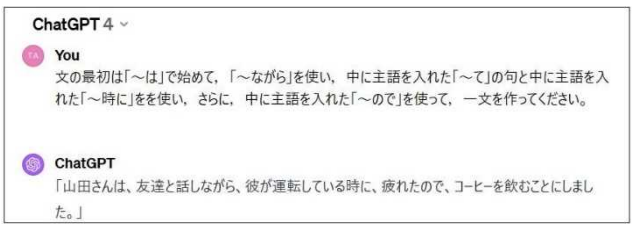

Figure 24

This time ChatGPT barely cleared the conditions for putting a subject in subordinate phrases except that it cannot insert another subject into the *node*-phrase as in Figure 24 in the same way as in Figure 19, 20 and 21. This implies that ChatGPT is bad at putting another subject at will in a certain type of phrase.

Instead, the logic flows shown above also seen in Figure 19, 20 and 22 are oddly lumbering owing to the disposition of the mid-sentence subordinate phrases in unnatural positions regardless of contextually natural order, which implies that ChatGPT is currently less attuned to the production of a sentence with high levels of subordinate phrases.

5 Summary

This inspection of ChatGPT's current capacity for judgement as to whether or not *wa* and *ga*, which are said to be the most controversial particles between which the use of distinguishing is intractable, can be used in a particular subordinate phrase from a structural standpoint showed that it is currently unable to stably give accurate nor proper responses to abstruse grammatical questions that require highly advanced perception. In general, it turns out that the linguistic phenomenon of *wa* being unusable is not recognized by ChatGPT as the property of B-type subordinate phrase. Other than *wa* and *ga*, whether or not the auxiliary verb for conjecture *darō* that must be put at the end of an independent sentence can be used in B-type subordinate phrase is questioned, which culminated in the exposure of inappropriate functioning of ChatGPT.

Since the grammatical issues that the author conducted a probe into in this paper can be deemed to have the most arcane aspects of Japanese grammar, the fact that ChatGPT currently seems to be unable to properly deal with them implies that it is just conceivable that ChatGPT may not be able to perform a task of creating rather complicated compound sentences well. It has turned out that this can be too much a task that requires depthful insight for AI to attempt at the current time.

There are many other elements of which the usages a subordinate phrase imposes limitations on within it, so the author has come to take the belief that this report may have set up some definite criterions for evolution of ChatGPT so that it becomes more advanced in skill for the production of a complicated compound sentence in a future update.

References

[1] Minami, Fujio（1974）. *Gendai Nihongo no Kōzō*, Taishūkan Shoten.
[2] Minami, Fujio（1993）. *Gendai Nihongo no Rinkaku*, Taishūkan Shoten.