Nouniness, Factive and Implicative Readings: Japanese *Wasure-* ('Forget')*

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1 Introduction

This paper is about the Japanese verb *wasure-* ('forget') in construction with sentential *koto-* and *no*-arguments (= tensed clauses followed by *koto* / *no*).

(1) nom-u { koto / no }-o wasure-ta-ri, non-da {
take-PRES { koto / no }-ACC forget-PAST-CONNECTOR take-PAST {
koto / no }-o wasure-nai yoo-ni su-ru.
koto / no }-ACC forget-NEG yoo-ni do-PRES
'Do not forget to take it [the medicine], nor forget having taken it.'
[Instructions on taking medication, BCCWJ]

Like *forget* in English, *wasure-* can have factive and implicative readings when it combines with sentential arguments. We introduce these notions in detail in the next section. The empirical goal of this paper is to explore the

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frequency of these readings based on a corpus study in relation to (a) different argument-types (*koto*- vs. *no*-arguments) and (b) different temporal and aspectual forms in the embedded clause (mainly: present vs. past). Given our findings, we discuss different options for their analysis with a focus on *koto*. Our tentative conclusion is that the different readings can be traced back to a flexibility in the lexical meaning of *wasure*- that is conceptually restricted by the choice of tense/aspect forms in the embedded clause. Both *koto*- and *no*-arguments are semantically neutral with respect to factive and implicative readings. There is nonetheless a tendency that *no*-arguments are prefered over *koto*-arguments in expressing implicative readings. This may be due to the different roles that *koto*- and *no*-arguments play elsewhere in Japanese.

2 Background: Implicative and Factive Readings With *Forget*

The English verbs *claim* and *forget* can both combine with finite *that*-clauses and with infinitival *to*-clauses, as illustrated in (2) and (3), respectively.

(2) a. Sue$_i$ claims that she$_i$ is taking the medicine.
b. Sue$_i$ claims PRO$_i$ to be taking the medicine.

(3) a. Sue$_i$ forgot that she$_i$ is taking the medicine.
b. Sue$_i$ forgot PRO$_i$ to take the medicine.

There are crucial semantic differences between the pairs in (2) and (3): First, while the sentences in (2) may be used to express the same truth conditions in a given context; the sentences in (3) report the forgetting of different things: (3-a) reports that Sue forgot a certain fact, namely, that she was taking the medicine; (3-b) reports that Sue forgot to perform a certain action, namely, the action of taking the medicine. Second, while both sentences in (2) neither entail nor presuppose the truth of their complement; the sentence in (3-a) presupposes the truth of its complement; the sentence in (3-b) entails its falsity.

(4) FACTIVE INFERENCE PATTERN
a. Sue forgot that she was taking the medicine.
$\rightsquigarrow$ 'Sue was taking the medicine.'
b. Sue didn't forget that she was taking the medicine.
$\rightsquigarrow$ 'Sue was taking the medicine.'

(5) (NEGATIVE) IMPLICATIVE INFERENCE PATTERN
a. Sue forgot to take the medicine. $\rightsquigarrow$ 'Sue didn't take the medicine.'
b. Sue didn't forget to take the medicine. $\rightsquigarrow$ 'Sue took the medicine.'

The alternation between a knowledge-related factive interpretation and an action-related (negative) implicative interpretation, as we find it for English *forget*, we want to call "**Fact/act-alternation**".

If we try to relate the Fact/Act-Alternation in English to grammatical properties of the complement clauses, we find that there are two grammatical dimensions that have influence on the semantic interpretation: (a) the choice of COMPLEMENT-TYPE and (b) the choice TENSE/MOOD AND ASPECT in the embedded clause. A valid generalization with respect to the choice of complement-type seems to be: **G1** *The use of a finite 'that'-clause excludes implicative readings.* To generalize that infinitivals exclude factive readings, on the other hand, may be too strict. In German, where the grammatical facts are very similar to English, we do find infinitivals that clearly are knowledge- and not action-related and seem to introduce a fact rather than an action.

(6) Denn das Meer ist so ruhig und die Disney Magic mit 83000 Tonnen so kolossal, dass man unterwegs schon mal vergessen kann, auf einem Schiff zu sein. Die Zeit, 09.03.2000, Nr. 11

literally: 'Because the sea is so calm and the Disney Magic with 83000 tons so colossal that you can sometimes forget to be on a ship (= that you are on a ship).'

(7) Frisch geschieden, wollen viele am liebsten vergessen, jemals verheiratet gewesen zu sein. Die Zeit, 05.08.1994, Nr. 32

literally: 'Newly divorced, many would like to forget to ever have been married (= that they were ever married).'

With respect to TENSE/MOOD AND ASPECT, we have to note another difference between the sentence pairs in (2) and (3): While the sentences in (2) both feature progressive forms in the embedded clause, only the sentence in (3-a) features a progressive form. If we change the verbal form in (3-b) to a progressive form, resulting in (8), the sentence sounds marked and a factive reading becomes more salient.

(8) ??Sue$_i$ forgot PRO$_i$ to be taking the medicine.

What the sentences in (6)-(8) seem to have in common is that the predicates in the embedded clause exclude an interpretation as an intended action either by their lexical meaning, (6), or by their temporal/aspectual form, (7) and (8). A valid generalization seems to be: **G2** *If an embedded predicate excludes an interpretation as an intended action by its lexical meaning or its temporal/aspectual form, then it excludes an implicative interpretation.* The reason for this is conceptual in nature: Implicative readings relate to intended actions. If the lexical meaning or the grammatical form of the predicate excludes reference to an intended action, an implicative reading is unavailable.

3 Motivation for a Corpus Study

The example in (1) already suffices to illustrate that we find the same Fact/Act-alternation for *wasure-* in Japanese as we find for *forget* in English. Different from English, neither the choice of a *koto-* nor of a *no*-argument already decides in favour of one reading over the other. In fact, in the example in (1) *koto* and *no* seem to be interchangable. This is particularly surprising for *koto*-arguments since *koto*-arguments are typically associated with factivity and sometimes are even analysed as having the lexical meaning 'the fact that'.

If we assume that the choice between sentential *koto-* and *no*-arguments belongs to the grammatical dimension COMPLEMENT-TYPE, we have to conclude that the grammatical dimension COMPLEMENT-TYPE is not as decisive a category in Japanese as it is in English. Neither *koto-* nor *no*-arguments seem to have the disambiguating effect of a finite *that*-clause in English.

The goal of our empirical study is therefore to explore (a) whether there is nevertheless a tendency for *koto-* or *no*-arguments to favour an implicative or factive reading and (b) whether there is confirmation for the similarity to English and German in the grammatical dimension TENSE/MOOD AND ASPECT, as we would expect it on the assumption of its conceptual nature. We focus on the temporal interpretation.

4 Corpus Study

We report data of *wasure*-related occurrences from the Balanced Corpus of Contemporary Written Japanese, **BCCWJ** (Maekawa et al., 2014) and the Corpus of Everyday Japanese Conversation, **CEJC** (Koiso et al., 2022). We also searched *wasure*-related utterances in child corpora (CHILDES), specifically **MiiPro Corpus** (Miyata, 2012a) and **Miyata Corpus** (Miyata, 2012b) to report implications.

We found 2181 occurrences of *wasure-* in BCCWJ and CEJC. We coded the data according to the part of speech of the complement (noun, verb stem, or finite clause), tense information of verb if finite clause (present or past), the use of *koto* or *no*, and the interpretation (factive or implicative). The results from 1148 relevant occurrences, which contain a finite clause in its complement, are shown in the following table and the figure.[1]

[1] An example of "minority"-type, **V-PRES-no-ACC wasure** on a factive reading:

(i) Mado-o akete-iru-no-o wasurete fuufu genka-o sita-ra, [...]
window-ACC open-STATIVE-no-ACC forget marital quarrel-ACC did-when [...]
oowarai sare masi-ta. (BCCWJ)
big:laughter PASSIVE polite-PAST
'We forgot that the window was open and had a marital quarrel, then we had the neighbor laugh out loud.'

String	Factive	Implicative
[$_{mat}$ [$_{emb}$ ... PAST]-koto/-no/-ka wasure-*]	282, 100%	0, 0%
[$_{mat}$ [$_{emb}$ ... PRES]**-koto** {-o/-∅/-sae/-mo} wasure-*]	272, 68%	126, 32%
[$_{mat}$ [$_{emb}$ ... PRES]**-no** {-o/-∅/-sae/-mo} wasure-*]	103, 22%	365, 78%

Table 1. Results from 1148 relevant occurrences

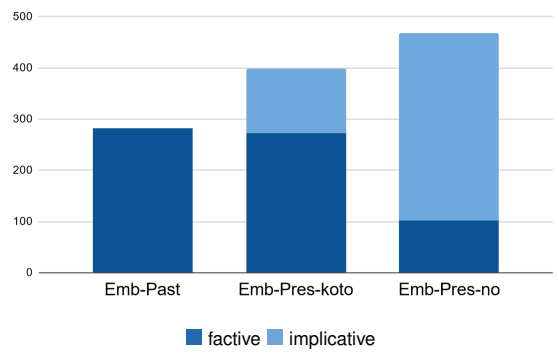

Figure 1. Interpretations by embedded tense and nominalizer type

All the instances where the past tense is used in the complement had the factive reading, regardless of the use of *koto* or *no*. This is in agreement with **G2** from above. Besides that, we observe several things: First, we found more occurrences with present tense than with past tense in the complement of *forget* in the BCCWJ and CEJC corpora. Secondly, our corpus study confirms that both *koto* and *no* are compatible with both factive and implicative readings. Furthermore, we found that *koto* has a tendency for factive readings while *no* has a tendency for implicative readings. Finally, we note that there were relatively more factive interpretations in BCCWJ and CEJC combined.

The MiiPro corpus and the Miyata corpus contain data from four children and surrounding adults and three children and surrounding adults, respectively. The children's ages range from one year and two months to five years old (MiiPro) and one year and three months to three years old (Miyata). We found a total of 34 occurrences of *wasure-* in those corpora. The breakdown of the speakers and interpretations are summarized in Table 2. There were 2 occurrences of **V-PAST-no wasure** and 1 occurrence of **V-PAST-ka wasure** by adults, which accounted for all the instances of factive uses in our data. Of 18 implicative uses by adults, 16 were in the form of **V-PRES-no wasure**. Since the number of data is small, we included 1 occurrence of **V-STEM wasure** and 1 occurrence of **Noun wasure** in Table 2, both of which had the implicative interpretation. Of 13 occurrences by children, we could identify

the intended interpretations for 12 occurrences, all of which are implicative. There were 3 utterances which contained errors; but we were able to identify the interpretation based on the context or by the notes by transcribers.[2]

Speaker	Factive	Implicative	Error	Unclear	**Total**
Adults (mother, investigator)	3, 14% PAST-no/-ka	18, 86% PRES-no	0	0	**21**
Children	0, 0%	12, 100% PRES-no	(3) (implicative)	1	**13**

Table 2. Results from child corpora

Although the data are limited, we observed that not many factive uses were found (only a few by adults; no utterances from a child). Also, we did not find any utterances where the embedded clause was headed by *koto*.[3]

5 Exploring Theoretical Options

Despite the fact that both *koto*- and *no*-arguments can be used on a factive interpretation, it is clear that neither *koto* nor *no* can mean 'the fact that' by their lexical meaning; see also the discussions in Makino (2003); Hiraiwa (2010); Uchibori (2000). A weaker assumption is called for. In this section, we focus on two theoretical options for an analysis of *koto*.

5.1 Theoretical Option I: *Koto* as a Definite Description Operator

A theoretical option that we have to consider is the option that *koto* may denote a definite description operator as proposed by Bogal-Allbritten and Moulton (2018) for Korean *kes*. This hypothesis is motivated against the background of the assumptions that *koto* is the Japanese counterpart of Korean *kes*, cf. Lee (2019).

Without having to go into the details of Bogal-Allbritten and Moulton (2018)'s analysis of *kes*, it seems to be intuitively plausible to assume that *koto*-arguments in construction with *wasure*- denote facts or actions. But this

[2] An example of erroneous utterance:

(ii) Roosoku tukete-nai-no wasure-ta (3;08, Arika, MiiPro).
candle light-NEG-no forget-PAST
'I forgot to light the candle', wrong for "Roosoku tukeru-no wasureta"

[3] We list here future directions as a part of the first language acquisition project. Given that the child-directed speech does not contain many occurrences of factive uses, we would like to investigate if children know that when V-PAST or V-STATIVE is embedded a factive interpretation is more prominent or the only available. Also, we would like to find out if they know that *koto* works similarly as *no*.

intution may have a deeper conceptual basis. Cross-linguistic evidence suggests that event- or fact-denoting DPs with 'forget'-type predicates have to be definite and cannot be indefinite, compare (9-a) vs. (9-b) from German.

(9) a. Sue hat das Anstoßen vergessen.
Sue has the toasting forgotten.
Reading A: 'Sue forgot **to do** the toasting.' ⇝ implicative
Reading B: 'Sue forgot **that** the toasting **happened**.' ⇝ factive
b. *Sue hat ein Anstoßen vergessen.
Sue has a toasting forgotten.

While the cross-linguistic data is compatible with the assumption that *koto*-arguments are definite DPs, they call into question the necessity to attribute the definiteness effect to *koto* since a corresponding interpretation seems to be forced on us on independent grounds. If we want to claim that *koto* denotes a definite description operator, we have to find further evidence.

If we have a look at the uses of *koto* elsewhere in Japanese grammar, we don't find evidence in support of the assumption that *koto* is a definite description operator. To the contrary. It seems that *koto* is a regular noun that can be modified by adjectives, as in (10-a), and combine with demonstrative determiners, such as *sono* / *ano* in (10-b) – even when it picks up a proposition or a given fact from the discourse context.

(10) a. Sore-wa yoi koto des-u ne.
DEM-TOP good koto be-PRES PRT
'This is (a) good (thing), isn't it.'
b. {Sono / Ano} koto-wa shira-nai.
{DEM / DEM} koto-TOP know-NEG
'I don't know this.'

If *koto* were a definite description operator in the examples with *wasure-*, *koto* in (1) and *koto* in (10) would have to be different lexical items.

Also problematic for this assumption are sentences like (11) that express an unspecific liking. Similar as in the English translation, there is no reason to assume that the object of an unspecific liking as expressed in (11) should be denoted by DP that is underlyingly definite.

(11) Terebi-o mi-ru koto-ga suki des-u.
TV-ACC see-PRES koto-NOM liked be-PRES
'I like watching TV.'

We therefore conclude that *koto* is not a definite description operator.[4]

[4] A Korean native speaker informs us that all the examples involving *koto* discussed in this paper

5.2 Theoretical Option II: *Koto* as a Noun

Our theoretical conclusions with respect to *koto* are (a) that it doesn't mean 'the fact that' and (b) that it doesn't denote a definite description operator as proposed by Bogal-Allbritten and Moulton (2018) for *kes* in Korean. In this section, we explore an analysis on which *koto* is a transitive noun that takes a proposition as its internal argument.[5] The proposal is more a proof of concept than a fully spelled out theory. The flexibility of *koto* to denote facts, events or individuals depending on the context is modelled by the assumption that the things that *koto* is true of are situations in the sense of Kratzer (2002), which include things, events and facts. The exemplification relation is similar to the relation that Bogal-Allbritten and Moulton (2018) assume for *kes*.

(12) $[\![\textbf{koto}]\!] = \lambda w.\ \lambda p.\ \lambda s'.\ s'$ is a salient part of the situation s that exemplifies p in w

We assume that *koto*-arguments like other nominal arguments in Japanese may come with a silent determiner. This could be a definite or an indefinite determiner or some other operator. In the case of the examples with *wasure-*, it is a definite determiner. Similar as is commonly assumed for overt determiners, we assume that if a definite determiner can be used, it has to be used; cf. Heim (1991). That a definite determiner can always be used with a fact- or action-denoting argument is due to the meaning of *wasure-*. We follow standard assumptions about the interpretation of tensed clauses in Japanese.

(13) $[\![[[[[\ \textbf{pro}_i\ \textbf{keeki-o tabe}\ ]\ \textbf{-ru}\ ]\ \textbf{koto-o}\ ]\ \varnothing_{\text{the}}\ ]]\!]^{t,g} = \lambda w.\ (\iota s')(s'$ is a salient part of the situation s that exemplifies $(\lambda w.\ (\exists t')(t \leq t'\ \&\ g(i)$ eats cake at t' in $w)))$ in $w)$

(14) $[\![[[[[\ \textbf{Taroo keeki-o tabe}\ ]\ \textbf{-ta}\ ]\ \textbf{koto-o}\ ]\ \varnothing_{\text{the}}\ ]]\!]^{t,g} = \lambda w.\ (\iota s')(s'$ is a salient part of the situation s that exemplifies $(\lambda w.\ (\exists t')(t' \leq t\ \&$ Taroo eats cake at t' in $w)))$ in $w)$

The meaning of *wasure-* is the same on implicative and factive readings. The difference in readings is determined by the context and constrained by the tense and aspect forms in the embedded clause. *wasure-* means that the subject doesn't think of the object during a time (interval) t and presupposes that it intended to do so. We assume that the second part is a presupposition.

– even the nouny and non-definite ones discussed in this subsection – can be translated to Korean using *kes*. This is in agreement with Lee (2019)'s assessment that *koto* is the Japanese counterpart of Korean *kes*. If this is the case, all the arguments against an analysis of *koto* as a definite description operator should carry over to Korean *kes*. Future research will have to show to what extend this is the case.

[5] If *koto* is used without an overt internal argument, the argument may be provided by the context.

(15) $[\![\textbf{wasure-}]\!]^{t,g}$ = $\lambda w.\ \lambda C_{se}.\ \lambda x.\ x$ intended to think of C during t in w. x doesn't think of C during t in w

On the conceptual side, we assume that individuals that intend to think of a thing are mentally acquainted with the thing in one way or other, i.e., they have a mental file for it. This motivates the use of the definite determiner. The presupposition of the definite determiner is satified with respect to this mental file. This gives us:[6]

(16) $[\![$ **Suu**$_i$**-wa** [[[[[**pro**$_i$ **keeki-o tabe**] **-ru**] **koto-o**] $\varnothing_{\text{the}}$] **wasure**]]$]\!]^{t,g}$
= λw. Sue intended to think of [$\lambda w.\ (\iota s')(s'$ is a salient part of the situation s that exemplifies $(\lambda w.\ (\exists t')(t \leq t'$ & Sue eats cake at t' in $w)))$ in $w)$] during t in w. Sue doesn't think of [$\lambda w.\ (\iota s')(s'$ is a salient part of the situation s that exemplifies $(\lambda w.\ (\exists t')(t \leq t'$ & Sue eats cake at t' in $w)))$ in $w)$] during t in w

(17) $[\![$ **Suu-wa** [[[[[**Taroo-ga keeki-o tabe**] **-ta**] **koto-o**] $\varnothing_{\text{the}}$] **wasure**]]$]\!]^{t,g}$
= λw. Sue intended to think of [$\lambda w.\ (\iota s')(s'$ is a salient part of the situation s that exemplifies $(\lambda w.\ (\exists t')(t' \leq t$ & Taroo eats cake at t' in $w)))$ in $w)$] during t in w. Sue doesn't think of [$\lambda w.\ (\iota s')(s'$ is a salient part of the situation s that exemplifies $(\lambda w.\ (\exists t')(t' \leq t$ & Taroo eats cake at t' in $w)))$ in $w)$] during t in w

A salient situation that is a part of a situation that exemplifies a proposition about the past can only be a fact or a part of a fact. A salient situation that is a part of a situation that exemplifies a proposition that is about the subject's future actions may well be an action that the subject plans to perform. This predicts that we get an implicative reading only with an embedded non-past marked clause when the subject is correferent with the matrix subject.

6 Concluding Remarks on *Koto* Versus *No*

There are examples with *wasure-* where *koto* cannot be replaced by *no*, (18). The reason in (18) is that *koto* but not *no* can combine with a relative clause to denote a content[7] (= what the teacher said) that may be forgotten.

(18) Watasi-wa sensei-ga i-tta {-koto / *-no} -o
I-TOP teacher-NOM say-PAST {-koto / *-no} -ACC
wasure-te imasita.
forget-STATIVE
'I forgot what the teacher said.'

[6] In a more detailed analysis, the embedded subject in (16) should receive a *de se* interpretation.

[7] "Content" is understood in the sense of Kratzer (2006); Moulton (2015); but the way to refer to it here is by way of a DP.

Against this background we speculate that the difference between *koto*- and *no*-arguments may be similar to the difference between nominal (= definite DPs) and verbal ways (= infinitivals) of referring to facts/actions in English or German. Although typically blocked by the availability of an unambiguous finite 'that'-clause, inifinitivals can in principle be used to refer to facts if the temporal/aspectual forms clearly indicate a factive use. Since there is no *that*-like clause-type in Japanese that excludes implicative readings, *no*-arguments are not blocked and may therefore be used more frequently with reference to facts than infinitivals in English; but less frequently than *koto*-arguments due to their more verbal character.

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