Constraint of the Japanese Conjunction "*shikashi* (*but*)"

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Abstract

In this paper, we will propose an integrated viewpoint of the constraint of the Japanese conjunction *shikashi*, which roughly corresponds to the conjunction "but" in English. We regard the conventional implicature of the word *shikashi* as establishing a contrast relation between two binary tuples, each of which consists of two constituents of one of connected sentences. From the point of view, we will show that many cases of usage of *shikashi* can be treated uniformly as contrast relations, by classifying these relations into two types, namely, *direct contrast*, the case that all elements of two binary tuples appear in connected sentences, and *indirect contrast*, the case that some elements do not appear explicitly and are provided implicitly by some inference.

1 Introduction

According to ?, the function of the conjunction *but* is classified into conventional implicatures[1]. Unlike conversational implicatures,

> Conventional implicatures are non-truth conditional inferences that are not derived from superordinate pragmatic principles like the maxims[2], but are simply attached by convention to particular lexical items or expressions(?, page 127).

Levinson also pointed out that conventional implicatures have the following natures:

> non-cancellable, detachable, not be calculated but given by convention, relatively determinate content.

The nature "non-cancellable" is one of the most important natures for discourse understanding because of the following point. The nature that conventional implicatures can not be defeated by some other factors means that the content of conventional implicatures may be used in discourse analysis as the context for conversational implicatures and other phenomena which have more context dependency. The property is useful to analyze a discourse, which includes conversational implicatures such as metaphor.

Japanese conjunction *shikashi*, which roughly corresponds to the English word *but* , seems to have same property of conventional implicature as *but* in English. On the other hand, in Japanese discourses, focusing particles, which have conventional implicatures as well, are preferably used. Especially, the Japanese particle *wa*, which indicates some comparison about a noun phrase prefixed by it, has the similar function as the conjunction *shikashi*. So, there seems to be some strong interaction between them. But there is no research, as far as we know, which studies such interaction. From the viewpoint described above, this paper will focus on the conjunction *shikashi* and formulate the pragmatic constraint of *shikashi*.

2 Preparation—Japanese sentence

Generally speaking, a Japanese sentence has the following structure(?):

(1) $[\mathrm{NP}_1\text{-}\mathrm{P}_1 \cdots \mathrm{NP}_n\text{-}\mathrm{P}_n\ \mathrm{V}]_{\mathrm{PRO}}\ [\mathrm{Suffixes}]_{\mathrm{MODAL}}$

[1]From the viewpoint of the truth condition, both *but* and *and* are reduced to same one.

[2]Grice's maxims of conversation.

In this structure, the PRO part expresses a proposition and the MODAL part expresses some modal information attached to the proposition. In the PRO part, P_i is a *particle*, or a postposition, which usually shows the connection between the object designated by the noun phrase NP_i and the predicate designated by the verb V, that is, roughly speaking, P_i is the case-marker of NP_i. The noun phrase NP_i and the particle P_i make a postpositional phrase NP_i-P_i. In the MODAL part, the information about polarity, tense and so on is described. Since the relation between one of objects and a predicate is explicitly expressed by a particle, word order of Japanese sentences is relatively free. In this paper, each example is shown as a list which contains an original Japanese sentence, the interpretations of each constituent and the translation to English like the following.

(2) Taro-ga Hanako-ni hanataba-wo watashi-ta.
Taro-NOM Hanako-DAT bouquet-ACC hand-PAST.
Taro handed Hanako a bouquet.

3 *Shikashi* as a contrast relation

According to ?, the Japanese conjunction *shikashi* is not a conjunction which expresses just a violated expectation, but a conjunction which adds some new opinions or facts to the things described so far, which is admitted to be true by the speaker. Generally speaking, the Japanese conjunction *shikashi* is used in the following ways:

1. Asserting something which is opposite to either the content of utterances described so far or the view of the other party.
2. Changing the current topic to a certain but different one.
3. Starting a description about something impressed .

About the usage ??, ? said that roughly speaking *shikashi* has the following conjunctive relations:

1. The assertion of the next sentence is opposite to the inference drawn from the assertion of the previous one.

   (3) Jiko-ga a-tta.
   accident-NOM occur-PAST
   An accident occurred.

   shikashi, keganin-wa de-naka-tta
   but injured_person-TOP occur-NEG-PAST
   But there is no injured person.

2. The next sentence asserts the failure of achieving the goal which is drawn from the previous sentence.

   (4) Onaka-ga sui-ta.
   stomach-NOM be_empty-PAST
   I am hungry

   shikashi, chikaku-ni shokudou-wa nai.
   but around_here-LOC restaurant-TOP there_is_not
   But there is no restaurant around here.

3. A certain relation holds between the previous sentence and the next one in terms of correspondence among cases, predicates and polarities[3].

   (5) Taro-ga Hanako-ni hanataba-wo watashi-ta.
   Taro-NOM Hanako-DAT bouquet-ACC hand-PAST.
   Taro handed Hanako a bouquet.

   shikashi, Jiro-wa Hanako-ni tegami-wo watashi-ta.
   but Jiro-CNT Hanako-DAT letter-ACC hand-PAST.
   But Jiro handed her a letter.

? treated the English conjunction *but* in two separated ways, one of which corresponds to the case of ?? and ??, and the other corresponds to the case of ??[4]. ? enumerated combinations of several factors and described some properties about the combinations for the case of ??. They, however, have not mentioned any general properties which explain how some combinations are allowed and other ones are not. Moreover, Japanese has the particle *wa* which may indicate a contrast with something else according to context, but it has not been clear what interaction exist between *shikashi* and *wa*.

In order to explain these cases uniformly, in this paper, we basically stand at the following viewpoint:

Assumption 1 (Meaning of *shikashi*) Shikashi *expresses the attitude of a speaker toward two propositions that the speaker sets a* contrast relation *between them, one of which was described before* shikashi *and the other will be described after* shikashi.

To concentrate our attention on the basic constraint of *shikashi*, we will treat the case that two simple sentences are connected by *shikashi*. We will use the term the *previous sentence* and the *next sentence* to

[3] As described later, CNT shows the contrastive use of *wa*, while TOP shows the topical use of *wa*.

[4] While ? treated several subordinating conjunctions in Dutch, conjunctions which correspond to *but* or *shikashi* were not treated.

refer to the sentence which appears immediately before *shikashi* and the sentence which appears immediately after *shikashi*, respectively. In fact, our standing point is not novel at all and we basically succeed Grice's viewpoint(?) or Hobbs's one(?, ?). We, however, should clarify the following points in order to use the constraint of *shikashi* for the analysis of discourse structure(?; ?; ?; ?) and, moreover, the calculation of some other pragmatic phenomena, for example, resolving anaphora, identification of ellipsis and so on.

1. What kind of structure does the *contrast relation* of *shikashi* have?
2. What kind of interaction does *shikashi* have with the particle *wa* of Japanese?
3. Is there some integrated framework in which the case that needs some inference also can be treated?

The goal of this paper is to provide an integrated answer to the questions. Summaries of our answers are the followings, respectively:

1. Comparison between two different *binary tuples*.
2. The particle *wa* is closely related, especially, in the case that all items in a contrast relation appear explicitly.
3. Yes. We can treat *shikashi* in an unified manner. (It is pieces of inference that make clear a relation between the assertions expressed explicitly and the contrast relation set implicitly by *shikashi*.)

Our assumption ?? just accounts for the case that contrasted items are explicitly expressed in two sentences, that is, the case of ?? in Itoh's analysis. We will call this usage the *direct contrast use*. On the other hand, the cases which include some inference, such as ?? and ??, are not explained by the assumption alone. We, however, can account for the cases, if we assume that some cognitive process of a hearer is invoked to make sure of the meaning of *shikashi* in our assumption. That is, in order to establish some contrast relation which should be expressed by *shikashi*, these cases require some other cognitive effort, such as some inference. We will call this usage the *indirect contrast use*.

In the following sections, first of all, we will describe the direct contrast use, and then we will consider the indirect contrast use.

4 Direct contrast

4.1 Contrast structures

In order for a contrast relation to hold between two sentences, it should be necessary that there exist both a *shared part* and a *distinct part* in each sentence. It seems that a distinct part is a *binary* tuple, which makes the core of a contrast relation, and it is neither a unary tuple nor a tuple of more than two items. This comes from the fact that the contrast relation is to compare the value for an item with the value for another item from a certain viewpoint, which is emerged from a shared part described above. Therefore, a binary tuple in form of (*item*,*value*) is compared with another binary tuple. We call such a comparison *binary-tuple contrast*. Since the binary tuple (*item*,*value*) may mean that the item *item* has the value *value* in terms of some viewpoint, which is shown by the shared part, the order of the tuple should have some information. So we call *item* and *value* in the tuple the *key of contrast* and the *contrasted value*, respectively. For example, the sentence (??) consists of the following parts in our analysis:[5]

- shared part

  (6) θ_1 Hanako-ni θ_2 watashi-ta.
  θ_1 Hanako-DAT θ_2 hand-PAST.
  θ_1 handed Hanako θ_2.

- distinct part

  The previous sentence: $\begin{pmatrix}\text{Taro-ga} & \text{hanataba-wo}\\ \text{Taro-NOM,} & \text{bouquet-ACC}\end{pmatrix}$

  The next sentence: $\begin{pmatrix}\text{Jiro-wa} & \text{tegami-wo}\\ \text{Jiro-CNT,} & \text{letter-ACC}\end{pmatrix}$

We call the shared part and the two distinct parts highlighted by *shikashi* the *contrast structure* of the sentences, and denote it as follows:

[5] Where θ_1 and θ_2 are variables to abstract the distinct part, which correspond to each element of one of tuples, in the order of appearance. In the case that the appearing orders of items of two sentences are different, as described later, this notation follows the order of items of the next sentence.

(7) $$\frac{\begin{pmatrix}\text{Taro-ga} & \text{hanataba-wo}\\ \text{Taro-NOM,} & \text{bouquet-ACC}\end{pmatrix} \Leftrightarrow \begin{pmatrix}\text{Jiro-wa} & \text{tegami-wo}\\ \text{Jiro-CNT,} & \text{letter-ACC}\end{pmatrix}}{\begin{array}{c}\theta_1 \text{ Hanako-ni } \theta_2 \text{ watashi-ta}\\ \theta_1 \text{ Hanako-DAT } \theta_2 \text{ hand-PAST}\end{array}}$$

As the following examples show, if a distinct part consists of only one item or more than two items, *shikashi* hardly connect the two sentences without some special context[6].

(8) ?? Taro-ga Hanako-ni hanataba-wo watashi-ta.
Taro-NOM Hanako-DAT bouquet-ACC hand-PAST
Taro handed Hanako a bouquet.

shikashi Jiro-wa Hanako-ni hanataba-wo watashi-ta.
but Jiro-CNT Hanako-DAT bouquet-ACC hand-PAST
But Jiro handed Hanako a bouquet.
(Each distinct part consists only one item.)[7]

(9) ?? Taro-ga Hanako-ni hanataba-wo watashi-ta.
Taro-NOM Hanako-DAT bouquet-ACC hand-PAST
Taro handed Hanako a bouquet.

Shikashi Jiro-wa Madoka-ni tegami-wo watashi-ta.
but Jiro-CNT Madoka-DAT letter-ACC hand-PAST.
But Jiro handed Madoka a letter.
(Each distinct part consists of three items.)

Based on these observations, we propose the following principle.

Principle 1 (Binary-tuple contrast) *The contrast relation made by* shikashi *is a* binary-tuple contrast*.*

Definition 1 (Direct contrast) *If all items in the distinct parts appear in a previous sentence and a next sentence and a contrast structure can be composed from them, we call the case direct contrast*[8]*.*

4.2 Candidates for binary-tuple contrast

In the case that two single sentences are conjoined by *shikashi*, the followings can be candidates for elements of a binary-tuple contrast at least.

1. Distinct objects marked by the same case marker, or particle.

2. Distinct predicates.

3. Distinct polarities (positive/negative)

Two items are picked up from candidates described above to make a binary tuple of a contrast structure. There seems to be the following constraints to make a contrast structure:

(10) a. When predicates are different, they should stand in some contrast relation by themselves, that is, each of them should have both a shared part and a distinct part.

b. When a predicate has some special relation with some other constituent in the current context, the predicate part and these constituents behave like one predicate.

c. When a shared part has the negative polarity, we feel a certain peculiar feeling.

The following examples show these constraints.

(11) Taro-ga Hanako-ni hanataba-wo tewatashi-ta.
Taro-NOM Hanako-DAT bouquet-ACC hand-PAST.
Taro handed Hanako a bouquet.

shikashi Jiro-wa Hanako-ni hanataba-wo yusoushi-ta.
but Jiro-CNT Hanako-DAT bouquet-ACC send-PAST.
But Jiro sent a bouquet to Hanako.
(cf. (??))

(12) ?? Taro-ga Hanako-ni hanataba-wo tewatashi-ta.
Taro-NOM Hanako-DAT bouquet-ACC hand-PAST
Taro handed Hanako a bouquet.

shikashi Jiro-wa Hanako-ni hanataba-wo age-ta.
but Jiro-CNT Hanako-DAT bouquet-ACC give-PAST
But Taro gave Hanako a bouquet.
(Constraint (??))

(13) ?? Taro-wa Hanako-ni hanataba-wo age-naka-tta.
Taro-TOP Hanako-DAT hanataba-ACC give-NEG-PAST.
Taro did not give Hanako a bouquet.

shikashi Jiro-wa Madoka-ni hanataba-wo age-naka-tta.
but Jiro-CNT Madoka-DAT hanataba-ACC give-NEG-PAST.
But Jiro did not give Madoka a bouquet.
(Constraint (??))[9]

As for the fact that we feel some strangeness when a shared part has the negative polarity, a sentence with focusing particles and negative polarity implicitly supposes some context in which information with positive polarity holds(?).

[6] The case with some special context may be considered as the case which includes some inference, described later.

[7] We will use the symbol ?? at the beginning of example sentences to indicate that they are pragmatically anomalous, while * indicates that the sentences are semantic or syntactic anomaly, and ? is non-committal about the nature of the anomaly.

[8] The definition of *indirect contrast* will be shown in the section ??.

[9] The particle *wa* also has the function to mark a topic as described in the next section. In this example, we use not *ga* which marks a nominal, but *wa* as a topic marker, because the particle *ga* has other special meaning, when the predicate shows some state like this example. Since this phenomenon is out of scope of this paper, we will not discuss it further more.

4.3 Focusing particle *wa* and direct contrast

Japanese particle *wa* introduces a contrastive implicature. As shown in our examples so far, the particle *wa* always appears in a direct contrast use of *shikashi*. That may be explained as the assumption that because the contrastive nature of *wa* may make a contrast structure explicitly and, on the other hand, *shikashi* cannot make it by itself, a direct contrast holds only if *wa* is properly used. The particle *wa*, however, has also the function to mark a *topic*. It seems to be controlled by context which function become dominant. In the following subsections, first of all, we will describe our treatment of the particle *wa*, then we will consider the interaction between the particle *wa* and the conjunction *shikashi* in the direct contrast use.

4.3.1 Focusing particle *wa*

Japanese has some particles which do not represent relations between an object and a predicate but make some implicatures. We call such particles *focusing particles*. The particle *wa* is one of focusing particles, which is used in either ways, by substituting it for an original case-marking particle or by adding it after some appropriate constituent, that is, which is used in the form 'X-*wa*' to add some implicature to X. It is said that the particle *wa* has two way of use, namely, the *topical use* and the *contrastive use* according to context. The constituent 'X-*wa*' in the topical use shows that X is the current topic. 'X-*wa*' in the contrastive use shows that X is contrasted with something else provided by context. While, as for the context dependency of *wa*, there is a standpoint that *wa* has two separated functions, there is another standpoint that one function of *wa* is a special case of the other function. The one of evidences of the latter standpoint is the fact that *wa* which normally represents only the topical meaning in a sentence can have not the topical meaning but the contrastive meaning in some context. For example, the sentence

(14) taro-wa isha-da.
Taro-$\left\{\begin{array}{c}\text{TOP}\\ \text{CNT}\end{array}\right\}$ doctor-is_a.
$\left\{\begin{array}{l}\text{Taro is a doctor.}\\ \text{Taro is a doctor.}\\ \text{(and it is implied that someone else is not a doctor.)}\end{array}\right\}$

would have either the topical meaning or the contrastive meaning according to the context in which it placed.

(15) kinou taro-ni a-tta. taro-wa isha-da.
yesterday Taro-ACC meet-PAST. Taro-TOP doctor-is_a.
Yesterday (I) met Taro. Taro is a doctor.

(16) Jiro-wa sensei-da. *shikashi* taro-wa isha-da.
Jiro-TOP teacher-is_a. but Taro-CNT doctor-is_a.
Jiro is a teacher. But Taro is a doctor.

While this paper will not discuss which is the main function, the contrastive use or the topical use, we take the following standpoint to cope with the context dependency of *wa* like the sentence (??).

> The focusing particle *wa* has potentially both the contrastive function and the topical function by nature. When one of these functions cannot be available as the result of satisfying some constraints about the usage of *wa* in some given context, another function would be highlighted.

In this paper, we use the two features, 'CNT' and 'TOP' to express *contrastiveness* and *topicalness*, respectively. The features have either + or − as the value, which express that the feature is in or out, respectively. We also use the following notations:

(17)
wa_i/CNT The value of the feature CNT of wa_i
wa_i|[+CNT] wa_i such that wa_i/CNT=+

Our standpoint described above would be expressed in our feature system as follows.

Assumption 2 (Default feature values of *wa*) *The default feature value of the focusing particle* wa *is* [+TOP,+CNT] *and the value can become to be negative so as to satisfy the constraints of* wa *if needed.*

As for the constraint of the focusing particle *wa*, various proposals have been offered by many researchers, like ?, ? and so on. The following constraints are the rewritten versions of those constraints with our feature system.

Constraint of *wa* 1 (Features of *wa*) *The focusing particle* wa *has topicalness or contrastiveness.*

(18) wa/TOP= + $\vee$ wa/CNT= +

Constraint of *wa* 2 (Condition of topical use) *If* wa *marks a topic, the topic should be either a generic noun phrase or a referential noun phrase.*

(19) "α-wa_i" is a Japanese fragment $\wedge$ $\neg$ generic-NP(α) $\wedge$ $\neg$ referential-NP(α) $\Rightarrow$ wa_i/TOP=−

Constraint of *wa* 3 (Number of *wa* of the topical use) *Topical* wa *appears at most once in one sentence.*

(20) $wa_k/\text{TOP}{=}{+} \wedge l \neq k \Rightarrow wa_l/\text{TOP}{=}{-}$

Constraint of *wa* 4 (Tendency to have the contrastive meaning) *There is the following order of tendency to have the contrastive meaning according to the original case-marking particle.*

ga	< wo	< ni	< e	< kara	< de
NOM	ACC	DAT	DST	SRC	COND

4.3.2 Interaction between *shikashi* and *wa*

In direct contrast, the next sentence of a *shikashi* should have some focusing structure, namely, the focusing particle *wa* of the contrastive use. For example, (??) would be anomalous if the particle *ga*, which indicates only a nominative case, is substituted for the *wa* in 'Jiro-wa' as (??), while the sentence as (??) which has not *shikashi* but the conjunction *soshite*, which corresponds to *and* in English, would be appropriate.

(21) ?? Taro-ga Hanako-ni hanataba-wo age-ta.
Taro-NOM Hanako-DAT hanataba-ACC give-PAST.
Taro gave Hanako a bouquet.

shikashi Jiro-*ga* Hanako-ni tegami-wo watashi-ta.
but Jiro-NOM Hanako-DAT letter-ACC give-PAST.
But Jiro gave Hanako a letter.

(22) Taro-ga Hanako-ni hanataba-wo age-ta.
Taro-NOM Hanako-DAT hanataba-ACC give-PAST.
Taro gave Hanako a bouquet.

soshite Jiro-*ga* Hanako-ni tegami-wo watashi-ta.
and Jiro-NOM Hanako-DAT letter-ACC give-PAST.
And Jiro gave Hanako a letter.

Moreover, only one of noun phrases which are focused on by *wa* should be a key of contrast[10]. Since the sentence (??) has a contrastive *wa* but it appears in the shared part, it is anomalous.

(23) Taro-ga Hanako-ni hanataba-wo watashi-ta
Taro-NOM Hanako-DAT hanataba-ACC watashi-PAST
Taro handed Hanako a bouquet.

shikashi Jiro-ga Hanako-ni-wa
but Jiro-NOM Hanako-DAT-*wa*|[+TOP,+CNT]
tegami-wo watashi-ta
tegami-ACC watashi-PAST
But Jiro handed Hanako a letter.

From the observations, the function of *shikashi* in the direct contrast use is described as follows in our feature system.

[10] We do not have the way to explain that *wa* marks not a value of contrast but a key of contrast. That is just our view based on the fact that it is *wa* that has contrastive meaning.

Principle 2 (Interaction between *shikashi* and *wa*) Shikashi *in the direct contrast use picks up one of constituents marked by* wa|[+CNT] *as the key of contrast and makes it* wa|[−TOP].

Now, the sentences (??), (??),(??) and (??) show the property that a next sentence has dominant position in constructing contrast structures. That is, the word order of the next sentence determines the contrast structure, on the other hand, the word order of the previous sentence may have no effects[11].

(24) Taro-ga Hanako-ni hanataba-wo watashi-ta.
Taro-NOM Hanako-DAT bouquet-ACC hand-PAST.

shikashi Taro-wa
but Taro-*wa*|[+TOP,+CNT]
Madoka-ni-wa tegami-wo watashi-ta.
Madoka-DAT-*wa*|[−TOP,+CNT] letter-ACC hand-PAST.

(25) Taro-ga hanataba-wo Hanako-ni watashi-ta.
Taro-NOM bouquet-ACC Hanako-DAT hand-PAST.

shikashi Taro-wa
but Taro-*wa*|[+TOP,+CNT]
Madoka-ni-wa tegami-wo watashi-ta.
Madoka-DAT-*wa*|[−TOP,+CNT] letter-ACC hand-PAST.
(cf. (??))

(26) ?? Taro-ga Hanako-ni hanataba-wo watashi-ta.
Taro-NOM Hanako-DAT bouquet-ACC hand-PAST.

shikashi Taro-wa Madoka-ni
but Taro-*wa*|[+TOP,+CNT] Madoka-DAT
tegami-wa watashi-ta.
letter-*wa*|[−TOP,+CNT] hand-PAST.

(27) Taro-ga Hanako-ni hanataba-wo watashi-ta.
Taro-NOM Hanako-DAT bouquet-ACC hand-PAST.

shikashi Taro-wa tegami-wa
but Taro-*wa*|[+TOP,+CNT] letter-*wa*|[−TOP,+CNT]
Madoka-ni watashi-ta.
Madoka-DAT hand-PAST.

It may be one of reasons that the contrasted value is controlled by the position of *wa*|[−TOP,+CNT], which represents the key of contrast. For instance, consider the followings, which are the next sentences of (??) and (??).

(28) Taro-wa Madoka-ni
Taro-*wa*|[+TOP,+CNT] Madoka-DAT
tegami-wa watashi-ta.
letter-*wa*|[−TOP,+CNT] hand-PAST.

(29) Taro-wa tegami-wa
Taro-*wa*|[+TOP,+CNT] letter-*wa*|[−TOP,+CNT]
Madoka-ni watashi-ta.
Madoka-DAT hand-PAST.

[11] Since the constraint of *wa* ??, ?? and ?? are applied to the following examples, the second *wa* of each example becomes *wa*|[−TOP,+CNT].

While (??) has only one implicature, that is, the contrast (tegami-wa 'letter-CNT',ϕ(=POS)) $\Leftrightarrow$ (*something-else*-wa '*something-else*-CNT', NEG), (??) may have one more implicature of the contrast (tegami-wa 'letter-CNT', madoka-ni 'Madoka-DAT') $\Leftrightarrow$ (*something-else*-wa '*something-else*-CNT', *someone-else*-ni '*someone-else*-DAT'), which matches the contrast structure of (??). Based on these observations, we propose the following principle:

Principle 3 (Scope of contrastive *wa*) *A key of contrast is marked by* wa_i|[+CNT]. *If it has the feature* [−TOP,+CNT], *the contrasted value for it should appear after* wa_i.

Employing the principle, we can explain the anomaly of (??), which does not satisfy the principle.

5 Indirect contrast

In the previous section, we dealt with the case in which all items of a contrast structure made by *shikashi* appear explicitly in two sentences. However, there are many situations in which *shikashi* is used in non direct contrast use. For example, the following is an ordinary usage of *shikashi*, in which some items of the contrast structure do not appear.

(30) Jiko-ga a-tta.
accident-NOM occur-PAST
An accident occurred.

shikashi keganin-wa de-naka-tta
but injured_person-*wa*|[+TOP,+CNT] occur-NEG-PAST
But there is no injured person.

Moreover, as the following example, there are some cases that the next sentence of *shikashi* can have each polarity.

(31) Kare-wa kawa-de obore-ta.
he-TOP river-LOC is_drowning-PAST
He was drowning in a river.

shikashi tamatama hito-ga toorikaka-tta.
but accidentally someone-NOM pass_by-PAST
But someone happened to pass by.

(32) Kare-wa kawa-de obore-ta.
he-TOP river-LOC is_drowning-PAST
He was drowning in a river.

shikashi dare-mo toorikakara-naka-tta.
but someone-TOP pass_by-NEG-PAST
But unfortunately no one passed by.

It seems that the examples described above show the general usage of *shikashi*. While, at a glance, it seems that they are based on some inference such as prediction, it is not clear what connection hold between the contrast function of *shikashi* and such inference. In this paper, we propose a viewpoint that such cases, which include some inference, are emerged from both the meaning of *shikashi* that is, the attitude of the speaker that he/she sets a contrast relation, and hearer's cognitive process as follows.

1. While *shikashi* should express some contrast relation, any contrast relation does not appeared explicitly. Therefore the hearer would assume some contrast relation based on one sentence and obtain a contrasted proposition from the contrast relation.

2. Then in order to connect coherently between the contrasted proposition and the proposition expressed by the other sentence.

We call such case *indirect contrast.*

Definition 2 (Indirect contrast) Indirect contrast *is one of usages of* shikashi *in which direct contrast holds between the proposition expressed by the next sentence (or the previous sentence) of* shikashi *and the proposition derived from the proposition expressed by the previous sentence (or the next sentence, respectively) with some inference rules which connect among propositions, such as causal relations, predictions, planning, and so on.*

5.1 Analysis as indirect contrast

The reason why *shikashi* in the indirect contrast use usually expresses some violated expectation is that some contrast relation would hold between some expected situation and the described, usually real, situation. That is, it is the point that in the process of retrieving direct contrast we take account of not only items expressed in the considering sentence explicitly but also the condition '*in that situation*', which the sentence has implicitly, as an optional candidate of items for contrast structures. For example, we will show our account of (??). Since the next sentence of the example may be rewritten with its implicit condition as follows:

(33) (*in that situation*)
(*in* S_a (=*that situation*))$_{\mathrm{opt}}$
keganin-wa de-naka-tta
injured_person-*wa*|[+TOP,+CNT] occur-NEG-PAST
(*in that situation*) there is no injured person.

the candidates for direct contrast should be the following contrast structures. Where α and β are variables and ϕ means the null expression.

(34) $$\frac{(\alpha,\beta)\Leftrightarrow\left(in\ S_a,\ \begin{matrix}\text{keganin-wa}\\ \textit{injured\_person-wa}|[+\text{TOP},+\text{CNT}]\end{matrix}\right)}{\begin{matrix}\theta_\alpha\ \theta_\beta\ \text{de-naka-tta}\\ \text{occur-NEG-PAST}\end{matrix}}$$

(35) $$\frac{(\alpha,\phi(=\text{POS}))\Leftrightarrow(in\ S_a,\ \text{NEG})}{\begin{matrix}\theta_\alpha\ \text{keganin-wa} & \text{de-}\theta_\beta\text{-ta}\\ \textit{injured\_person}\text{-TOP} & \text{occur-}\ \theta_\beta\text{-PAST}\end{matrix}}$$

(36) $$\frac{(\beta,\phi(=\text{POS}))\Leftrightarrow\left(\begin{matrix}\text{keganin-wa}\\ \textit{injured\_person-wa}|[-\text{TOP},+\text{CNT}],\end{matrix}\ \text{NEG}\right)}{\begin{matrix}\theta_\beta\ \text{de-}\theta_\gamma\text{-ta}\\ \text{occur-}\theta_\gamma\text{-PAST}\end{matrix}}$$

First of all, it would be hard for (??) to be constructed because of the constraint (??) of direct contrast. In contrast to that, (??) and (??) can be constructed with no violation of constraints. The followings are the sentences retrieved from the possible contrast structures, which exist implicitly and are contrasted with the next sentence, as we supposed.

(37) α
α ($\Leftrightarrow$ *in* S_a)
keganin-wa de-ta.
injured_person-*wa*|[+TOP,+CNT] occur-PAST
In some other situation α, there were some injured persons.

(38) β de-ta.
β ($\Leftrightarrow$ injured_person-*wa*|[−TOP,+CNT]) occur-PAST
Something else β occurred.

The next stage is finding some inference rules and assigning some contrasted items to the variables α and β to make some connection between the proposition expressed by (??) (or (??)) and the proposition expressed by the previous sentence:

(39) Jiko-ga a-tta.
accident-NOM occur-PAST
An accident occurred.

Our assumption for this stage is as follows:

Assumption 3 (Requirement of indirect contrast) *In order for an indirect contrast by* shikashi *to be held, appropriate values should be assigned consistently by some consistent inference to all variables in the contrast structure retrieved from either the previous sentence or the next sentence.*

That is, (??) will be one of interpretations of (??) if some condition which can be contrasted with *in* S_a is assigned to α. For instance, "in a typical situation" would be assigned to α if the hearer has some default rule such as follows:

(40) a. "An accident occurs." $\Rightarrow$ "*In a typical situation*, there are some injured persons."
b. accident(X)$\wedge$ situation(S) $\wedge$ occurs_in(X,S) $\Rightarrow$ (typical(S) $\Rightarrow$ injured_person(Y) $\wedge$ occurs_in(Y,S))

Where (??) is more precise version of the rule (??), which is represented in an intuitive way. In the same way, (??) will be an interpretation of (??) if some candidate which can be contrasted with *injured_person*-CNT is assigned to β. If the hearer has the following default inference rule, "*some other damages*" would be assigned to β.

(41) a. "An accident occurs." $\Rightarrow$ "In a typical situation, there are some other damages."
b. accident(X)$\wedge$ situation(S) $\wedge$ occurs_in(X,S) $\Rightarrow$ (typical(S) $\Rightarrow$ damages(Y) $\wedge$ occurs_in(Y,S))

In the case of (??), the condition "in a typical situation" becomes one of necessary information for contrast structure, because the next sentence rejects the result of inference derived from the default rule (??) and the previous sentence. On the other hand, in the case of (??), since the default rule (??) is used actually, the condition does not appear in the contrast structure.

5.2 The case in which either positive polarity or negative one is available

In this section, we will consider the case in which either positive polarity or negative one is available in the next sentence of *shikashi* such as (??). The usage of *shikashi* such as (??) is called the *pseudo usage* of *shikashi*, in which there is no causal relation between the previous sentence and the next sentence, and some conjunctions which is said to express a *violated expectation*, for example, *but* in English, *mais* in French, and so on, have same function(?). This usage would be explained with the following formalization by ?, Ducrot(?), and so on:

(42) Violated Expectation:
In "S_0 *but* S_1", infer P from the assertion of S_0 and $\neg P$ from the assertion of S_1.

? said that such formalization is over generalization and the pseudo usage of *shikashi* would be explained as the derivation of the sentence "P *shikashi* R" from "P *shikashi* R-nanode 'because of R' Q". However, Sakahara's account cannot explain the usage of *shikashi* in (??). On the other hand, in the over generalized account (??), it is not clear what propositions P and $\neg P$ should be inferred from the previous sentence and the next sentence of *shikashi*. That is, the following points are problematic. The fact that both (??) and (??) are available means that there are several candidates for such inferences. But it has not been clear what connection exist between the selection of inference and the assertions of the previous sentence and the next sentence. Our claim in this paper is that pseudo usage of *shikashi* should be treated not as the matter of a statement of causal relation but as the matter of a statement of some planning. According to whether requirements for the plan are available or not, we would make two types of sentences. That would be explained in our framework as the fact that there are two ways to make a contrast structure in indirect contrast, that is, by using a previous sentence and by using a next sentence. As far as we considered, sentences of this type have the structure in which the statement of the previous sentence generates some goal and the next sentence describes some requirements to achieve the goal. In contrast with it, the example in the previous section is of the causal relation type in which the next sentence describes some result of the event expressed by the previous sentence. In the usage of *shikashi* of the causal relation type, only one polarity would appear in the next sentence because such a sentence describes the contrast between expectation and some result already happened. For example, the following sentence is anomalous:

(43) ??Jiko-ga a-tta.
accident-NOM occur-PAST
An accident occurred.

shikashi, keganin-wa de-ta
but injured_person-*wa*[+TOP,+CNT] occur-PAST
But there were some injured persons.

On the other hand, the usage of *shikashi* in planning type sentence, such as (??), can describe two situations, that is, a situation in which a certain goal would be achieved and a situation in which it would not be achieved according to whether the requirement of the plan to achieving the goal is satisfied, which is described in the next sentence.

- The case that the next sentence states that a certain requirement of the plan is not satisfied:
  A contrast relation stands between the situation described the next sentence and the expected situation of the previous sentence in which the requirement is satisfied and therefore goal would be achieved.

- The case that the next sentence states that a certain requirement of the plan is satisfied:
  A contrast relation stands between the situation of the previous sentence, in which some goal would be set to resolve the problem of that point but it has not been achieved yet, and the situation in which the problem would be settled by carrying out the plan with the requirement.

Now, we will explain our intuition described above with indirect contrast. The point is that there are two ways to make a contrast structure, that is, making it from the previous sentence and making it from the next sentence. For example, we will explain the case (??).

The case (??)

First of all, it may depend on the hearer which goal would be assigned to the initial situation "kare-wa kawa-de obore-ta 'he-TOP river-LOC is_drowning-PAST' ", but in the typical case the goal would be the situation in which "he have been rescued", and the plan would be the one to achieve the goal. The contrast structure retrieved from the previous sentence would be as follows:

(44) $\underline{(in\_that\_situation,\ \phi(=\text{POS}))\Leftrightarrow(\alpha,\text{NEG})}$
θ_α kare-wa kawa-de obore-θ_γ-ta
θ_α he-TOP river-LOC is_drowning-θ_γ-PAST

This structure shows that the information contrasted with the previous sentence is the information "α kare-wa kawa-de obore-naka-tta 'in the situation α, he-TOP river-LOC is_drowning-NEG-PAST' ", which shows the situation after achieving the goal. If there exists a plan to achieve the goal under the condition expressed by the next sentence "tamatama hito-ga toorikaka-tta 'unfortunately someone-NOM pass_by-PAST' ", the state "the plan has done" would be assigned to α . Since such a plan may exist, the indirect contrast should be held because of the assumption ??. The condition expressed by the next sentence would be one of the requirements of the plan.

The case (??)

The contrast structure retrieved from the next sentence would be as follows:

(45) $\underline{(\beta,\phi)\Leftrightarrow(in\_that\_situation,\text{NEG})}$
θ_β tamatama hito-ga toorikaka-θ_γ-tta.
θ_β accidentally someone-NOM pass_by-θ_γ-PAST

Therefore, what is in contrast with the statement of the next sentence would be the statement of the sentence "In the situation β, someone happened to pass by." In order for the statement to have some connection with the plan generated from the previous sentence, the condition "in the situation in which the plan would be tried" should be assigned to the variable β. Since the condition β is in a contrast relation with *in_that_situation*, it is not an actual situation. Some imaginary condition, in which the plan would be tried, may be assigned to β. In such an imaginary situation, it would be successful to make a plan to achieve the goal, with the same manner as (??). Therefore, because of the assumption ??, this indirect contrast may be meaningful.

6 Conclusion

In this paper, we described the function of the conjunction *shikashi* from the viewpoint of the contrastive function. We showed that various usages of *shikashi* can be explained uniformly as the contrastive function of *shikashi*, which includes direct contrast, which corresponds to the normal contrast relation, and indirect contrast, which consists of direct contrast and some inference. However we could not consider the case in which *shikashi* connects complex sentences like conditionals. It should be discussed in our future works.

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