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The Semantics and Pragmatics of the Japanese Evidentials -*Rashii*, -*Sooda*, and -*Yooda*: an Experimental Investigation

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ABSTRACT

The Semantics and Pragmatics of the Japanese Evidentials
-Rashii, *-Sooda*, and *-Yooda*: an Experimental Investigation

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Languages provide expressions that allow its users to indicate their source of information for a given claim, which can have an effect of attenuating how committed they appear to be to the truth of their claims (e.g., *ame-ga futteiru-**sooda*** 'It is raining, **I hear**'). This linguistic notion has been termed EVIDENTIALITY, and Japanese has a rich set of morphosyntactic evidentials that express indirect evidentiality (i.e. *-rashii*, *-sooda*, and *-yooda*) for situations where the speaker only had access to indirect means of arriving at her claim, such as conjecture or hearsay. This dissertation presents a systematic investigation of how features of the context (i.e. the preceding sentences) can affect the interpretation and acceptability of evidential statements, and how this varies with the type of evidential. Study 1 examined the factors of (a) Sensory Information (whether sensory information for a given claim was available to the speaker), and (b) Speaker Conjecture (whether the speaker arrived at her claim via conjecture). Although there was some variability within the Japanese evidentials on how significant these factors were in terms of predicting felicity, there was a notable divide between a reportative evidential statement (exemplified above) and a matrix-clause hearsay one (e.g. *ame-ga futteiru-**to kiita*** '**I heard that** it is raining'). This result prompted Study 2, which examined the factors of (a) Evidence Strength / Source Reliability

and (b) Speaker Conjecture, on the degree of contradiction of an evidential statement that has been modified in the vein of Moore's paradox (e.g. *ame-ga futteiru-**sooda**-ga, futteinai* 'It is raining, **I hear**, but it is not'). The results again showed a divide between *-sooda* (and *-rashii* and *-yooda*) vs. matrix-clause hearsay, leading to the semantic (possible worlds) analysis of these Japanese evidentials as epistemic modals, or as 'epistemic evidentials'. The practical implication is that the utterance of a Japanese evidential statement using *-rashii*, *-sooda*, or *-yooda* generally conveys partial speaker commitment to the truth of the embedded proposition. In addition, this dissertation explores the option of an analysis that does not subscribe to the dichotomy of an evidential element being analyzed either as an epistemic modal or not. Instead, I identify features that are useful for analyzing the epistemic **and** evidential status of any linguistic element that can be used to express evidentiality.

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List of abbreviations

The following abbreviations are used in this dissertation.

1	first person
3	third person
ACC	accusative
B	inanimate
CNJ	conjectural evidential
CNTR	contrast
COMPL	completive
CONJ	conjunction
COP	copula
DAT	dative
DECL	declarative
DET	determiner
DIR	direct evidential
DISTR	distributive
END	end marker
ERG	ergative
EVID	evidential
EXIS	existential

IMPF	imperfective
INF	infinitive
LOC	locative
MOD	modal
NARR	narrative
NEG	negation
NF	non-feminine
NOM	nominative
NONVIS	non-visual
OBJ	object
QUOT	quotative
PASS	passive
PERF	perfect
PL	plural
POSS	possessive
PRES	present
PROCOMP	procomplement
PROG	progressive
PST	past
REC.P	recent past
RES	resultative
RPT	reportative evidential
SEQ	sequence
SG	singular

SUBJ	subjunctive
SUBR	subordinator
TOP	topic
TOP.NON.A/S	topical non-subject case
TRANS	directive transitivizer
VIS	visual

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CHAPTER 1

Introduction and background

1.1. What is evidentiality?

Languages provide various means by which speakers indicate the source of information for some asserted proposition *p*. For example, English speakers are able to indicate that they have acquired some information through hearsay by using the matrix clause *I heard that...* (e.g., *I heard that it is raining*). Alternatively, they are able to indicate that they have directly experienced what they are asserting by the use of *I see that...* (e.g., *I see that it is raining*). Within linguistic theory, this linguistic encoding of information source has been situated within the semantic domain of EVIDENTIALITY, and grammaticalized or morphosyntactic markers that express evidentiality are referred to as EVIDENTIALS. Note that, under this view, the English frames *I heard that...* and *I see that...* are examples of evidentiality but not of a grammaticalized evidential (see Tenny 2006 for a discussion of other evidential verbs or adverbs in English, such as *appears* and *evidently*). This distinction between evidentiality and evidentials will be maintained for the remainder of this dissertation, in line with Dendale & Tasmowski (2001), Murray (2010), and others.

Some languages require that information source be expressed grammatically, by means of a dedicated class of morphemes or an inflectional system (e.g. Cheyenne (Murray 2010), Tucano (Aikhenvald 2004), Tuyuca (Barnes 1984), and Wintu (Aikhenvald 2004)), much like how English has a grammatical requirement that tense be expressed. Other languages (e.g. Cuzco Quechua (Faller 2002), Japanese (Aoki 1986), and St'át'imcets (Matthewson *et al.* 2007)) do not have a grammatical requirement but do have morphosyntactic markers that, when present, are used to

express evidentiality. For example, in (1), the Japanese marker -*sooda* is optionally attached to a tensed sentence in order to indicate hearsay evidence:[1]

(1) ame-ga fut-teir-u-**sooda**
rain-NOM fall-PROG-NPST-**RPT**
'It is raining, **I hear**'.[2]

Although some researchers strictly reserve the term 'evidential' for fully grammaticalized, systematic, and obligatory linguistic markers that encode information source (Aikhenvald 2004), I will adopt Faller's (2002), Matthewson *et al.*'s (2007), and Murray's (2010) position that evidentials need not be grammatically obligatory as long as they are not independent lexical items and can be systematically analyzed as a uniform category sharing a set of features. In other words, an evidential is a linguistic form whose primary function is to encode information source (Faller 2002).

1.2. Cross-linguistic descriptions of evidentiality systems

There is relative consensus regarding the limited number of distinctions within the semantic domain of evidentiality (e.g. Dendale & Tasmowski 2001, Willett 1988). For example, Aikhenvald (2004) posits six semantic parameters claimed to account for the full range of evidential systems in the world: (a) VISUAL (information acquired through sight); (b) SENSORY (information acquired through the other senses, i.e. hearing, smell, taste, touch); (c) INFERENCE (information based on inference from visible or tangible evidence or result); (d) ASSUMPTION (information based on evidence other than visible results, such as logical reasoning, assumption, or general knowledge); (e) HEARSAY (reported information with no overt or explicit reference to the source);

[1]Any non-cited examples will be my own constructed examples as a native speaker of English and Japanese. I was raised in a Japanese-speaking home in the UK/US and received various forms of English and Japanese schooling. I have also consulted with other native speakers of English and Japanese.
[2]The most relevant linguistic element of any given example will be bolded, such as the evidential -*sooda* and the corresponding gloss/translation in this example.

and (f) QUOTATIVE (reported information with overt reference to a source). An example of each is provided from (2) to (7):[3]

(2) diâyɨ wa'î-re yaha-**ámi**
dog fish-TOP.NON.A/S steal-REC.P.**VIS**.3.SG.NF
'The dog stole the fish, **I saw**'.
(visual evidential in Tucano (Aikhenvald 2004:52))

(3) diâyɨ wa'î-re yaha-**ásĩ**
dog fish-TOP.NON.A/S steal-REC.P.**NONVIS**.3.SG.NF
'The dog stole the fish, **I heard the noise**'.
(sensory evidential in Tucano (Aikhenvald 2004:52))

(4) diâyɨ wa'î-re yaha-**ápĩ**
dog fish-TOP.NON.A/S steal-REC.P.**CNJ**.3.SG.NF
'The dog stole the fish, **I inferred**'.
(inferential evidential in Tucano (Aikhenvald 2004:52))

(5) Manuel ano fi-**n-ki**-e
Manuel food eat-**CNJ-DECL**-END
'Manuel ate'.
[Context: Manuel always eats at eight o'clock, and it is now nine o'clock.]
(assumptive evidential in Tsafiki (Aikhenvald 2004:54))

(6) ayáa pá **nú'u** tyú-hu'-u-rɨh
thus SUBJ **RPT** DISTR-NARR-COMPL-do
'This is, **they say**, what took place'.
(hearsay evidential in Cora (Aikhenvald 2004:57))

(7) y-én peh **yée** wa-híhwa m^{w}áa, yáa pú nú'u hí
here-TOP you.SUBR **QUOT** COMPL-yell you.SG PROCOMP SUBJ RPT SEQ
t^{y}í-r-aa-ta-hée
DISTR-DISTR.SG-COMPL-PERF-tell
"'From right up on top here, you will call out loud and clear", that is what she called on him to do'.
(quotative evidential in Cora (Aikhenvald 2004:57))

[3]The inferential evidential in (4) and (5) and the hearsay evidential in (6) are glossed as CNJ and RPT respectively to maintain consistency with the rest of the dissertation. All glosses from cited examples have been similarly modified.

Within this system, Aikhenvald groups certain domains together; for example, she combines VISUAL and SENSORY as 'firsthand' information and the other four domains as 'non-firsthand'.

This broader 'firsthand' vs. 'non-firsthand' distinction overlaps with the semantic distinction between DIRECT and INDIRECT information sources, which has been identified by many researchers to be a key evidential parameter expressed in natural language (Bybee 1985, Faller 2002, Givón 1982, Murray 2010, Willett 1988, *inter alia*). When using a direct evidential, as in the Cuzco Quechua example illustrated in (8), the speaker indicates that she has directly experienced what is described in the embedded proposition p:[4]

(8) para-sha-n-**mi**
rain-PROG-3-**DIR**
'It is raining, **I see**'.
(Faller 2002:3)

For cases where what is described in the embedded proposition has not been or cannot be experienced with one's own senses, the direct evidential indicates that there is still sufficient evidence to justify the speaker's belief in the proposition (Faller 2002, Izvorski 1997), as illustrated in the Cuzco Quechua example (9):

(9) Inés-qa llakiku-n-**mi**
Inés-TOP be.sad-3-**DIR**
'Inés is sad, **she told me**'.
(Faller 2002:127)

Put differently, the speaker can be said to be fully committed to the truth of p when using a direct evidential.

[4]This embedded proposition p is also referred to as the PREJACENT (von Fintel & Gillies 2007) or SCOPE (Murray 2010). In this dissertation, p (when referring to propositions and not statistical significance) will always refer to this embedded proposition.

The use of an indirect evidential, on the other hand, indicates that there is not sufficient evidence to justify the speaker's belief in *p*. For example, the speaker could indicate that she has made a conjecture based on some relevant input, as in (10) (Cuzco Quechua) and (11) (Japanese), where the English equivalent would be the use of *p, it seems*:

(10) para-sha-n-**chá**
rain-PROG-3-**CNJ**
'It is raining, **it seems**'.
(Faller 2002:3)

(11) ame-ga fut-teir-u-**yooda**
rain-NOM fall-PROG-NPST-**CNJ**
'It is raining, **it seems**'.

Alternatively, the speaker may indicate that she has acquired some information through hearsay, as in (12) (Cuzco Quechua) and (13) (Japanese), where the English equivalent would be *p, I hear* or *p, they say*:

(12) para-sha-n-**si**
rain-PROG-3-**RPT**
'It is raining, **I hear**'.
(Faller 2002:3)

(13) ame-ga fut-teir-u-**sooda** [= (1)]
rain-NOM fall-PROG-NPST-**RPT**
'It is raining, **I hear**'.

Following Faller (2002) and Murray (2010), in this dissertation these indirect evidentials will be referred to as CONJECTURAL and REPORTATIVE evidentials respectively, and the speaker can be said to be more or less committed to the truth of *p* when uttering such statements. Here, I have chosen to focus on conjectural and reportative evidentials as the linguistic elements of interest, as

they promise to shed light on the relationship between evidentiality and EPISTEMIC MODALITY, as explained in §1.3.

As an important aside, although the direct-indirect parameter has proved useful for many researchers (Faller 2002, Murray 2010, *inter alia*), it does not specify within the indirect category whether or not the speaker had "sensory information about the event" (de Haan 2001:195). de Haan incorporates just this distinction by having both (i) a direct vs. indirect and (ii) firsthand vs. secondhand parameter, where the former specifies whether the speaker had access to sensory information, and the latter specifies whether the speaker had sensory information about the proposition itself. This results in "footprints in the snow as evidence of a human or animal passing by" (195) to be categorized as direct secondhand evidentiality.

de Haan (2001)'s distinction is useful in analyzing indirect evidentiality. However, it causes the parameter of directness to drastically diverge from the general consensus (Faller 2002, Murray 2010, *inter alia*). Therefore, the current dissertation offers the simple solution of switching the two labels above (i.e., directness specifies whether the speaker had sensory information about the proposition itself, and firsthandedness whether the speaker had access to sensory information). This switch would result in the 'footprints in the snow' example to be categorized as firsthand indirect evidentiality.

1.3. Exploring the relationship between evidentiality and epistemic modality

In contrast to evidentiality, which encodes information source, epistemic modality "is concerned with the probability, possibility, or necessity" of the occurrence of an event or some other state of affairs (Narrog 2009:1). How evidentiality and epistemic modality are related has been the subject of considerable debate. Some have argued that they are distinct categories (e.g. Aikhenvald 2004, de Haan 1999, Michael 2012), whereas others have maintained that the two categories overlap (e.g. Faller 2002, Matthewson *et al.* 2007, Murray 2010). Still others have

suggested that evidentiality is a type of epistemic modality (e.g. Palmer 1986), and others the opposite - that epistemic modals need to be analyzed as a type of evidential marker (e.g. Drubig 2001).

Researchers have applied various semantic tests to investigate the relationship between evidentiality and epistemic modality (e.g. Faller 2002, Matthewson *et al.* 2007, Murray 2010). One such test concerns the speaker's commitment to the embedded proposition when uttering an evidential or epistemic statement (Izvorski 1997), which was alluded to in §1.2. To illustrate this diagnostic with the English epistemic modal *may*, the speaker is said to be committed to the possibility of the proposition 'It is raining' when uttering the sentence *It may be raining* (Faller 2002:193). In other words, it is infelicitous for a speaker to utter *It may be raining* if she already knows that it is in fact not raining (i.e. #*It may be raining, but it is not raining*).

This test has been proposed as a diagnostic for analyzing an evidential linguistic marker as an epistemic modal (e.g. Faller 2002, Matthewson *et al.* 2007, Murray 2010): If a certain evidential is to be analyzed as an epistemic modal, an utterance of such an evidential statement should be infelicitous if the speaker knows the proposition to be false. And indeed, the use of conjectural evidentials has been found to bind speakers to the possibility of the proposition, as shown in (14) (Cuzco Quechua) and (15) (St'á'timcets):

(14) #llave-qa muchila-y-pi-**chá** ka-sha-n, ichaqa mana-**n** aqhay-pi-chu
key-TOP backpack-1-LOC-**CNJ** be-PROG-3 but not-**DIR** there-LOC-NEG
'The keys are in my backpack, **it seems**, but they are not there'.
(Faller 2002:178)

(15) #wa7 **k'a** kwis, t'u7 aoz t'u7 k-wa-s kwis
IMPF **CNJ** rain but NEG just DET-IMPF-3POSS rain
'It is raining, **it seems**, but it is not raining'.
(Matthewson *et al.* 2007:213)

These results have led some researchers to analyze conjectural evidentials as epistemic modals (e.g. Matthewson *et al.* 2007, Murray 2010).

However, in contrast to conjectural evidentials, the analysis of reportative evidentials has yielded conflicting results cross-linguistically: In some languages, the use of the reportative evidential has been found to not commit the speaker to the possibility of the embedded proposition being true, as in (16) (Cuzco Quechua) and (17) (Cheyenne):[5]

(16) para-sha-n-**si**, ichaqa mana crei-ni-chu
rain-PROG-3-**RPT** but not believe-1-NEG
'It is raining, **I hear**, but I do not believe it'.
(Faller 2002:194)

(17) é-hoo'kòhó-**nėse** naa oha é-sáa-hoo'kòhó-háne-**ø**
3-rain-**RPT**.B.SG and CNTR 1-NEG-rain-MOD$_B$-**DIR**
'It is raining, **I hear**, but **I am sure** it is not'.[6]
(Murray 2010:58)

In other languages, however, the reportative evidential **does** commit the speaker to the possibility of the proposition being true, as in (18) (St'át'imcets):

[5]AnderBois (2014) proposes an account based on PRAGMATIC PERSPECTIVE SHIFT to explain why the scope can be negated in examples such as (16) and (17); essentially, when there is another perspectival agent who is salient in the context, this allows for the perspective of the statement to shift to a non-speaker. This account can be compared to Searle's (1983:9) observation that there are "cases where one dissociates oneself from one's speech act, as in, e.g., 'It is my duty to inform you that p, but I don't really believe that p'...In such cases it is as if one were mouthing a speech act on someone else's behalf. The speaker utters the sentence but dissociates [herself] from the commitment of the utterance". However, given the lack of an explicit context in (16) and (17), it is an empirical question whether native speakers of the respective languages would agree that there is an additional salient perspectival agent (especially when compared to (18)).

[6]The exact wording used in the second clause may have a non-negligible effect, but what they have in common is that the speaker is denying the proposition in the first clause, or that they believe it (Murray 2010:53-54).

(18) #um'-en-tsal-itás **ku7** i án'was-a xetspqíqen'kst táola, t'u7 aoz
give-TRANS-1SG.OBJ-3PL.ERG **RPT** DET.PL two-EXIS hundred dollar but NEG
kw s-7um'en'tsal-itás ku stam'
DET now-give-TRANS-1SG.OBJ-3PL.ERG DET what
'They gave me $200, **I hear**, but they did not give me anything'.
(Matthewson *et al.* 2007:214)[7]

Therefore, some researchers have analyzed reportative evidentials of the latter type (i.e. St'át'imcets) as epistemic modals (Matthewson *et al.* 2007), whereas other researchers have analyzed those of the former type (i.e. Cuzco Quechua and Cheyenne) as illocutionary mood markers (Murray 2010) or speech act operators (Faller 2002).[8,9]

As for Japanese, AnderBois (2014) and Murray (2010) claim that the Japanese reportative (i.e. *-sooda*) is best analyzed as an epistemic modal. However, their main reference for Japanese evidentiality, McCready & Ogata (2007:161), states that "the speaker need not believe the content [herself] for the sentence to be true and felicitous" when using *-sooda*. In fact, McCready & Ogata explicitly state that the Japanese reportative evidential is similar to the Cuzco Quechua reportative evidential, which Faller (2002) analyzed as a speech act operator. There seems to be a clear discrepancy in the literature here, which the current dissertation attempts to resolve. Moreover, this dissertation will explore the option of an analysis that does not subscribe to the dichotomy of an evidential element being analyzed either as an epistemic modal or a speech act operator. Instead, I will identify certain features that are useful for analyzing the epistemic and evidential status of any linguistic element that can be used to express evidentiality, such as the diagnostic described above.

[7]We can deduce from this example that 'It is raining, **I hear**, but I do not believe it' would be equally infelicitous in St'át'imcets.
[8]Illocutionary mood markers / speech act operators will be discussed in more detail in Chapters 3 and 4.
[9]Murray (2010) has labeled languages of the former type as having ILLOCUTIONARY EVIDENTIALS (e.g. Cuzco Quechua, Cheyenne) and the latter type as EPISTEMIC EVIDENTIALS (e.g. St'át'imcets).

1.4. Exploring the influence of context on speaker commitment

As explained briefly in §1.3, one semantic aspect that has been intensively investigated in the literature on evidentiality concerns what is conveyed of the speaker commitment to the truth of the embedded proposition when using an evidential (e.g. Faller 2002, Izvorski 1997, Matthewson *et al.* 2007, Murray 2010). To demonstrate further, take an English utterance of an assertion such as *It is raining*, where the speaker can be said to be fully committed to the truth of it raining. The speaker cannot simultaneously assert and deny the proposition without contradicting herself (i.e., the utterance ?*It is raining, but it is not raining* is a semantic anomaly if taken literally). Similarly, an utterance involving a conjectural evidential (or epistemic modal) cannot be denied either, as the speaker is partially committed to the truth of the proposition (hence the infelicity when uttering #*It is raining,* ***it seems****, but it is not*).[10] Turning to the reportative evidential, Murray (2014) suggests that the use of English *p, I hear* commits the speaker to the proposition 'being at least possibly true' (leading to the potential infelicity of #?*It is raining,* ***I hear****, but it is not*).[11]

What the above English examples show is that the level of speaker commitment to the truth of the proposition seems to be encoded by the accompanying evidential.[12] What it does not show, however, is whether extra-linguistic factors can influence this speaker commitment, such as the speaker's estimation of the reliability of their information source or the strength of the resulting conjecture based on some input. I hypothesize that such factors do have an effect on the interpretation of speaker commitment, independently of the linguistic meaning of the evidentials (see Matthewson *et al.* 2007:240 for a discussion on this possibility). I intend

[10]This phenomenon can be thought of as a modified version of Moore's paradox (Linville & Ring 1991, *inter alia*), where there intuitively seems to be a contradiction when one utters the sentence, '*p and I believe that not p*' or '*p and not* [*I believe that p*]'.

[11]As mentioned in §1.1, English *I heard that...* is not an evidential. However, some authors maintain that parenthetical uses such as *p, I hear* can be analyzed as evidentials (Murray 2014, Simons 2007).

[12]The semantic and/or pragmatic nature of this encoding will be discussed in Chapter 4.

on testing this hypothesis through a controlled experiment, as it is not possible to manipulate the context systematically with naturally-occurring language. In §1.5, I provide an overview of Japanese evidentiality and explain why Japanese was chosen as the target language of study.

1.5. Overview of Japanese evidentiality

Unlike English, Japanese has a rich set of morphosyntactic evidentials; they are not grammatically obligatory, but they all do display some systematicity by attaching to tensed sentences, as seen in (19):

(19) ame-ga fut-teir-u-**rashii**/-**sooda**/-**yooda**
rain-NOM fall-PROG-NPST-**EVID**
'It is raining, **I hear / it seems**'.

There has recently been a surge in work investigating non-obligatory yet grammaticalized evidentials across languages (e.g. Cuzco Quechua (Faller 2002), Japanese (McCready & Ogata 2007), St'át'imcets (Matthewson *et al.* 2007)). These researchers have mainly relied upon fieldwork involving native speaker intuitions to investigate the level of speaker commitment for using various evidentials. The current project will be a significant contribution to this body of work, as there have been heretofore few studies that have systematically examined how the meaning of different evidentials might influence native speaker intuitions in different ways depending on the context. In addition, the target set of Japanese evidentials is unique in that one evidential is conjectural (i.e. -*yooda*) and another reportative (i.e. -*sooda*), but there is a third that is traditionally classified as conjectural and yet has shown to be compatible with reportative contexts as well (i.e. -*rashii*). This distribution is typologically significant, as evidentials are usually not found to cover both conjectural and reportative contexts unless there is only one indirect evidential in the language (Willett 1988). This unique variability makes Japanese an important language to examine.

Like St'át'imcets (Matthewson *et al.* 2007), Japanese has no direct evidential, overt or null;[13] however, as mentioned above, the language has a rich system of indirect evidentials that has been intensely investigated (Aoki 1986, Asano-Cavanagh 2010, Kasioka 1980, Kikuchi 2000, Makino & Tsutsui 1989, Masuoka & Takubo 1992, Matsubara *et al.* forthcoming, McCready & Ogata 2007, Mushin 2001, Saito 2004, Tamura 2012, Tanomura 1991, Teramura 1984, *inter alia*). The general consensus in the literature is that the conjectural and reportative evidentials in the language are *-rashii*, *-sooda*, and *-yooda*.[14]

The evidential *-rashii* is traditionally categorized as conjectural; however, it has been suggested that it is also compatible with reportative contexts (Makino & Tsutsui 1989, McCready & Ogata 2007, Mushin 2001, Saito 2004, Tamura 2012), and there is indeed experimental support for this position, as described in Chapter 2 (the work will also appear as Matsubara *et al.* forthcoming). An example sentence can be seen in (20):

(20) ame-ga fut-teir-u-**rashii**
rain-NOM fall-PROG-NPST-**CNJ**/**RPT**
'It is raining, **it seems** / **I hear**'.

The evidential *-sooda* is reportative when attached to a tensed sentence, as in (21):

(21) ame-ga fut-teir-u-**sooda** [= (1) = (13)]
rain-NOM fall-PROG-NPST-**RPT**
'It is raining, **I hear**'.

There is also a conjectural *-sooda* that attaches to the stem form, as in (22):

[13]In Cuzco Quechua, speakers can indicate direct evidentiality via *-mi*. In addition, "the absence of an evidential implicates that the speaker has the most direct evidence possible for the described event, that is, it implicates the same evidential value that is encoded by *-mi*" (Faller 2002:23).

[14]Japanese speakers use additional evidentials to indicate (a) indirect evidence for sensation experienced by someone other than the speaker via *-gar*; and (b) 'generally valid evidence' via *-no* (Aoki 1986).

(22) ame-ga fut-tei-**sooda**
rain-NOM fall-PROG.INF-**CNJ**
'It is raining, **it seems**'.[15]

However, this dissertation will not be examining conjectural-*sooda* closely, as it does not follow the systematicity displayed in (19), and -*rashii* and -*yooda* cannot be attached to the stem form.

The last of the Japanese evidentials I will be examining, -*yooda*, is conjectural, as in (23):[16]

(23) ame-ga fut-teir-u-**yooda** [= (11)]
rain-NOM fall-PROG-NPST-**CNJ**
'It is raining, **it seems**'.

The three evidentials of interest are morphosyntactically heterogeneous: -*rashii* is conjugated like an adjective, while the other two like nouns with a copula attached (i.e. -*yoo-da* and -*soo-da* (Aoki 1986). However, the three have also been analyzed as being similar in that they occur where epistemic modals typically appear in Japanese (e.g. -*daroo/-kamoshirenai* 'I think' / 'might') by attaching to a tensed sentence (Inoue 1976), as illustrated in (24):[17]

(24) ame-ga fut-teir-u-**daroo**/**-kamoshirenai** | **-rashii**/**-sooda**/**-yooda**
rain-NOM fall-PROG-NPST-**MOD** | **-EVID**
'It is **probably**/**perhaps** raining'. | 'It is raining, **it seems** / **I hear**'.

[15]Even though the translation for the embedded proposition is identical between (21) and (22), the difference in morphology (i.e. -*u* vs. -*i*) is what leads to the difference in evidential value.

[16]The evidential -*yooda* can also be used for comparative judgments, as seen in (i):
(i) marude ame-ga fut-teir-u-**yooda**
as.if rain-NOM fall-PROG-NPST-**COMPARATIVE**
'**It is as if** it is raining'.
(adapted from Makino & Tsutsui 1989:549)
I will not be examining this non-evidential use in the present study, as this use does not convey speaker commitment to the possibility of p.

[17]Conjectural-*sooda* is different in that it attaches to the stem form.

Contrary to the claim that "we do not find languages that allow sequences of evidential morphemes" (Speas 2004:265),[18] there are cases of co-occurrence, rare though they are, among the Japanese evidentials (Inoue 1976), as seen in (25) and (26):

(25) ame-ga fut-teir-u-**rashii-sooda**-yo
rain-NOM fall-PROG-NPST-**CNJ-RPT**-END
'It is raining, **it seems (to someone)**, **I hear**'.
(adapted from Inoue 1976:24)

(26) Shiroo-wo tateru-toiukotode matomar-i-**soo-rashii**
Shiroo-ACC honored-that decided-INF-**CNJ-RPT**
'They will decide to honor Shiroo, **it seems (to someone)**, **I hear**'.
(Balanced Corpus of Contemporary Written Japanese, Maekawa & Yamazaki 2011)

As far as ordering constraints go, reportative-*sooda* occurs after (conjectural)-*rashii*, as in (25), while (reportative)-*rashii* occurs after conjectural-*sooda*, as in (26). My native intuitions are that reportative-*sooda* can also follow -*yooda* and conjectural-*sooda*, and indeed Aoki (1986) confirms that reportative-*sooda* can follow conjectural-*sooda*. These observations seem to indicate that reportative evidentials may generally allow for embedding of conjectural evidentials.

As for the co-occurrence of Japanese epistemic modals with evidentials, -*daroo* 'I think' for example cannot precede the evidentials; however, this restriction may be only for morphosyntactic reasons, as the epistemic modal -*kamoshirenai* 'might' readily precedes the evidentials. On the other hand, although both modals are able to morphosyntactically follow the evidentials, the resulting sentences are awkward, though not unacceptable.

1.6. Research question

As initially sketched out in §1.3, there are several diagnostics that are available to test whether an evidential can be analyzed as an epistemic modal (e.g. Faller 2002, Matthewson *et al.* 2007,

[18] Speas (2008:949) has since acknowledged that "some languages allow multiple evidentials in a single clause".

Murray 2010) (or to test what the epistemic status is of the use of a certain evidential). One such test is whether an utterance containing an evidential is infelicitous if the speaker already knows the proposition to be false (a variation on Moore's paradox). The application of this test to reportative-*sooda* can be seen in (27), and to matrix-clause hearsay (phrasal evidentiality) in (28) :

(27) #?ame-ga fut-teir-u-**sooda**-ga, fut-tei-nai
rain-NOM fall-PROG-NPST-**RPT**-CONJ fall-PROG-NEG
'It is raining, **I hear**, but it is not raining'.

(28) ame-ga fut-teir-u-**to** **kiita**-ga, fut-tei-nai
rain-NOM fall-PROG-NPST-**CMPL** **heard**-CONJ fall-PROG-NEG
'I **heard that** it is raining, but it is not raining'.

If reportative-*sooda* were to be analyzed as an epistemic modal (e.g. Matthewson *et al.* 2007), the utterance of (27) should be infelicitous, whereas if it were an illocutionary marker (e.g. Faller 2002, McCready & Ogata 2007), the utterance would be felicitous. On the other hand, both accounts would predict that there is no infelicity in (28) and that the utterance should be consequently felicitous. As such, it is important to establish whether reportative-*sooda* is best analyzed as an epistemic modal (or what is indicated of the speaker's epistemic stance) by testing what is conveyed of the speaker commitment when uttering a sentence with -*sooda* (as opposed to a sentence with matrix-clause hearsay).

However, one could also argue that although the utterance of (28) does not convey speaker commitment to the possibility of the embedded proposition being true, the interpretation of this commitment could be influenced by the pragmatic context. To give an example, an utterance of the English sentence *I heard that it is raining* does not convey speaker commitment to the embedded proposition; thus, *I heard that it is raining, but it is not raining* is acceptable. However, pragmatically speaking, it could still be interpreted as odd by the hearer for a speaker to utter *I*

heard that it is raining if the speaker already knew that it wasn't actually raining. This oddness could be explained as a violation of the Cooperative Principle (Grice 1989 [1967]:26), which is a general principle that conversation participants are expected to observe, unless there is good reason to do otherwise: "Make your conversational contribution such as is required, at the stage at which it occurs, by the accepted purpose or direction of the talk exchange in which you are engaged".

These issues lead to my main research question: Is the interpretation of sentences containing an evidential (or an evidential expression) influenced by the pragmatic context, independently of the lexical semantics of the evidentials (or the evidential expressions)? If yes, then speakers could be taken as being committed to the possibility of p being true even if this commitment is not encoded semantically (they could also be taken as not committed even when this **is** encoded semantically). A natural follow-up question if there is indeed an influence would be: To what extent does the pragmatic context influence the interpretation of a sentence that contains an evidential? if pragmatic context has no influence on the interpretation of evidential sentences, then speakers would generally be taken as committed to p when using a linguistic element that encodes speaker commitment, regardless of the pragmatic context (and would not be interpreted as being committed when not using such a linguistic element). Japanese is an ideal language to investigate this question with its rich variety of indirect evidentials, which potentially differ along the dimension of how committed the speaker is to the possibility of p.

The dissertation is organized as follows: I provide the results of a preliminary typological study and a detailed semantic analysis of the three Japanese evidentials *-rashii*, *-sooda*, and *-yooda* in Chapter 2. This analysis will include the results of various diagnostics, much like the one I have already introduced in the current chapter. I then present in Chapter 3 the results of a follow-up experiment that was undertaken to address the questions raised in Chapter 2 (and the current section). In Chapter 4, I present a formal analysis of Japanese evidentiality that takes

into account the results and discussion in Chapters 2 and 3. Finally, I discuss the implications and conclude with Chapter 5.

CHAPTER 2

Japanese evidentiality

Japanese has a rich set of non-obligatory morphosyntactic evidentials and one subset, *-rashii*, *-sooda*,[1] and *-yooda*, share the property of attaching to tensed sentences, as in (1):

(1) ame-ga fut-teir-u-**rashii**/**-sooda**/**-yooda**
rain-NOM fall-PROG-NPST-**EVID**
'It is raining, **I hear** / **it seems**'.

Aoki (1986:223) observes that these three evidentials are used to indicate that the speaker "cannot say that [she] is in complete possession of information because of the nature of the evidence"; in other words, she is indicating that a report or a conjecture has been made.

Reserarchers have analyzed the pragmatic properties of *-rashii*, *-sooda*, and *-yooda*, some based on their own intuitions and others from instances of language use such as Japanese newspapers and transcripts (Aoki 1986, Asano-Cavanagh 2010, Kasioka 1980, Kikuchi 2000, Makino & Tsutsui 1989, Masuoka & Takubo 1992, McCready & Ogata 2007, Mushin 2001, Saito 2004, Tamura 2012, Tanomura 1991, Teramura 1984, *inter alia*). The main findings from each study have been compiled below; upon examining these conventions of use,[2] some commonly-shared

[1]This *-sooda* is reportative and is distinct from conjectural-*sooda*, which is attached to the stem form (*-i*). A minimal pair can be seen in (i) and (ii):
(i) ame-ga fur-u-**sooda**
rain-NOM fall-NPST-**RPT**
'It will rain, **I hear**'.
(ii) ame-ga fur-i-**sooda**
rain-NOM fall-INF-**CNJ**
'It will rain, **it seems**'.
As a default, in this dissertation, I will use *-sooda* to refer to reportative-*sooda*, and conjectural-*sooda* will be marked as such.

[2]I use the term 'convention of use' instead of 'definition', as these are descriptions for the use of a word as opposed to some prior-determined definition.

elements arise, which have been coded according to whether or not the speaker had firsthand access to Sensory Information (SI) (FIRST vs. NONFIRST) (cf. de Haan 2001 and §1.2) and whether or not the speaker made a Conjecture to arrive at some proposition[3] (CNJ) (CNJ vs. NONCNJ).[4]

Compilation of conventions of use for *-rashii*:

- Expresses non-firsthand information sources (NONFIRST) accessed by means other than one's own senses (Aoki 1986:231);
- Expresses a judgment (CNJ) made based on some information through seeing/hearing (FIRST) or feeling something else (Asano-Cavanagh 2010:167);
- Expresses some kind of distance (NONFIRST) between the speaker and the information source, whether it be time, space, or psychological distance (Kasioka 1980:177);
- Expresses a conjecture (CNJ) based on observation (FIRST) or an evaluation based on hearsay (NONFIRST) information (that is credible); also expresses greater distance than *-yooda* between the information source and the conjecture (Kikuchi 2000:46);
- Expresses a conjecture (CNJ) based on information that has been heard or read (NONFIRST); also expresses information that is more reliable than that for when conjectural-*sooda* is used. (Can be used similarly to reportative-*sooda* (NONCNJ) if there has been relatively little conjecture in the speaker's mind) (Makino & Tsutsui 1989:373);
- Expresses a conjecture (CNJ) based on non-firsthand (NONFIRST) experience such as hearsay or others' research; tends to indicate a relative lack of commitment or responsibility to the conjecture (Masuoka & Takubo 1992:128);
- Expresses reports (NONCNJ) in addition to auditory evidence (FIRST); also expresses internal sensory or unclear information sources (McCready & Ogata 2007:155);

[3]It was not necessary to code for directness, as none of the evidentials are used to indicate that the speaker had access to sensory information about the proposition itself (i.e., they are all indirect).

[4]Henceforth, capitals are used for factors (i.e. SI and CNJ), and small capitals are used for levels within a factor (i.e. FIRST, NONFIRST, CNJ, NONCNJ).

- Used as a narrative reportative evidential strategy to preserve not only the reportative (NONCNJ) flavor of the retelling but to also represent something of the reteller's involvement (CNJ) in reconstructing the story based on what she heard (NONFIRST) (Mushin 2001:1377);
- Expresses reports (NONCNJ) in addition to conjectures (CNJ), which can be based on firsthand (FIRST) or non-firsthand (NONFIRST) information sources (Saito 2004:45);
- Expresses reports (NONCNJ) in addition to conjectures (CNJ) (Tamura 2012);
- Expresses a conjecture (CNJ) that has some basis (Tanomura 1991:76);
- Expresses a conjecture (CNJ) based on firsthand (FIRST) or non-firsthand (NONFIRST) information (Teramura 1984:249).

Compilation of conventions of use for *-sooda*:

- Expresses a report (NONCNJ) (Aoki 1986:230);
- Expresses a report (NONCNJ) without any additional judgment (NONFIRST) (Kikuchi 2000:46);
- Expresses a report (NONCNJ) where the speaker conveys information obtained from an information source without altering it (NONCNJ) (Makino & Tsutsui 1989:407);
- Expresses the relaying of knowledge that one has gained from hearsay without any additional judgment (NONCNJ); can be used for both general knowledge and information from a specific person or source (Masuoka & Takubo 1992:131);
- Expresses hearsay information that has been communicated directly (NONCNJ) to some individual (McCready & Ogata 2007:161);
- Expresses that the speaker has acquired the information through hearsay but that she does not know anything directly (NONCNJ) (Teramura 1984:256);

Compilation of conventions of use for *-yooda*:

- Expresses visible, tangible, or audible evidence collected through the speaker's own senses (FIRST) to make a conjecture (CNJ) (Aoki 1986:231);
- Expresses a judgment (CNJ) based on one's experience of seeing/hearing (FIRST) or feeling (Asano-Cavanagh 2010:170);
- Expresses a conjecture (CNJ) based on information that was accessed firsthand by one's own senses (FIRST) (Kasioka 1980:177);
- Expresses that a firsthand observation (FIRST) has been made by the speaker and that there is little distance between the information source and the conjecture (CNJ) (Kikuchi 2000:46);
- Expresses the speaker's reasoning or judgment (CNJ) based on firsthand/visual (FIRST) information that is reliable (Makino & Tsutsui 1989:547);
- Expresses a conjecture (CNJ) based on firsthand (FIRST) evidence such as visual information or one's own research; tends to indicate commitment or responsibility to the conjecture (Masuoka & Takubo 1992:128);
- Expresses tactile/visual/auditory evidence (FIRST) in addition to reports (NONCNJ); also expresses internal sensory and unclear information sources (McCready & Ogata 2007:163);
- Expresses a firsthand observation (FIRST) or impression (CNJ) (Tanomura 1991:76);
- Expresses that the speaker does not have conviction on the truth of p, but that some target phenomenon displays properties that suggest (CNJ) the truth of p (Teramura 1984:243).

Based on these compiled descriptions of pragmatic conventions of use, we are able to place the Japanese evidentials– *-rashii*, *-sooda*, and *-yooda*–into previously described typological systems (e.g. Aikhenvald 2004, de Haan 2001, Willett 1988) (see §1.2). For example, under Aikhenvald's

system, -*rashii* and -*yooda* would be classified as 'inference', while -*sooda* (and some authors would argue -*rashii*) would be 'hearsay'. Inference and hearsay would in turn be classified as being 'non-firsthand'. Alternatively for Willett, the most prominent distinction is that of 'direct' vs. 'indirect' evidentiality and, within the latter, there is the distinction between 'reported' and 'inferring' evidentiality. All three Japanese evidentials would be indirect, and as for reported vs. inferring, they would pattern similarly to the categories of Aikhenvald. And finally for de Haan who employs the two dimensions of directness and firsthandedness, -*yooda* would be an example of 'firsthand indirect evidentiality', -*sooda* would be 'secondhand indirect', and -*rashii* would be 'first-/secondhand indirect'.[5,6]

Focusing on the elements of (a) Sensory Information and (b) Speaker Conjecture, I created working conventions of use for the respective evidentials, which were used as a basis for generating hypotheses regarding the typological structure of Japanese evidentiality and their interpretation. §2.1 describes the experimental investigation of these hypotheses, the results of which contribute to the general typological picture of evidentiality that has been painted thus far.[7]

2.1. Typological experiment on Japanese evidentiality

2.1.1. Working conventions of use for -*rashii*, -*sooda*, and -*yooda*

Working convention of use for -*rashii*: (i) used to indicate that a conjecture has been made, often based on information that is not accessible firsthand (cf. Asano-Cavanagh 2010, Kikuchi 2000, Saito 2004 for the claim that firsthand information is also compatible); (ii) can be used reportatively when the speaker has not added much conjecture of her own (Makino & Tsutsui

[5]Note that I have flipped the labels for de Haan's (2001) categories (i.e. 'direct' <–> 'firsthand', as explained in §1.2.

[6]Throughout this chapter I assume that as a general rule, direct experience, when compared with an indirect information source, provides a stronger epistemic basis. Though I do not believe that this relative strength is specifically linguistic, I believe that linguistic systems may reflect its validity in their inference patterns.

[7]The contents have been adapted from Matsubara *et al.* (forthcoming).

1989, McCready & Ogata 2007, Mushin 2001, Saito 2004, Tamura 2012). An example conjectural context with non-firsthand information is provided in (2):

(2) ame-ga fut-teir-u-**rashii**
rain-NOM fall-PROG-NPST-**CNJ**
'It is raining, **it seems**'.
[Context: Speaker hears that people are holding umbrellas open outside.]

It should be emphasized that *-rashii* has been traditionally described as conjectural (Aoki 1986, *inter alia*); however, as a substantial number of authors also suggest it is compatible with reportative contexts (Makino & Tsutsui 1989, *inter alia*), this aspect has been included in the working convention of use.

Working convention of use for *-sooda*: Used to indicate the reporting or relaying of hearsay information without any additional speaker judgment. An example is provided in (3):

(3) ame-ga fut-teir-u-**sooda**
rain-NOM fall-PROG-NPST-**RPT**
'It is raining, **I hear**'.
[Context: Speaker is told that it is raining.]

Working convention of use for *-yooda*: Used to indicate that a conjecture has been made, often based on sensory information accessible firsthand. An example is provided in (4):

(4) ame-ga fut-teir-u-**yooda**
rain-NOM fall-PROG-NPST-**CNJ**
'It is raining, **it seems**'.
[Context: Speaker witnesses people holding umbrellas open outside (but cannot see the rain).]

As seen in the working convention of use for *-yooda*, this evidential has been categorized to be strictly conjectural (however, see McCready & Ogata 2007 for the claim that it can also be used reportatively).

As mentioned earlier, there are two main factors relevant for distinguishing among the evidentials *-rashii*, *-sooda*, and *-yooda*, which are also reflected in the conventions of use: (a) whether Sensory Information (SI) was accessible firsthand by the speaker (FIRST vs. NONFIRST), and (b) whether there was any Speaker Conjecture (CNJ) involved when uttering a proposition (CNJ vs. NONCNJ). These factors, SI and CNJ, cross-cut the factors of directness and firsthandedness (Aikhenvald 2004, de Haan 2001, Willett 1988), which is important for considering Japanese evidentials, as they potentially have different conventions of use concerning firsthandedness despite all being indirect.[8] By manipulating SI and CNJ, we can observe how the Japanese evidentials *-rashii*, *-sooda*, and *-yooda* behave in discourse environments that fit each combination (i.e. FIRSTHAND-CONJECTURE, NON-FIRSTHAND-CONJECTURE, FIRSTHAND-NON-CONJECTURE, NON-FIRSTHAND-NON-CONJECTURE). These (henceforth FIRST-CNJ, NONFIRST-CNJ, FIRST-NONCNJ, NONFIRST-NONCNJ) will be explained in detail in §2.1.5.

As a sidenote, there are other factors that can potentially account for the distribution of *-rashii*, *-sooda*, and *-yooda*, such as the sensory mode in which the information was acquired (i.e. visual vs. auditory vs. other senses), the degree of speaker commitment to the truth of p, and the degree of reliability of the information source. These factors are not as prominent in the compiled conventions of use above and therefore were not included in this typological study.

[8]Faller (2002, example (58)) also introduces a separate pair of clines that are theorized to capture a universal evidential hierarchy, shown in (iii):

(iii) The Personal Evidence Cline:

Performative > Visual > Auditory > Other sensory > Inference from results > Reasoning > Assumption

The Mediated Evidence Cline:

Direct > Secondhand > Thirdhand > Hearsay / Folklore

The personal evidence cline shows some similarity to firsthandedness, but it does not capture the notion that some conjectures are based on sensory information.

However, sensory mode was controlled for (i.e. restricted to visual information), and degree of speaker commitment / source reliability will be investigated in Chapter 3.

2.1.2. Hypotheses and predictions

Given the working conventions of use above, here are my hypotheses and predictions regarding the relevant factors for predicting felicitous environments for -*rashii*, -*sooda*, and -*yooda*. The predictions have been summarized in Table 2.1.

Hypothesis 1: Whether Sensory Information for a certain proposition was accessible first-hand to the speaker is a significant and differentiating factor when interpreting evidential statements in Japanese.

Predictions: When examining Sensory Information as a factor, the use of -*yooda* will be judged to be more felicitous in FIRST contexts than NONFIRST when compared across SI; the use of -*sooda* will be judged to be the opposite (i.e. NONFIRST more felicitous than FIRST). The traditional categorization of -*rashii* would predict its use to be more felicitous with NONFIRST contexts, but it is possible that SI does not play a significant role when determining the felicity of -*rashii*, given more modern conventions of use.

Hypothesis 2: Whether there was any Conjecture required by the Speaker for a certain proposition is a significant and differentiating factor when interpreting evidential statements in Japanese.

Predictions: When examining Conjecturehood as a factor, -*yooda* will be judged to be more felicitous in CNJ contexts than NONCNJ when compared across CNJ; -*sooda* will be the opposite (i.e. NONCNJ more felicitous than CNJ). The traditional categorization of -*rashii* would predict its use to be more felicitous with CNJ contexts, but it is possible that CNJ does not play a significant role when determining the felicity of -*rashii*.

	Sensory Information	Speaker Conjecture
-yooda	FIRST > NONFIRST	CNJ > NONCNJ
-sooda	NONFIRST > FIRST	NONCNJ > CNJ
-rashii	NONFIRST > (or =) FIRST	CNJ > (or =) NONCNJ

Table 2.1. Predictions regarding Sensory Information and Speaker Conjecture

It is worth noting that the examination of any given evidential may not lead to uniform results with regards to a given factor. For example, it is possible that *-rashii* may not be sensitive to either the SI or CNJ factor. However, it may still be sensitive to the interaction of these factors (e.g. FIRST-CNJ vs. FIRST-NONCNJ).

Finally, in terms of translating these hypotheses for the experimental domain, we assume, following Hofmeister & Sag (2010) and Schwarz (2015), *inter alia*, that non-felicity corresponds to a higher processing cost, which in turn leads to degraded naturalness judgments. This assumption is also consistent with the body of work in psycholinguistics showing that more complicated concepts take longer to process than less complicated ones (e.g. Papafragou *et al.* 2007), since the natural drive toward relevance (Grice 1989 [1967]) might lead speakers to do more work to try and interpret non-felicitous utterances. §2.1.3 describes the experiment that tested these hypotheses.

2.1.3. Design

I conducted an Internet survey (chosen in order to recruit participants non-locally as well as locally) in which participants read a context passage and were then asked to make a naturalness judgment on a follow-up sentence given this context as quickly as possible.[9] Each passage-sentence pair fit one of the four discourse environments discussed in §2.1.1 (i.e. FIRST-CNJ, NONFIRST-CNJ,

[9]Participants were explicitly warned that their responses may be discounted if they took an overly long amount of time to respond; however, all responses were recorded, and none were deleted on the basis of excessive reaction times.

	FIRSTHAND	NON-FIRSTHAND
CONJECTURE	**FIRST-CNJ context:** Person A witnesses an event that provides visual information for conjecturing *p*. **Follow-up:** A utters *p*.	**NONFIRST-CNJ context:** Person A witnesses an event that provides visual information for conjecturing *p*. A tells Person B about the experience (but not *p*). **Follow-up:** B utters *p*.
NON-CONJECTURE	**FIRST-NONCNJ context:** Person A experiences an event that corresponds to *p*. **Follow-up:** A utters *p*.	**NONFIRST-NONCNJ context:** Person A experiences an event that corresponds to *p*. A tells Person B about the experience (*p*). **Follow-up:** B utters *p*.

Table 2.2. Design of current study.

Age range	19-22	23-25	26-30	31-35	36-40	41-45	46-50	61-65
Participant count	5	34	15	21	3	5	2	1

Table 2.3. Age range of participants

FIRST-NONCNJ, NONFIRST-NONCNJ), creating a 2 x 2 factorial design crossing the SI and CNJ factors as illustrated in Table 2.2.

2.1.4. Participants

Eighty-six self-reported native speakers of Japanese volunteered to participate in the experiment, for which the single criterion for participation was to have grown up speaking Japanese.[10] They were recruited through the Northwestern University Japanese coffee hour, the Teachers College Columbia University Japanese community listserv, social networks (e.g. Facebook), email, and word-of-mouth.[11] Eighteen were male, and 68 were female. The age range of the participants can be seen in Table 2.3.

[10]Whether participants were required to have spoken Japanese from birth was not specified, but only implied.
[11]A portion of participants received a physical flyer, which can be seen in Appendix A.

All participants listed a Japanese prefecture as their hometown except for five, whose hometowns were Taiwan (n = 1) or the USA (n = 5). All participants reported living in Japan at the time of the experiment except for 33, who resided in England (n = 1), France (n = 2), Hong Kong (n = 1), Korea (n = 2), Spain (n = 1), or the USA (n = 26). Many reported speaking a language other than Japanese, namely English, Chinese, French, German, Korean, Russian, Spanish, or Turkish. None of these languages have grammaticized evidentials in their inventory, but they have various means of expressing evidentiality (e.g., see Chung 2010 for Korean evidential sentences and Schenner 2008 for German modals which can have evidential readings).

2.1.5. Stimuli

In line with the above hypotheses, each proposition employed in the experiment, of which there were 48, was manipulated to render four sub-contexts (i.e. FIRST-CNJ, NONFIRST-CNJ, FIRST-NONCNJ, NONFIRST-NONCNJ). These are exemplified in (5) to (8) for p = *It is raining*:

(5) Satoo-san-wa soto-wo mi-mashi-ta. Hitori-no josei-ga kasa-wo
Satoo-POL-TOP outside-ACC see-POL-PST one-LNK woman-NOM umbrella-ACC
sashi-teir-u-no-ga mie-mashi-ta.
hold-PROG-NPST-LNK-NOM see-POL-PST
'Satoo looked outside. It could be seen that a lady was holding an umbrella open'.
(FIRST-CNJ)

(6) Satoo-san-wa soto-wo mi-mashi-ta. Hitori-no josei-ga kasa-wo
Satoo-POL-TOP outside-ACC see-POL-PST one-LNK woman-NOM umbrella-ACC
sashi-teir-u-no-ga mie-mashi-ta. Satoo-san-wa kono-koto-wo
hold-PROG-NPST-LNK-NOM see-POL-PST Satoo-POL-TOP this-thing-ACC
Tanaka-san-ni hanashi-mashi-ta.
Tanaka-POL-to tell-POL-PST
'Satoo looked outside. It could be seen that a lady was holding an umbrella open. Satoo told Tanaka this'.
(NONFIRST-CNJ)

(7) Satoo-san-wa soto-ni de-mashi-ta. Ame-ga fut-tei-mashi-ta.
Satoo-POL-TOP out-LOC go-POL-PST rain-NOM all-PROG.INF-POL-PST
'Satoo went outside. It was raining'.
(FIRST-NONCNJ)

(8) Satoo-san-wa soto-ni de-mashi-ta. Ame-ga fut-tei-mashi-ta. Satoo-san-wa
Satoo-POL-TOP out-LOC go-POL-PST rain-NOM all-PROG.INF-POL-PST Satoo-POL-TOP
kono-koto-wo Tanaka-san-ni hanashi-mashi-ta.
this-thing-ACC Tanaka-POL-to tell-POL-PST
'Satoo went outside. It was raining. Satoo told Tanaka this'.
(NONFIRST-NONCNJ)

The FIRST-NONCNJ context corresponds to the strongest information source (all else being equal), with the speaker having experienced *p* directly. The NONFIRST-NONCNJ context was a purely reportative context in which the speaker heard from another individual about the direct experiencing of *p*. In the conjectural contexts, FIRST-CNJ finds the speaker witnessing some event that provides sensory information (specifically, visual) for conjecturing *p*. In NONFIRST-CNJ contexts, the speaker has heard from a third party about a witnessing of the conjecture-inducing information (but crucially not *p*). Modes of source other than visual (audio, for example) could have been chosen for the CNJ contexts, but I opted to control for this dimension by restricting to visual sources in order to assure comparability of results. These four discourse environments were followed up by the evidential sentences *p-rashii, p-sooda*, and *p-yooda*. There were also two baselines: (i) bare proposition *p* and (ii) *p* embedded within matrix-clause hearsay (i.e. *p-to kiita* 'I heard that *p*'). It was ensured that any given participant would only see one discourse-evidential pair per proposition (e.g. only one stimulus related to rain).[12]

When creating specific stimuli, there were a number of considerations that were taken into account (see Appendix B for the list of Japanese stimuli and fillers and their English translations).

[12]In statistical terms, I employed a Youden's square, where each participant was presented with an equal amount and type of treatment combinations as applied to different items, as opposed to a Latin square design, where each participant sees every item rendered by all treatments.

For example, predicates of personal taste and other evaluative expressions (e.g. *utsukushii* 'is beautiful', *omoi* 'is heavy') were not used in order to eliminate potential confusion as to which individual in a given scenario believed that something had this particular subjective quality. I also opted for non-gradable adjectives that offered only binary (mutually exclusive) choices, such as *aiteiru* 'open' (i.e., something cannot be *totemo aiteiru* 'very open'; it either is 'open' or is not) (cf. Kennedy & McNally 2005 for a discussion on open and closed scale adjectives). This choice was also made to avoid the situation of participants being confused as to what qualified as having a certain gradable quality, such as being *kenkoo* 'healthy'.

For CNJ contexts, additional precautions were taken. Visual sources were explicitly mentioned to strengthen the idea that the information leading to the conjecture was seen but that the actual event corresponding to p was not. The CNJ passages were also normed for their conjectural status by asking five participants (who did not participate in the main experiment) to rate how reasonable a certain conjecture was given a certain scenario;[13] I only utilized items that had an average score of 6 or higher on a 7-point Likert scale (1 = the conjecture is very unreasonable; 4 = neither unreasonable nor reasonable; 7 = very reasonable). Additionally, I took care to ensure that the propositions inferred by these contexts were not actually entailments by testing whether any of the propositions could be uttered in their conjectural context in combination with *-noda* (= evidential *-no* - copula *-da*). Adding *-noda* is said to mark that the proposition is a statement of fact (Aoki 1986); thus, any item compatible with *-noda* was eliminated.[14]

[13]All stimuli were of the 'abductive' argument type, where "the conclusion can be viewed as the best explanation given the available evidence: it can be likely or possible, but nothing in the premises entails the conclusion" (Smirnova in prep:5). In contrast, the conclusion **is** entailed by the premises for 'deductive' arguments.

[14]Additionally, when there were multiple sentences in the context passages, pronouns were often dropped in sentences following the first to sound more natural. Also, a thorough online Japanese-English dictionary (Ahlström *et al.* 2013) was consulted to ensure that all words and kanji were sufficiently familiar to participants (i.e. learned in school and indicated as 'common'). Random name generators were used for the individuals mentioned in the stimuli (Campbell 1996, Rokugatsu 2013).

2.1.6. Fillers

There were twenty-four fillers, four of six types, all dealing with information source for a certain proposition *p*: (1) Person A saw that *p* on the Internet; (2) A heard that *p* from a friend; (3) It is said in general that *p*; (4) A read that *p* in the newspaper; (5) (PRO) were saying on TV that *p*; (6) (PRO) were saying on the radio that *p*. Three of the fillers for each type were designed to yield high scores (very natural), while the fourth was intended to yield low scores (very unnatural). Fillers were biased in this way to discourage participants from being too lenient and accepting all test items as natural.

2.1.7. Interface and database

The study utilized Adobe Flash Builder 4.6 Standard to create an online platform for the experiment. The programming language ActionScript was used alongside PHP code that built the database connections. Placing the experiment online was desirable, as we were recruiting Japanese participants locally and non-locally alike. The experiment required a computer and could not be run on smartphone or tablet. This may have been viewed as an inconvenience to participants, but I believe that it also prevented them from accessing the experiment in overly distracting locations such as on public transportation. Any time a participant accessed the website, this triggered a certain version of the experiment (out of 24 stimuli lists), which in turn triggered a different version for the next participant. Any data that was gathered by the platform (consent, background information, test/filler item responses) were immediately stored on a MySQL database. This meant that if a participant terminated the experiment at any time, their data until moment of termination was stored.

2.1.8. Procedure

The entire experiment including the consent form was conducted in Japanese (see Appendix C for the Japanese consent form and English translation). Participants were directed to access the experiment through an online link, which required a pre-determined username and password. After logging in, participants encountered a welcome message, followed by a consent form and then a Japanese screening question to filter out people who were not highly proficient in Japanese. (Answering the screening question incorrectly automatically terminated the experiment.) Then participants answered a short background questionnaire about their (1) age range; (2) gender; (3) hometown and length of residence; (4) current location and length of residence; (5) whether they spoke any languages other than Japanese; and (6) whether they grew up speaking Japanese.

The instructions for the main experiment first asked participants to consider a situation in which an individual utters some statement for which they could have a number of different kinds of information sources. Because the concept of 'information source' was explicit in the directions, I did not employ a large number of fillers, which would have been necessary to mask the intent of the research. It was then explained that participants would see a follow-up sentence intended to be directed at them (in the sense that the participant was in the role of the hearer) and that they were to rate its naturalness, given the context of the preceding passage, as quickly as possible on a 6-point scale (1 = very unnatural; 6 = very natural). There was no actual time limit to the task, but participants were told that excessively slow responses may be thrown out. I follow the assumption that more felicitous contexts will yield higher scores on a naturalness scale (cf. Tiemann *et al.* 2015 for a similar use of acceptability ratings when investigating the phenomenon of presupposition). A 6-point scale was chosen in order to rule out participants' defaulting to a middle score in cases of uncertainty (i.e. 4 on a 7-point scale). Participants were assured that there were no right or wrong answers and that they should respond with their initial intuitions.

Participants were presented with two example items, one designed to be very natural and one very unnatural, to serve as end points of the scale.

The main experiment consisted of 48 test items and 24 fillers (which were pseudo-randomized beforehand in order to avoid the situation of participants being presented with similar stimuli in succession, such as three *-sooda* items in a row). As mentioned earlier, it was assumed that infelicitous discourse contexts would lead to a higher processing cost, corresponding to degraded ratings (Hofmeister & Sag 2010, *inter alia*). The follow-up sentence was presented on a subsequent screen without the context passage available in order to discourage overthinking (see Fraser-Mackenzie & Dror 2011, Wilson & Schooler 1991 for a discussion of how excessive introspection can divert participants' attention from optimal criteria).

2.1.9. Results

2.1.9.1. Exclusion criteria. In some cases, participants terminated participation for one reason or another and returned to the experiment later, at which point they started a new trial. In these cases, their first trial was discarded, and their second trial was included only if the participant completed less than 5% of the test items in the first trial. This led to the removal of three participants. Along similar lines, if a participant simply opted out during participation without a second attempt, their data was thrown out ($n = 1$). However, there were some cases of a glitch occurring in the experimental interface, resulting in some participants being one or two items shy of a complete dataset. Although these data do not strictly adhere to the statistical assumption that each participant provides a complete set of data, I believe this is acceptable as the sample size was large.

Upon examining the results for the filler items which were designed to be unnatural, some items were more successful than others in eliciting a uniform response (mean score < 2 out of 6). For the successful four unnatural items (out of a total of 6 items), if a participant had a mean

score of 4 or above, they were not included in the analysis, as this indicates that they were not paying attention during the experiment. This led to three more participants' responses being removed.

2.1.9.2. Mean plots. Figure 2.1 shows the mean naturalness rating for each type of evidential in the four discourse environments (i.e. FIRST-CNJ, FIRST-NONCNJ, NONFIRST-CNJ, NONFIRST-NONCNJ), along with its 95% confidence interval.[15] The higher the mean, the more natural a use of an evidential in a certain context.

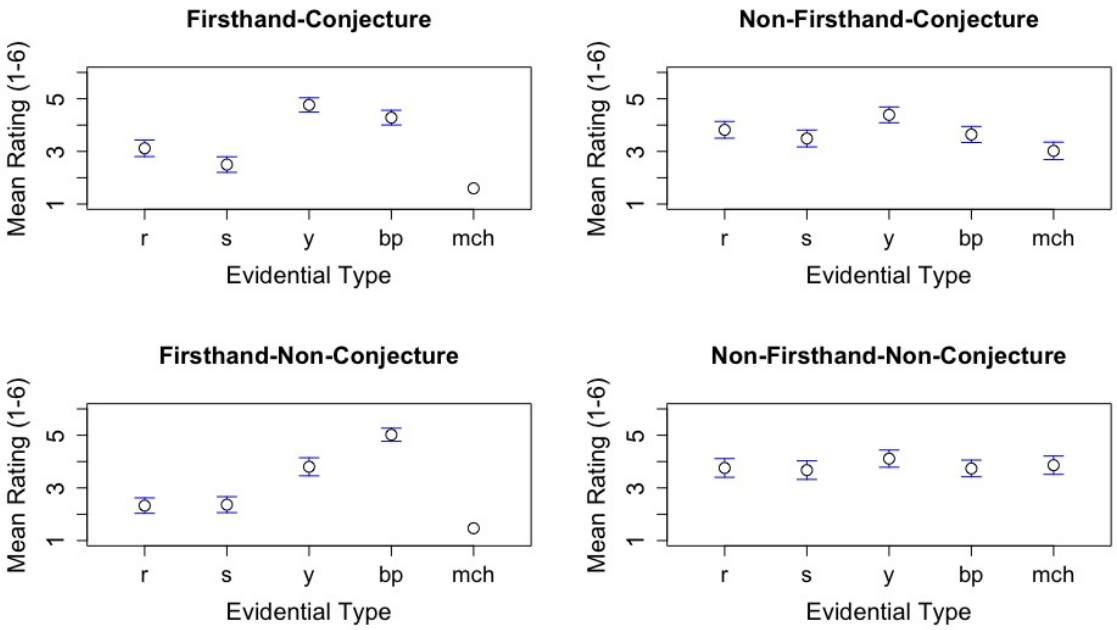

Figure 2.1. Mean plots for Likert score by evidentials across discourse environment (r = *-rashii*; s = *-sooda*; y = *-yooda*; bp = bare proposition; mch = matrix-clause hearsay)

A set of ANOVAs confirmed that there were significant differences between the mean ratings of the evidential types for three of the four discourse environments: (a) FIRST-CNJ $F(4, 772) =$

[15]As the confidence intervals are relatively small, they only appear as small ticks in the plots.

85.49, $p < 0.05$; (b) NONFIRST-CNJ $F(4, 772) = 10.54$, $p < 0.05$; FIRST-NONCNJ $F(4, 772) = 97.96$, $p < 0.05$; NONFIRST-NONCNJ $F(4, 774) = 0.98$, n.s.[16]

2.1.9.3. Linear mixed effects models. I built a linear mixed effects model for each evidential (Barr *et al.* 2013).[17] In essence, these models help determine, for a given evidential, which factors were the most crucial in predicting its felicity scores. The factors that were included in the models were:

- Fixed effects for SI (FIRST-NONFIRST), CNJ (CNJ-NONCNJ), and the two-way interaction when relevant
- Random effects for participant and proposition[18]
- Control variables: (a) the character count of the context passage (see Mazuka *et al.* 2002:146-147 for the concern that longer sentences lead to a greater processing cost); (b) the character count of the follow-up sentence; (c) the order of presentation of stimuli (first half vs. second half of the experiment); (d) whether the follow-up sentence had a 'uniquely identifiable' (Birner & Ward 1994) referent (e.g. Ms. Ueda) as opposed to one that was not (e.g. the patient).[19]

[16]Bonferroni-corrected tests revealed the following significant differences between specific evidentials within each context ($p < 0.005$): (i) FIRST-CNJ: all contrasts are significant except *-yooda* vs. bare *p* and *-rashii* vs. *-sooda*; (ii) NONFIRST-CNJ: matrix-clause hearsay vs. <*-rashii*, *-yooda*> and *-yooda* vs. *-sooda*; (iii) FIRST-NONCNJ: all contrasts are significant except *-rashii* vs. *-sooda*.

[17]The R code and output for the models can be seen in Appendix D.

[18]Random intercepts for participant/proposition were included in order to be able to generalize to the larger pool of participants/propositions. Random slopes were included for all fixed effects of interest by participant/proposition to account for any individual/propositional differences.

[19]With 'Ms. Ueda is pregnant', it would not be difficult to infer as a hearer that there must be some individual named 'Ms. Ueda'. However, with 'the patient is pregnant', this utterance may seem decidedly odd, being the first-mention of the referent within the conversation between the speaker and the hearer. On the other hand, though, Gregory Ward and Sid Horton (personal communication) note that there is a tendency for participants to accommodate such first-mention definites in experimental contexts.

Before building the models, I generated SI x CNJ interaction plots in order to determine whether this two-interaction should be included in a certain model.[20] In addition, I scaled all the variables (dependent and independent) to be centered around the mean. When a certain model did not converge, I simplified the random slopes structure one effect at a time.[21]

In what follows, I describe the statistically significant factors of interest ($p < 0.05$) for each model/evidential. In §2.1.10, I return to the results and compare them to the hypotheses/predictions and typological evidential systems.

Beginning with the bare propositions baseline in Figure 2.2, bare p's were judged to be more felicitous with FIRST contexts than with NONFIRST contexts (β = 0.64, s.e.β = 0.23, $\chi^2(1)$ = 6.33). In addition,there was a significant interaction between SI and CNJ (β = -0.68, s.e.β = 0.24, $\chi^2(1)$ = 7.88). Post hoc analyses[22] revealed that FIRST-NONCNJ was judged to be significantly more felicitous than FIRST-CNJ (β = -0.63, s.e.β = 0.25, $\chi^2(1)$ = 5.53), but there was no such difference between NONFIRST-CNJ and NONFIRST-NONCNJ.[23]

The phrasal reportative baseline (i.e. matrix-clause hearsay) was judged to be more felicitous in NONFIRST than FIRST contexts (β = -1.79, s.e.β = 0.24, $\chi^2(1)$ = 44.25) and NONCNJ than CNJ contexts (β = -0.43, s.e.β = 0.16, $\chi^2(1)$ = 6.51). In addition, there was a significant interaction between SI and CNJ (β = 0.94, s.e.β = 0.27, $\chi^2(1)$ = 11.26); specifically, NONFIRST-NONCNJ was judged to be more felicitous than NONFIRST-CNJ (β = -0.93, s.e.β = 0.26, $\chi^2(1)$ = 11.64). These trends are reflected in Figure 2.3.

[20]I also generated interaction plots between the fixed effects of interest and the control variable of unique identifiability, as it became apparent through participant feedback that this variable may have been having an inadvertently large influence on the naturalness ratings. Some of the models therefore include interactions with this control variable when relevant.

[21]Occasionally I would get an error stating that the 'maximum number of function evaluations' had been reached. In this case, I added code that increased the number of function evaluations.

[22]I subset the data to include only FIRST results and then tested whether CNJ was a significant factor; this process was then repeated for NONFIRST results.

[23]There was also a significant effect for the length of the follow-up sentence (β = 0.07, s.e.β = 0.03, $\chi^2(1)$ = 4.26).

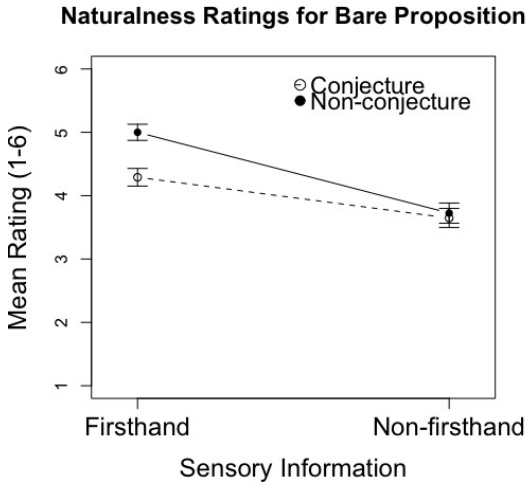

Figure 2.2. SI by CNJ: Bare proposition

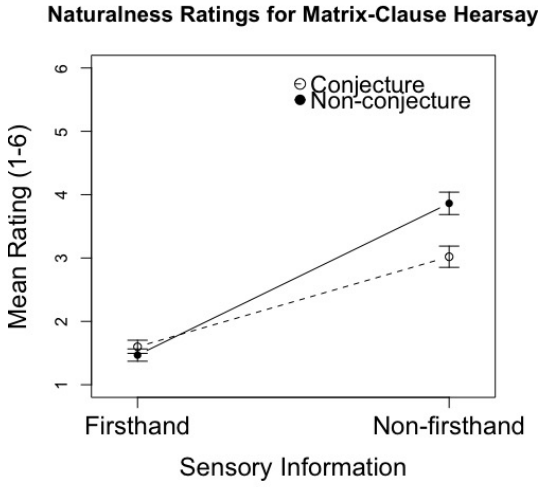

Figure 2.3. SI by CNJ: Matrix-clause hearsay

On the other hand, *-sooda* showed no effect of CNJ whatsoever and was more felicitous in NONFIRST than FIRST contexts (β = -1.37, s.e.β = 0.29, $\chi^2(1) = 18.62$).[24] These trends are reflected in Figure 2.4 below.

[24]Length of the follow-up sentence was a significant factor ($\beta = 0.09$, s.e.$\beta = 0.04$, $\chi^2(1) = 5.42$), as well as order of stimuli presentation (β = -0.44, s.e.$\beta = 0.20$, $\chi^2(1) = 3.90$).

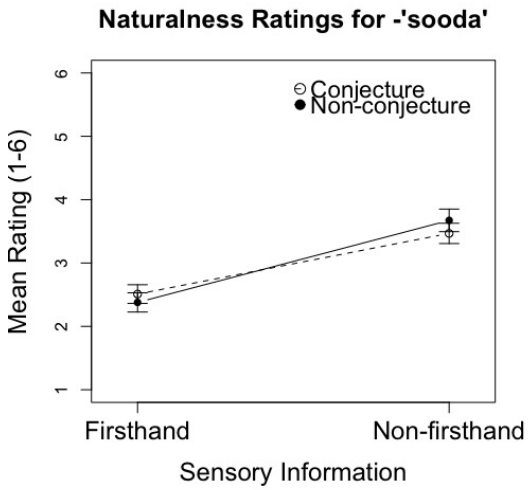

Figure 2.4. SI by CNJ: -*sooda*

The evidential -*yooda* was more felicitous with CNJ than NONCNJ contexts in general (β = 0.53, s.e.β = 0.21, $\chi^2(1) = 5.90$), as can be seen in Figure 2.5. Although SI was not a significant predictor, there was a significant interaction between SI and CNJ (β = 0.69, s.e.β = 0.31, $\chi^2(1)$ = 4.90); specifically, FIRST-CNJ was judged to be more felicitous than FIRST-NONCNJ (β = 0.98, s.e.β = 0.28, $\chi^2(1) = 11.26$).[25]

Finally, as regards -*rashii*, its use was judged to be relatively felicitous with NONFIRST than FIRST contexts (β = -1.49, s.e.β = 0.28, $\chi^2(1) = 23.53$) and CNJ than NONCNJ contexts (β = 0.65, s.e.β = 0.25, $\chi^2(1) = 6.31$). In addition, we see a significant two-way interaction between SI and CNJ (β = 0.68, s.e.β = 0.26, $\chi^2(1) = 6.66$) such that NONFIRST-CNJ and NONFIRST-NONCNJ were both judged to be natural with -*rashii*, whereas there is a significant difference between FIRST-CNJ and FIRST-NONCNJ (β = 0.97, s.e.β = 0.29, $\chi^2(1) = 10.16$). In other words, there is a

[25]In addition, unique identifiability was a significant factor in that identifiable referents led to higher naturalness ratings (β = -0.67, s.e.β = 0.22, $\chi^2(1) = 8.25$).

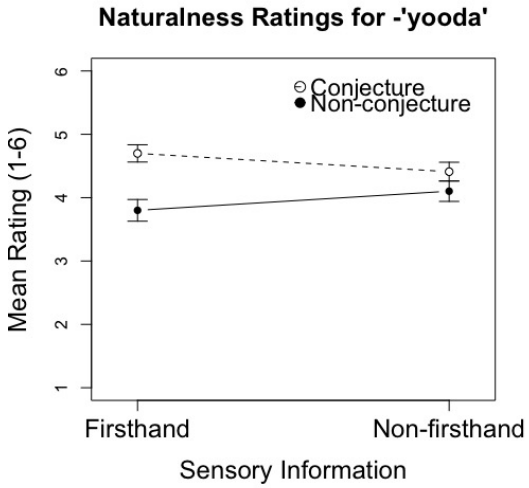

Figure 2.5. SI by CNJ: *-yooda*

strict divide between direct experience and everything else (all forms of indirect evidentiality).[26] These patterns can be seen in Figure 2.6.

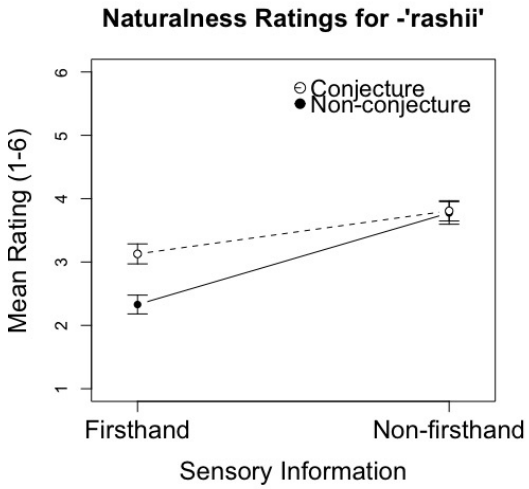

Figure 2.6. SI by CNJ: *-rashii*

[26]There was a significant interaction between SI and the unique identifiability of the referent (β = 0.89, s.e.β = 0.32, $\chi^2(1) = 7.27$); specifically, stimuli in NONFIRST contexts were judged to be more felicitous than their FIRST counterparts, but this pattern was especially strong for uniquely-identifiable referents (β = -0.98, s.e.β = 0.27, $\chi^2(1) = 11.96$). In addition, length of the follow-up sentence was a significant factor (longer sentences were rated more natural) (β = 0.10, s.e.β = 0.04, $\chi^2(1) = 6.10$).

In §2.1.10, I revisit the consolidated results of this section through a typological and theoretical lens and discuss the possible explanations for the naturalness judgments reported in this section, some of them which may be surprising.

2.1.10. Discussion

In this section, I return to the original statement of the hypotheses and accompanying predictions from §2.1.2 and provide the relevant outcomes for each. The outcomes in relation to the predictions have been summarized in Tables 2.4 and 2.5.

Hypothesis 1: Whether Sensory Information for a certain proposition was accessible first-hand to the speaker is a significant and differentiating factor when interpreting evidential statements in Japanese.

Predictions (with outcomes in parentheses) (YES = significant results; NO = non-significant results):

- When examining Sensory Information as a factor, -*yooda* will be judged to be more felicitous in FIRST contexts than NONFIRST when compared across SI **(NO)**; -*sooda* will be the opposite (i.e. NONFIRST more felicitous than FIRST) **(YES)**. The traditional categorization of -rashii would predict its use to be more felicitous with NONFIRST contexts **(YES)**, but it is possible that SI does not play a significant role in determining the felicity of -*rashii*, given more modern conventions of use **(NO)**.

Hypothesis 2: Whether there was any Conjecture required by the Speaker for a certain proposition is a significant and differentiating factor when interpreting evidential statements in Japanese.

Predictions (and outcomes):

- When examining Conjecturehood as a factor, -*yooda* will be judged to be more felicitous in CNJ contexts than NONCNJ when compared across CNJ **(YES)**; -*sooda* will be the

Sensory Information		
	prediction	outcome
-yooda	FIRST > NONFIRST	FIRST = NONFIRST
-sooda	NONFIRST > FIRST	NONFIRST > FIRST
-rashii	NONFIRST > (or =) FIRST	NONFIRST > FIRST

Table 2.4. Predictions and outcomes regarding Sensory Information

Speaker Conjecture		
	prediction	outcome
-yooda	CNJ > NONCNJ	CNJ > NONCNJ
-sooda	NONCNJ > CNJ	CNJ = NONCNJ
-rashii	CNJ > (or =) NONCNJ	CNJ > NONCNJ

Table 2.5. Predictions and outcomes regarding Speaker Conjecture

opposite (i.e. NONCNJ more felicitous than CNJ) **(NO)**.The traditional categorization of *-rashii* would predict its use to be more felicitous with CNJ contexts **(YES)**, but it is possible that CNJ does not play a significant role in determining the felicity of *-rashii* **(NO)**.

These results paint an interesting and unexpected picture in which the account that is most consistent with the results of the empirical study is that any kind of indirect evidentiality is compatible with *-yooda*. However, we must keep in mind that the current study investigated only two of many possible variables (e.g. sensory mode). In particular, the use of *-yooda* has been suggested to commit the speaker more strongly to the truth of the embedded proposition (Masuoka & Takubo 1992:128). Thus, though follow-up sentences with *-yooda* resulted in high felicity ratings in all four SI x CNJ contexts, one might prefer to use a different evidential to express less speaker commitment (e.g., see Makino & Tsutsui 1989:410 for the observation that conjectural-*sooda* may serve this purpose). Though both conjectural evidentials that we have examined (i.e. *-rashii* and *-yooda*) are presumed to commit the speaker to the possibility of the embedded proposition's truth (c.f. Matthewson *et al.* 2007 and Lee 2013 for an examination of

speaker commitment with regards to the use of an evidential), this presumption does not preclude different levels of commitment among them.[27] Despite this caveat about trying to create a full picture based on the results of only two primary variables, there are still many ways in which the conventions of use of these evidentials are either supported or need to be revised based solely on SI and CNJ criteria. In what follows, I consider the findings for each evidential type in turn.

For the bare propositions baseline, it is not surprising that they were most judged to be felicitous when the speaker had direct experience (FIRST-NONCNJ). What **is** potentially surprising given the vast literature on Japanese pragmatic and cultural norms favoring indirectness, vagueness, and hedging (e.g. Donahue 1998, Ikegami 1991, Naruoka 2014, Tsuda 1984, Watanabe 1993, *inter alia*), is that bare propositions received very felicitous scores even in cases where the speaker only had access to a relatively weak source. In other words, the speaker in this context did not have access to the best possible source of information (direct experience) for a given proposition (cf. Faller 2002). Because there were insufficient tokens in some of the age groups, it was not possible to conduct an analysis to see whether these results reflect an undergoing change in progress in Japanese utterances toward more direct forms, but this analysis could be done with a replication better systematically controlled for age. The same is true for a replication controlled for gender of the speaker to see whether, for example, bare propositions said to be produced by women would be judged as less felicitous than those by men in the same indirect contexts.[28,29]

In the other direction, it is also surprising that *-yooda* was found to be relatively felicitous with direct experience (FIRST-NONCNJ), and in fact was felicitous overall (although there **was** a

[27]Speaker commitment to the proposition will be explored further in §2.2 and in Chapter 3.

[28]Post hoc analyses where age and gender were included as control variables in the linear mixed effects models for each evidential did not find a significant effect for either age or gender.

[29]Kamio (1994:73), in his theory on the 'territory of information', explains that there are instances where bare propositions are acceptable, if not required, when the speaker is conveying "information about persons and things which are close to the speaker: That is, personal information about the speaker". However, none of the current experimental stimuli evoke the sense that the speaker was conveying 'personal' information; nonetheless, this aspect is something to keep in mind for future studies.

preference for it to be used in firsthand conjectural situations). This finding is inconsistent with the assumption of researchers such as Kekidze (2000) and McCready & Ogata (2007), who claim that Japanese (indirect) evidentials are infelicitous with direct experience.

Turning now to the phrasal matrix-clause hearsay baseline, I will discuss it in connection with *-sooda* because they were predicted to show a similar pattern, both being 'reportative' (NONFIRST-NONCNJ) by definition. According to the results, both were predictably infelicitous with direct experience and firsthand conjectures but, crucially, while matrix-clause hearsay was judged to be more felicitous with NONFIRST-NONCNJ than with NONFIRST-CNJ, *-sooda* was judged to be relatively felicitous with both. This is an unexpected finding, as *-sooda* has been characterized as indicating exclusively the reporting or relaying of hearsay sources without added judgment (Aoki 1986, Kikuchi 2000, Makino & Tsutsui 1989, Masuoka & Takubo 1992, McCready & Ogata 2007, Teramura 1984); therefore, it is surprising that NONFIRST-CNJ contexts are equally felicitous with *-sooda*. One might be tempted to speculate that the higher processing cost associated with the length of NONFIRST contexts might have neutralized the difference between CNJ and NONCNJ for *-sooda*, but we do see exactly this difference for matrix-clause hearsay (showing the possibility of the same pattern for *-sooda*). And indeed, post hoc analyses reveal that there was a two-way interaction between SI and evidential type (when limiting the analysis to the contrast between *-sooda* vs. matrix-clause hearsay) ($\beta = 0.76$, s.e.$\beta = 0.21$, $\chi^2(1) = 12.56$). In other words, matrix-clause hearsay is strictly felicitous with 'reports', while what has been called 'reportative-*sooda*' is more accurately 'non-firsthand-*sooda*', where the content of what is being reported, or more accurately, uttered, (i.e. a conjecture or a report) has no influence.[30]

This finding reflects what Murray (2010:34) observed about the Cheyenne reportative evidential *sesto*: "...[T]he speaker need not have ever heard the proposition that is literally in the

[30]However, as we will see in Chapter 4, the use of *-sooda* does require a communicative act (Grice 1957, Strawson 1964, *inter alia*), whereas this is not required for *-rashii* or *-yooda*.

evidential's scope. To my knowledge, this is a property of evidentials that holds crosslinguistically, but currently is not accounted for". In other words, "...[t]he speaker need not be directly told the scope proposition" (51). However, Murray's claim directly challenges what had been stated by McCready & Ogata (2007:161): "...[T]he proposition [that -*sooda*] applies to must be communicated directly to some individual". Even though such a requirement is conceivable for any given reportative evidential, what the current study shows is that the results for -*sooda* support Murray's claim.

Returning to the above contrast between -*sooda* and matrix-clause hearsay, I believe these findings bear on the well-known debate in the semantic and pragmatic literature on evidentiality related to whether evidentials can be analyzed as epistemic modals (Faller 2002, Matthewson *et al.* 2007, Murray 2010, *inter alia*). In Matthewson *et al.*, in which all St'át'imcets evidentials are taken to be epistemic modals, the usage of a sentence with a reportative evidential:

> ...*presupposes* the existence of a report which constitutes evidence for p, and *asserts* that p must be true, given that report. In a sentence containing a verb of saying, [the usage of] the sentence *asserts* that a report was made, and does not commit the speaker to any claim about the truth or otherwise of p. (210; emphases in original)

Although the results of the current experiment cannot directly address this question, the fact that we see a difference in naturalness judgments between -*sooda* and matrix-clause hearsay could reflect a formal difference comparable to the one described in Matthewson *et al.* (2007). For instance, if -*sooda* were an epistemic evidential presupposing a report, and if this presupposition were easy to accommodate, then in NONFIRST-CNJ contexts, the participants could have been accommodating the fact that the proposition in question–and not just the non-firsthand information–had been reported, leading to its equal footing with NONFIRST-NONCNJ contexts. Of course, in order to flesh out this possibility, further investigation is necessary. In particular,

we would need to test the commitment of the speaker to various evidential-attached statements to confirm that the speaker is in fact committed to the possibility of p with *-sooda* but not with matrix-clause hearsay, as this is a common diagnostic for identifying epistemic evidentials (e.g. Murray 2010). This follow-up work is especially important given that it could directly challenge a claim made by McCready & Ogata (2007) that *-sooda* behaves similarly to the reportative evidential in Cuzco Quechua (Faller 2002), which has been analyzed as an illocutionary speech act operator rather than an epistemic modal. Such a follow-up would further provide the basis for a new semantico-pragmatic model of Japanese evidentials, and this possibility will be explicated in §2.2 and Chapter 3.

Finally turning our attention to *-rashii*, we find that the results show that it is judged to be equally felicitous with NONFIRST-CNJ and NONFIRST-NONCNJ. This finding supports the claim of authors who state that *-rashii*, which traditionally has been categorized as being conjectural, can also function as a hearsay marker (Makino & Tsutsui 1989, *inter alia*). This nonrestrictivity with regards to *-rashii* confirms the suggestion made earlier in §1.5 that Japanese provides evidence to support Willett's (1988) claim that, even when a language has more than one indirect evidential, one of these can cover both reportative and conjectural evidentiality. In fact, as we have found that 'reportative-*sooda*' also functions more as a 'non-firsthand' marker, we can say that Japanese has two such 'broad' indirect evidentials. However, one thing to note is that unlike *-sooda*, *-rashii* shows an interaction such that FIRST-CNJ is judged to be more felicitous than direct experience (FIRST-NONCNJ), as predicted by Asano-Cavanagh (2010), Kikuchi (2000), and Saito (2004). In short, *-rashii* may be used with any indirect (i.e. conjectural or reportative) context but its use is favored in those contexts in which the information source is non-firsthand.

In addition to the main effects of interest, there was a significant interaction between SI and unique identifiability for *-rashii* and bare propositions, and unique identifiability was a significant factor for the use of *-yooda*. It can be concluded that unique identifiability of the relevant referent

in the follow-up sentence is a factor that must be controlled for, and this was ensured in the follow-up experiment discussed in Chapter 3.

Overall, it can be seen from the above results and discussion that the manipulation of SI and CNJ was successful in differentiating between *-rashii*, *-sooda*, and *-yooda* as well as the baselines of bare *p*'s and matrix-clause hearsay. In addition, a number of topics to be further investigated were identified. For example, what is the crucial factor that results in different felicity conditions among *-sooda* and matrix-clause hearsay, and do these differences tell us anything about whether Japanese evidentials can be analyzed as epistemic modals? What role, if any, does a speaker's commitment to the truth of a proposition play in the evaluation of evidential sentences? These questions will be first examined by employing semantic diagnostics in §2.2 and then investigated experimentally in Chapter 3.

2.2. Background on the semantics and pragmatics of Japanese evidentiality

In this section, I present a basic semantic and pragmatic analysis of Japanese evidentiality, mainly focusing on diagnostics that have been suggested for identifying epistemic evidentials (evidentials that can be analyzed as epistemic modals) vs. illocutionary evidentials (evidentials that can be analyzed as illocutionary operators) (see Faller 2002 (Cuzco Quechua), Matthewson *et al.* 2007 (St'át'imcets), and Murray 2010 (Cheyenne) as examples of studies that demonstrate the crosslinguistic utility of these tests). It should be noted that these diagnostics largely assume a Kratzerian semantics of modals (e.g. Kratzer 1991, Izvorski 1997, Garrett 2000). When considering modals in general, Kratzer (2012b:8) states that they "are inherently relational. To be semantically complete, a modal requires two arguments: a restriction and a scope". For example, the "semantic core" of the English epistemic modal *must* is represented by the relative modal phrase *must in view of*, which in turn requires the modal restriction 'what is known' and the modal scope (the proposition denoted by the prejacent). In addition, some of the diagnostics

are based on the assumption that epistemic indirect evidentials presuppose that the speaker has indirect evidence (Izvorski 1997:226).

On the other hand, the illocutionary analysis was largely put forth by Faller (2002), who based her analysis on SPEECH ACT THEORY (Searle & Vanderveken 1985, *inter alia*). Within this analysis, illocutionary acts consist of a propositional content (similarly to modals) and also an illocutionary force, which includes components such as degree of strength. Therefore, *it may/must be raining* could be roughly translated to 'It is raining, and I am asserting this with a weakened degree of strength (at various degrees)'. On the other hand, *I heard that it is raining* would be translated as 'It is raining, and I am presenting this as' "another speaker's assertion" (Faller 2002:199). In §2.2.1 to 2.2.4, I present a series of diagnostics that have been utilized by researchers (e.g. Matthewson *et al.* 2007, Murray 2010) to determine whether a certain evidential marker is best analyzed as an epistemic or illocutionary evidential.[31]

2.2.1. Diagnostic: Infelicitous if embedded proposition is known to be false by the speaker

For a given evidential statement, if embedding a proposition known to be false by the speaker results in infelicity, this evidential can be analyzed as an epistemic modal. This is because as mentioned above, modals require a restriction concerning 'what is known', and it would be contradictory for a modal to have a false scope if one is presenting it within the context of what is known (assuming what is known is held constant). On the other hand, if no such infelicity arises, the evidential would be compatible with an illocutionary analysis. This is because if the illocutionary force is of presentation of another speaker's assertion, the speaker is not committed even to the possibility of p being true. Examples (9) to (14) demonstrate the diagnostic ((9), (12), and (13) = English; (10) and (11) = St'át'imcets; (14) = Cuzco Quechua):

[31]These diagnostics will later form a set of features that will be useful for analyzing the epistemic and evidential status of any linguistic element that that can be used to express evidentiality.

(9) #It **may/must** be raining, but it is not raining.
(Faller 2002:191)

(10) #wa7 **k'a** kwis, t'u7 aoz t'u7 k-wa-s kwis
IMPF CNJ rain but NEG just DET-IMPF-3POSS rain
'It **may/must** be raining, but it is not raining'.
(Matthewson *et al.* 2007:213)

(11) #um'-en-tsal-itás **ku7** i án'was-a xetspqíqen'kst táola, t'u7 aoz
give-TRANS-1SG.OBJ-3PL.ERG **RPT** DET.PL two-EXIS hundred dollar but NEG
kw s-7um'en'tsal-itás ku stam'
DET now-give-TRANS-1SG.OBJ-3PL.ERG DET what
'They gave me $200, **I hear**, but they did not give me anything'.
(Matthewson *et al.* 2007:214)

(12) I **heard that** it is raining, but it is not raining.

(13) #?It is raining, **I hear**, but it is not raining.

(14) para-sha-n-**si**, ichaqa mana crei-ni-chu
rain-PROG-3-**RPT** but not believe-1-NEG
'It is raining, **I heard**, but I do not believe it.
(Faller 2002:194)

Example (9) shows that it is indeed infelicitous to negate the scope embedded under the English epistemic modals *may* and *must*. We can see that in (10) and (11) (the St'át'imcets conjectural and reportative evidentials), the propositional content cannot be denied without infelicity, whereas in (14) (the Cuzco Quechua reportative evidential) and (12) (English *I heard that*), there is no such infelicity.[32] The status of (13) is inconclusive but could be suggested that the sentence is not as felicitous as (12), and hence that the use of the English expression *p, I hear* conveys commitment of the speaker to the possibiity of *p* (Murray 2010, Simons 2007). Applying the diagnostic to *-rashii*, *-sooda*, and *-yooda* results in (15), (16), and (17), respectively:

[32]The form of denial is different between (10) and (14), which could potentially have a non-negligible effect. However, theoretically, any expression of denial or disbelief of the propositional content should be infelicitous with the use of an epistemic modal (Murray 2010:53-54).

(15) #ame-ga fut-teir-u-**rashii**-ga, fut-tei-nai
rain-NOM fall-PROG-NPST-CNJ/RPT-CONJ fall-PROG-NEG
'It is raining, **it seems/I hear**, but it is not raining'.

(16) #?ame-ga fut-teir-u-**sooda**-ga, fut-tei-nai
rain-NOM fall-PROG-NPST-**RPT**-CONJ fall-PROG-NEG
'It is raining, **I hear**, but it is not raining'.

(17) #ame-ga fut-teir-u-**yooda**-ga, fut-tei-nai
rain-NOM fall-PROG-NPST-**CNJ**-CONJ fall-PROG-NEG
'It is raining **it seems**, but it is not raining'.

As can be seen, the scope cannot be negated without infelicity with *-rashii* or *-yooda*. However, the picture is not so clear for *-sooda*. As mentioned in §2.1.10, McCready & Ogata (2007) claim that *-sooda* passes the test (i.e. the scope can be negated without infelicity). And it is also true that such constructions exist in the wild, as seen in (18):

(18) intaanetto-de modoru-botan-ga hyouji-sarenai-no-de tuurubaa-no yuuzaa-settei-de
internet-in back-button-NOM display-not-LNK-so toolbar-GEN user-setting-with
dekir-u-**sooda**-kedo, deki-mase-n
can-NPST-**RPT**-but can-POL-NEG
'When using the Internet, the Back button is not displayed, and I can display it via user preferences in the toolbar, **I hear**, but I can not'.
(Balanced Corpus of Contemporary Written Japanese, Maekawa & Yamazaki 2011)

However, when presenting examples such as (16) and (18) to native speakers of Japanese (personal communication),[33] I have found mixed results ranging from rejection to mild acceptance. Therefore, the status of *-sooda* with regards to this diagnostic is inconclusive.[34]

[33]I am indebted to Masaya Yoshida, Yoichi Mukai, and Rika Yamashita for their judgments.

[34]Murray (2010) and AnderBois (2014) categorize *-sooda* as an epistemic evidential, which should render these examples infelicitous. However, neither author give any specific examples with regards to negating the scope and actually cite McCready & Ogata (2007) as their main reference for Japanese evidentials.

2.2.2. Diagnostic: Infelicitous if embedded proposition is known to be true by the speaker

For a given evidential statement, if embedding a proposition known to be true by the speaker results in infelicity, the evidential can be analyzed as an epistemic modal. This is because under a (certain) modal analysis, "the evidentials presuppose that the evidence for *p* is only indirect" (Izvorski 1997:226, Matthewson *et al.* 2007:215). In other words, the speaker knowing that the proposition is true is directly at odds with the understanding that indirect evidence is generally too weak for knowledge of *p*. Examples (19) - (21) demonstrate the diagnostic:

(19) #It **may/must** be raining, and it is raining.

(20) I **heard that** it is raining, and it is raining.

(21) #nilh **k'a** k-Sylvia ku xílh-tal'i; wá7-lhkan t'u7 áts'x-en
FOC **CNJ** DET-Sylvia DET do(CAUSE)-TOP IMPF-1SG.SUBJ just see-DIR
'**It must have been** Sylvia who did it; I saw her'.
(Matthewson *et al.* 2007:216)

Applying the diagnostic to *-rashii*, *-sooda*, and *-yooda* results in (22), (23), and (24), respectively:

(22) #ame-ga fut-teir-u-**rashii**-shi, jissaini fut-tei-ru
rain-NOM fall-PROG-NPST-CNJ/RPT-CONJ really fall-PROG-NPST
'It is raining, **it seems/I hear**, and it really is raining'.

(23) #ame-ga fut-teir-u-**sooda**-shi, jissaini fut-tei-ru
rain-NOM fall-PROG-NPST-**RPT**-CONJ really fall-PROG-NPST
'It is raining, **I hear**, and it really is raining'.

(24) #ame-ga fut-teir-u-**yooda**-shi, jissaini fut-tei-ru
rain-NOM fall-PROG-NPST-**CNJ**-CONJ really fall-PROG-NPST
'It is raining, **it seems**, and it really is raining'.

As can be seen, the scope cannot be asserted as true without infelicity for any of the evidentials, indicating that they could be potentially analyzed as epistemic modals.[35]

2.2.3. Diagnostic: Indirect evidence cancelable?

As explained in §2.2.2, when analyzing evidentials as epistemic modals, the evidence being indirect is a presupposition according to some analyses (Izvorski 1997, Matthewson *et al.* 2007). Therefore, as with any other presupposition, it is not possible to cancel the indirect nature of the evidence, as demonstrated in (25) and (26):

(25) #It **may/must** be raining; I see it raining.[36,37]

(26) #nilh **k'a** k-Sylvia ku xílh-tal'i; wá7-lhkan t'u7 áts'x-en
FOC **CNJ** DET-Sylvia DET do(CAUSE)-TOP IMPF-1SG.SUBJ just see-DIR
'**It must have been** Sylvia who did it; I saw her'.
(Matthewson *et al.* 2007:216) [= (21)]

Applying the diagnostic to *-rashii*, *-sooda*, and *-yooda* results in (27), (28), and (29), respectively:[38]

(27) #ame-ga fut-teir-u-**rashii**; watashi-wa ame-wo mi-tei-ru.
rain-NOM fall-PROG-NPST-CNJ/RPT-CONJ; I-TOP rain-ACC see-PROG-NPST
'It is raining, **it seems/I hear**; I see it raining'.

[35]As seen in the results of Chapter 2, the use of *yooda* was judged to be relatively natural with direct (firsthand-nonconjectural) evidence. Therefore, there may be some variability with *-yooda* if we were to test this feature systematically.

[36]Thank you to Gregory Ward for the observation that *It must be raining; I saw it raining.* can be felicitous in the context where one is challenging the claim that it is not raining (i.e. the status of rain is under discussion). Note that this utterance would be odd without this context, and that even with the context it cannot be uttered without infelicity if the tense of the second clause is changed to *I see it raining.* This is a clear example where context and tense (and potentially other grammatical features) contribute to the felicity conditions of an utterance.

[37]Thank you also to Stefan Kaufmann for the observation that in cases where the eye witness report is not considered mutually conclusive evidence, an utterance such as *It must be raining; I see it raining* could be felicitous. For example, the speaker could be looking at some security camera footage that is hazy or be under the influence of psychoactive drugs.

[38]The same caveat as in §2.2.2 exists for *-yooda*.

(28) #ame-ga fut-teir-u-**sooda**; watashi-wa ame-wo mi-tei-ru.
rain-NOM fall-PROG-NPST-**RPT**-CONJ I-TOP rain-ACC see-PROG-NPST
'It is raining, **I hear**; I see it raining'.

(29) #ame-ga fut-teir-u-**yooda**; watashi-wa ame-wo mi-tei-ru
rain-NOM fall-PROG-NPST-**CNJ**-CONJ I-TOP rain-ACC see-PROG-NPST
'It is raining, **it seems**; I see it raining'.

As can be seen, with the evidence being indirect, an attempt to cancel that indirectness results in infelicity with all of the evidentials, indicating that they could potentially be analyzed as epistemic modals.

2.2.4. Diagnostic: Challengeability

Challengeability is a diagnostic for identifying whether a certain linguistic element contributes to the truth conditions of a certain proposition by checking "whether the meaning of the element in question can be questioned, doubted, rejected or (dis)agreed with" (Faller 2002:110). For example, if an individual utters *It is raining*, and another utters *False / That's not true / Bullshit*,[39] the latter has rejected the claim that it is raining, effectively claiming that it is not raining. Applying this diagnostic to epistemic modals and evidentials, we find that these elements cannot be directly challenged in the same way, as shown in (30) and (31):[40]

[39]The exact utterance that is used for the challenge has been shown to have an influence on the felicity of the challenge (e.g., Horn 2013a,b, to appear; see Smith *et al.* 2013 for an examination of *No* vs. *No, that's not true* with or without an alternative explanation).
[40]We do find that these elements can be challenged indirectly, such as by the utterance *What do you mean **may**? It **must** be raining!* (see Ward 2003 for a discussion on how to felicitously cancel presuppositions).

(30) A: It **may/must** be raining.
B: False / That's not true / Bullshit, it is not raining. (e.g., What you are saying is inconsistent with the evidence. / I know more than you. / You're drunk.)[41]
B′: # False / That's not true / Bullshit, it is not the case that it is possible/necessary that it is raining given what you know. (You have not made an epistemic judgment.)

(31) A: It is raining, **it seems**.
B: False / That's not true / Bullshit, it is not raining. (e.g., What you are saying is inconsistent with the content of the information. / I know more than you. / You're drunk.)
B′: # False / That's not true / Bullshit, you did not conjecture that it is raining based on the information you have. (You have not made a conjecture.)[42]

However, it has been found that epistemic modals pass the test "on at least some of their uses" (Matthewson *et al.* 2007:220), specifically when one's modal reasoning has been challenged, as in (32), (33), and (34):

(32) A: Jo **must** be the thief.
B: False / That's not true / Bullshit, there are some other plausible suspects. Jo may be entirely innocent.
(Faller 2002:113)

(33) A: Jo **may** be the thief.
B: False / That's not true / Bullshit, your reasoning is flawed.

(34) Context: Person A and B are inside and hear a pit-pattering sound on the roof.
A: It **may/must** be raining.
B: False / That's not true / Bullshit, it could be a water hose.

Applying the diagnostic to *-rashii*, *-sooda*, and *-yooda* results in (35) and (36):

[41]Although these responses are colloquially acceptable (Smith *et al.* 2013), there is the question of whether this is in fact a 'faultless disagreement', where B is fruitlessly challenging the fact that A has made an epistemic assessment (e.g. Kölbel 2004). Indeed, B's response becomes degraded if A had uttered *I think it may be raining.*
[42]Murray (2010) claims that the evidential content (e.g. that the speaker has conjectural/reportative evidence) does contribute to the truth conditions even though the evidential content is not challengeable, or put in other terms, 'not-at-issue'.

(35) Context: Person A and B are inside and hear a pit-pattering sound on the roof.

A: ame-ga fut-teir-u-**rashii/yooda**

rain-NOM fall-PROG-NPST-**CNJ**

'It is raining, **it seems**'.

B: sore-ha chigau, hoosu-kamoshirenai

that-TOP wrong hose-may

'That's not true, it may be the hose'.

(36) Context: Person A is inside and hears a pit-pattering sound on the roof. She tells Person B and C about the sound.

B: ame-ga fut-tei-ru-**rashii/sooda**

rain-NOM fall-PROG-NPST-**RPT**

'It is raining, **I hear**'.

C: sore-ha chigau, hoosu-kamoshirenai

that-TOP wrong hose-may

'That's not true, it may be the hose'.

As can be seen, the modal claim for *-rashii*, *-sooda*, and *-yooda* (i.e. what is inferred given what is known) can be challenged, patterning similarly with epistemic modals.

2.2.5. Limitations with regards to diagnostics

In §2.2.1-2.2.4, we examined several diagnostics that have been used by past researchers (Faller 2002, Matthewson *et al.* 2007, Murray 2010, *inter alia*) for determining whether a certain evidential could be analyzed as an epistemic modal. Although one may deduce from the results that *-rashii*, *-sooda*, and *-yooda* can all be analyzed as epistemic evidentials, we encountered some inconclusive cases such as in §2.2.1 (embedding a proposition known to be false). In addition,

"whether the direct challengeability test determines whether or not an element contributes to the propositional content has come under scrutiny recently" (Murray 2010:79), indicating that semantic diagnostics may not be sufficient for the purposes of determining the epistemic status of Japanese evidentials. Therefore, I will be investigating the question of how best to analyze the Japanese evidentials via an empirical study, which is described in Ch 3.[43]

[43]There are additional diagnostics for epistemic modality, which mainly concern the embeddability of the linguistic element in question, such as within the antecedent of a conditional, under a factive attitude verb or a verb of saying, or under tense, negation, or other modals. The main gist of these diagnostics is that embeddable linguistic elements must be contributing to the propositional content and therefore may potentially be analyzed as epistemic modals. I have decided not to include these diagnostics here, as most of the resulting Japanese sentences are awkward (e.g., see Sotoyama 1964:133 for the observation that attaching the Japanese negation morpheme -*nai* to a sentence that already has an evidential attached to the scope is rather awkward, although perhaps not infelicitous), which leads to clouded judgments regarding felicity. In addition, crosslinguistically speaking, these tests are not as reliable as the others, leading to conflicting results. For example, even though evidentials in both German and St'át'imcets are classified as being epistemic, only the former have been found to be embeddable within the antecedent of a conditional (Faller 2002, Matthewson *et al.* 2007). It is sufficient to say that the embedding diagnostics only strengthen the need to further investigate the question of whether Japanese evidentials (especially -*sooda*) are best analyzed as epistemic evidentials.

CHAPTER 3

The epistemic status of the Japanese evidentials *-rashii*, *-sooda*, and *-yooda*: An experimental investigation

As discussed in Chapter 1, languages provide various means by which speakers indicate the source of information for some asserted proposition *p*. For example, English speakers are able to indicate that they have acquired information through hearsay by using the matrix clause *I heard that p* (e.g., *I heard that it is raining*) or the parenthetical form *p, I hear* (e.g., *It is raining, I hear*) (Simons 2007). Within linguistic theory, this linguistic coding of information source has traditionally been situated within the semantic domain of evidentiality, and grammaticalized or morphosyntactic markers that express evidentiality are referred to as 'evidentials'. Under this view, the English frame *I heard that p* is an example of evidentiality but not of a grammaticalized evidential, while the frame *p, I hear* is an example of both (Simons 2007). This distinction between evidentiality and evidentials will be maintained for the remainder of this chapter, in line with Dendale & Tasmowski (2001), Murray (2010), and others.

In contrast to evidentiality, which encodes information source, epistemic modality "is concerned with the probability, possibility, or necessity" of the occurrence of an event or some other state of affairs (Narrog 2009:1). How evidentiality and epistemic modality are related has been the subject of considerable debate (Aikhenvald 2004, de Haan 1999, Drubig 2001, Faller 2002, Matthewson *et al.* 2007, Michael 2012, Murray 2010, Palmer 1986, *inter alia*), and the question of whether evidentials should be analyzed as epistemic modals has been investigated in various languages (e.g. Cuzco Quechua (Faller 2002), St'át'imcets (Matthewson *et al.* 2007), Cheyenne (Murray 2010)). According to these studies, evidentials that when used convey commitment of

the speaker to the possibility of the embedded p being true are prone to an epistemic modal analysis. On the other hand, evidentials that when used trigger no such requirement are best analyzed as illocutionary markers (e.g. Faller 2002, Matthewson *et al.* 2007, Murray 2010).

Employing this diagnostic, which is a modified version of Moore's paradox (Linville & Ring 1991, *inter alia*),[1] one finds that the use of conjectural evidentials does convey commitment of the speaker to the possibility of p, as demonstrated by the infelicity of *#It is raining, it seems, but it is not.* Therefore, there is relative consensus that conjectural evidentials are best analyzed as epistemic modals (Faller 2002, *inter alia*). However, the use of the reportative evidential leads to non-uniform results, where there is commitment to the possibility of p in some languages (e.g. St'át'imcets) but not with others (e.g. Cuzco Quechua and Cheyenne) (see AnderBois 2014 for an overview). Murray (2010) has labeled these two types, respectively, as epistemic vs. illocutionary evidentials, and this chapter focuses on determining to which type the Japanese reportative evidential *-sooda* belongs. The answer to this question is crucial for the semantic theorizing of Japanese evidentiality as a whole, which in turn will inform the more general theory of evidentiality.[2]

3.1. Epistemic vs. illocutionary evidentials

Reportative evidentials that when used seem to convey commitment of the speaker to the possibility of p have been analyzed as epistemic evidentials within possible worlds semantics (e.g. Kratzer 1991, Izvorski 1997, Garrett 2000). When considering modals in general, Kratzer (2012b:8) states that they are "inherently relational. To be semantically complete, a modal requires two arguments: a restriction and a scope". For example, the "semantic core" of the English

[1]Moore's paradox refers to the intuition that there seems to be a contradiction when one utters '*p and I believe that not p*' or '*p and not* [*I believe that p*]'.

[2]In Chapter 4, I will explore the option of an analysis that does not subscribe to the dichotomy of an evidential element being analyzed either as an epistemic modal or a speech act operator. Instead, I will (re-)identify certain features that are useful for analyzing the epistemic and evidential status of any linguistic element that can be used to express evidentiality, including the diagnostic described above.

epistemic modal *must* is represented by the relative modal phrase *must in view of*, which in turn requires the modal restriction 'what is known' and the modal scope (the proposition denoted by the prejacent). According to Kratzer (1991:649), "the differences between modal expressions in different languages can be captured in terms of three dimensions": (i) modal force (e.g. necessity, possibility[3]), (ii) modal base (e.g. epistemic, circumstantial), and (iii) ordering source (e.g. deontic, stereotypical). Under this framework, Izvorski (1997:222) analyzes the PERFECT OF EVIDENTIALITY, as found in Turkish, Bulgarian, and Norwegian, which "allows both a report and an inference reading", as an epistemic modal with the following interpretation:[4]

(1) Assertion: $\Box p$ in view of the speaker's knowledge state
Modal force = $\Box$ ('It is necessary that')
Modal Base = in view of the speaker's knowledge state
Ordering source = stereotypical

On the other hand, reportative evidentials that when used do not seem to convey commitment of the speaker to the possibility of p have been analyzed as illocutionary evidentials within speech act theory (e.g. Faller 2002, Murray 2010). Within this analysis, an utterance consists of propositional content and illocutionary force, the latter defined in terms of seven features by Searle & Vanderveken (1985) (see Green 2015 for a summary):

- Illocutionary point (the aim of a speech act, such as an assertion or a promise);
- Degree of strength of the illocutionary point (e.g., insisting is stronger than requesting in terms of attempting to get the addressee to do something);
- Mode of achievement (e.g., to testify is to assert in one's capacity as a witness);

[3]Kratzer (1991) also lists 'weak necessity', 'good possibility', 'slight possibility', 'at least as good possibility', 'better possibility', and other unspecified degrees of possibility as options for modal force.
[4]Izvorski (1997) also analyzes the PERFECT OF EVIDENTIALITY as having a presuppositional component of the speaker having indirect evidence for p.

- Content conditions (e.g., one can only promise what is in the future and under their control);
- Preparatory conditions (e.g., one cannot bequeath an object they do not own unless they have power of attorney);
- Sincerity conditions (e.g., an assertion expresses belief, whereas a promise expresses intention);
- Degree of strength of the sincerity conditions (e.g., imploring is stronger than requesting in terms of desire).

Within this framework, Faller (2002) represents an utterance containing the Cuzco Quechua reportative evidential -*si* as (2):

(2) para-sha-n-**si**[5]
rain-PROG-3-**RPT**
p = 'It is raining'.
ILL = PRESENT(p)
SINC = $\{\exists s_2[Assert(s_2, p) \wedge s_2 \notin \{h, s\}]\}$
(Faller 2002:199, example 165)

Here, the propositional content is 'It is raining', and the illocutionary force includes the illocutionary point of PRESENTATION, where the speaker presents p as "another speaker's assertion" (Faller 2002:199). The sincerity conditions strengthens the notion of this other speaker: "[T]here is some speaker...[who] is neither the hearer nor the current speaker...who asserted p". Because the speaker is merely presenting another speaker's assertion, this utterance does not commit the speaker to the possibility of p.

What is interesting with Faller's (2002) analysis is that although she concludes that the Cuzco Quechua conjectural evidential -*chá* is an epistemic modal, she analyzes it within speech

[5]The most relevant linguistic element of any given example will be bolded, such as the evidential -*si* and the corresponding gloss/translation in this example.

act theory as well in order to achieve a universal account across all Cuzco Quechua evidentials.[6] Faller's representation for an utterance containing *-chá* can be seen in (3):

(3) para-sha-n-**chá**
rain-PROG-3-**CNJ**
q = 'It is raining'.
$p = \Diamond q$
ILL = $\text{ASSERT}_s(\Diamond q)$
SINC = $\{Bel(s,\Diamond q),\ Rea(s,\ Bel(s,\ \Diamond q))\}$
STRENGTH = -1
(Faller 2002:184, example 146)

Faller analyzes the evidential meaning of *-chá* as a sincerity condition, where the predicate *Rea* means 'based on reasoning'. The modal force on the other hand is analyzed as part of the propositional content. Spelled out, "the speaker believes that p is an epistemic possibility and that this belief is based on [her] own reasoning" (184). What this representation shows is that according to Faller, the illocutionary analysis can be applied to all evidentials, whether their use commits the speaker to (the possibility of) p or not. This property is in opposition to the possible worlds analysis, which has been framed to only apply to those evidentials which when used commit the speaker to the possibility of p (Faller 2002, Matthewson *et al.* 2007, Murray 2010, *inter alia*).

3.2. Japanese evidentials

This dissertation focuses on a rich sub-set of Japanese morphosyntactic evidentials (i.e. *-rashii*, *-sooda*, and *-yooda*) that are used to indicate indirect evidentiality (i.e., the speaker has not directly experienced p). They are not grammatically obligatory, but they all do display some systematicity by attaching to tensed sentences, as seen in (4):

[6] In addition to *-si* and *-chá*, Cuzco Quechua speakers use the direct evidential *-mi*.

(4) ame-ga fut-teir-u-**rashii**/-**sooda**/-**yooda**
rain-NOM fall-PROG-NPST-**EVID**
'It is raining, **I hear/it seems**'.

All three evidentials have been found to be compatible with reportative contexts (see §2.1). However, their epistemic status requires further investigation. In particular, the status of the reportative evidential -*sooda* may inform the question of whether the possible worlds or illocutionary analysis is the more proper framework for Japanese evidentiality. As for the specific investigation, does embedding a proposition known to be false result in infelicity for -*rashii*, -*sooda*, and -*yooda*?[7] If yes, that evidential is more properly analyzed as an epistemic evidential: Within possible worlds, the reasoning is that it would be contradictory for an epistemic evidential to have a false scope if one were presenting the scope within the context of what is known; and within an illocutionary analysis, there is a sincerity condition that the speaker believes that p is an epistemic possibility. Examples (5) to (10) demonstrate the diagnostic ((5), (8), and (9) = English; (6) and (7) = St'át'imcets; (10) = Cuzco Quechua):

(5) #It **may/must** be raining, but it is not raining.
(Faller 2002:193, example 156)

(6) #wa7 **k'a** kwis, t'u7 aoz t'u7 k-wa-s kwis
IMPF **CNJ** rain but NEG just DET-IMPF-3POSS rain
'It **may/must** be raining, but it is not raining'.
(Matthewson *et al.* 2007:213, example 25)

(7) #um'-en-tsal-itás **ku7** i án'was-a xetspqíqen'kst táola, t'u7 aoz
give-TRANS-1SG.OBJ-3PL.ERG **RPT** DET.PL two-EXIS hundred dollar but NEG
kw s-7um'en'tsal-itás ku stam'
DET now-give-TRANS-1SG.OBJ-3PL.ERG DET what
'They gave me $200, **I hear**, but they did not give me anything'.
(Matthewson *et al.* 2007:214, example 28)

[7]As shown in §2.2, there are various diagnostics for determining the epistemic status of a modal/evidential. However, I have decided to focus on the present diagnostic, as it has been utilized frequently in the field (e.g. AnderBois 2014, Faller 2002, Matthewson *et al.* 2007, McCready & Ogata 2007, Murray 2010, *inter alia*) and is most worthwhile testing systematically, as my native Japanese consultants gave differing judgments.

(8) I **heard that** it is raining, but it is not raining.

(9) #?It is raining, **I hear**, but it is not raining.

(10) para-sha-n-**si**, ichaqa mana crei-ni-chu
rain-PROG-3-**RPT** but not believe-1-NEG
'It is raining, **I hear**, but I do not believe it.
(Faller 2002:194, example 158)

Example (5) shows that it is indeed infelicitous to negate the proposition embedded under the English epistemic modals *may* and *must*. Matthewson *et al.* (2007) show in (6) and (7) that it is also infelicitous to negate the proposition embedded under the St'át'imcets conjectural evidential *k'a* and reportative evidential *ku7*, which leads the authors to treat both as epistemic evidentials. Example (8) shows that the utterance is felicitous, as the non-grammaticalized English evidential expression *I heard that p* when used does not commit the speaker to the possibility of *p*. The status of (9) is inconclusive but could be suggested that the sentence is not as felicitous as (8), and hence that the use of the English expression *p*, *I hear* conveys commitment of the speaker to the possibility of *p* (Murray 2010, Simons 2007). And finally, Faller (2002) demonstrates in (10) that negating the proposition embedded under the Cuzco Quechua reportative evidential *-si* is felicitous, leading her to the conclusion that *-si* is not an epistemic evidential.[8]

Applying the diagnostic to *-rashii*, *-sooda*, and *-yooda* results in (11), (12), and (13), respectively:

(11) #ame-ga fut-teir-u-**rashii**-ga, fut-tei-nai
rain-NOM fall-PROG-NPST-**CNJ**/**RPT**-CONJ fall-PROG-NEG
'It is raining, **it seems**/**I hear**, but it is not raining'.

[8]The form of denial is different between (7) and (10), which could potentially have a non-negligible effect. However, theoretically, any expression of denial or disbelief of the propositional content should be semantically anomalous with the use of an epistemic evidential (Murray 2010:53-54).

(12) #?ame-ga fut-teir-u-**sooda**-ga, fut-tei-nai
rain-NOM fall-PROG-NPST-**RPT**-CONJ fall-PROG-NEG
'It is raining, **I hear**, but it is not raining'.

(13) #ame-ga fut-teir-u-**yooda**-ga, fut-tei-nai
rain-NOM fall-PROG-NPST-**CNJ**-CONJ fall-PROG-NEG
'It is raining **it seems**, but it is not raining'.

As can be seen, the scope cannot be negated without infelicity with *-rashii* or *-yooda*, which leads one to conclude that they are prone to the epistemic evidential analysis. However, the picture is not so clear for *-sooda*. As mentioned in §2.1.10, McCready & Ogata (2007:161) claim that *-sooda* passes the test (i.e., the scope can be negated without infelicity) and that "the speaker need not believe the content [herself when using *-sooda*] for the sentence to be true and felicitous". In fact, McCready & Ogata explicitly state that *-sooda* can be analyzed similarly to the Cuzco Quechua reportative evidential *-si*, which Faller (2002) analyzes as an illocutionary marker. And such constructions where the speaker indicates disbelief in p after uttering p-*sooda* do exist in the wild, as seen in (14):

(14) intaanetto-de modoru-botan-ga hyouji-sarenai-no-de tuurubaa-no yuuzaa-settei-de
internet-in back-button-NOM display-not-LNK-so toolbar-GEN user-setting-with
dekir-u-**sooda**-kedo, deki-mase-n
can-NPST-**RPT**-but can-POL-NEG
'When using the Internet, the Back button is not displayed, and I can display it via user preferences in the toolbar, **I hear**, but I can not'.
(Balanced Corpus of Contemporary Written Japanese, Maekawa & Yamazaki 2011)

However, when presenting examples such as (12) and (14) to native speakers of Japanese (personal communication),[9] I have found mixed results ranging from rejection to mild acceptance. Therefore, the status of *-sooda* with regards to this diagnostic is inconclusive and requires further

[9]I am indebted to Masaya Yoshida, Yoichi Mukai, and Rika Yamashita for their judgments.

examination.[10] Similarly to §2.1, I investigated this question systematically with a controlled experiment, where a large number of native Japanese speakers were asked for their judgments of sentences following the diagnostic above: Does the sentence frame '*p*-EVID, but not *p*' sound contradictory for a given evidential expression?[11]

3.3. Influence of context

Before presenting the hypotheses and predictions for the current experiment, I would like to explain an additional factor that I manipulated–pragmatic context–given the propensity of context to affect the semantic meaning of linguistic elements. For example, when presented with the two sentences (a) *I heard that it is raining, but it is not* and (b) *It is raining, I hear, but it is not*, the latter may be judged slightly more infelicitous than the former (Murray 2010). However, if we manipulated the context in terms of how reliable the speaker's information source was, these judgments could possibly be affected.

Matthewson *et al.* (2007:240) have also noted this possibility: "We expect that individual evidentials can exhibit tendencies towards greater or lesser levels of speaker certainty, based on the type of information source they encode, but that these tendencies can be overridden in context". In other words, one may hypothesize that in general, conjecture based on firsthand information (e.g. seeing many people holding up umbrellas leading to the proposition that it is raining) may lead to greater speaker certainty than hearsay (e.g. simply hearing from another that it is raining). However, for the latter, it is not hard to imagine that certain hearsay sources will be perceived as much more reliable than others (e.g. someone who has stepped inside a building only moments ago vs. an hour ago) (see also Faller 2002, Fitneva 2001,and Davis *et al.*

[10]AnderBois (2014) and Murray (2010) claim that *-sooda* is best analyzed as an epistemic evidential, and yet their main reference for Japanese evidentiality is McCready & Ogata (2007). This discrepancy indicates that there may be some confusion in the literature regarding *-sooda*.

[11]Note that the sentence frame does sound contradictory for Japanese epistemic modals (e.g. #'*p*'-*kamoshirenai*, 'but not *p*') but not for Japanese matrix-clause hearsay (i.e. '*p*'-*to kiita*, 'but not *p*').

2007 for the claim that the tendency for certain information sources to lead to greater conveyed speaker commitment is context-dependent and not cross-linguistically universal).

Therefore, this dissertation is not only concerned with the conveyed degree of speaker commitment to the possibility of p when using an evidential frame, but also with how the context may influence this degree of speaker commitment.[12] Specifically, I will be manipulating the context to render two levels: (a) a reliable information source for p or strong evidence for conjecturing p vs. (b) a relatively unreliable information source for p or relatively weaker evidence for conjecturing p. I hypothesize that, in general, (a) will lead to stronger conveyed speaker commitment to the possibility of p and, in turn, greater infelicity when denying p embedded under an evidential expression, as compared to (b). In §3.4, I list the hypotheses and predictions for the current study in more detail.

3.4. Hypotheses and predictions

Given the results of the semantic diagnostics in §3.2 and the concern for context-sensitivity in §3.3, I offer two sets of hypotheses and predictions–one for the epistemic status of *-rashii*, *-sooda*, and *-yooda*, and another for the influence of context on participants' judgments.

Hypothesis 1a: *-rashii*, *-sooda*, and *-yooda* are all best analyzed as epistemic evidentials.

Prediction: The use of *-rashii*, *-sooda*, and *-yooda* will be judged to be infelicitous when a speaker immediately denies the scope (e.g., 'p'-*rashii*, 'but not p').[13] Under a linear mixed effects analysis, evidential type should be a significant predictor in that the contrast condition where there is no difference among *-rashii*, *-sooda*, and *-yooda* will have a significant effect.

[12]Smirnova (in prep:3) "propose[s] that recent advances in research on inferential reasoning, specifically, the finding that arguments with different inductive strength are perceived with different degrees of believability...can help us better understand the nature of evidential meaning in language and cognition".

[13]I believe that I have ensured that the contexts do not allow pragmatic perspective shift (AnderBois 2014), which occurs when there is another perspectival agent who is salient in the context, allowing for the perspective of the statement to shift to a non-speaker. However, manipulating such perspective shift could prove fruitful for future research.

Hypothesis 1b: *-rashii* and *-yooda* are best analyzed as epistemic evidentials, but *-sooda* needs a separate analysis as an illocutionary evidential.

Prediction: The use of *-rashii* and *-yooda* will be judged to be infelicitous when a speaker immediately denies the scope. However, the use of *-sooda* will be judged to be relatively felicitous. Under a linear mixed effects analysis, evidential type should be a significant predictor in that the contrast condition where there is a difference between <*-rashii*, *-yooda*> vs. *-sooda* will have a significant effect.

Hypothesis 2a: Strength of Evidence is a significant and differentiating factor when interpreting evidential statements in Japanese.

Prediction: The use of any evidential statement (e.g. *p-rashii*, *p-sooda*, *p-yooda*, *p-to kiita*) will be influenced by the factor of Strength of Evidence when examining judgments regarding felicity. In addition, such statements when immediately followed by a denial of the scope will be influenced by the factor of Strength of Evidence when examining judgments regarding contradictoriness. For felicity, the general trend is predicted to be that stronger evidence will lead to higher degrees of naturalness; for contradictoriness, stronger evidence is predicted to lead to higher degrees of contradiction.

Hypothesis 2b: Strength of Evidence is a significant and differentiating factor when interpreting some, but not all, evidential statements in Japanese.

Prediction: The use of some, but not all, evidential statements will be influenced by the factor of Strength of Evidence when examining judgments regarding felicity. In addition, some, but not all, statements when immediately followed by a denial of the scope will be influenced by the factor of Strength of Evidence when examining judgments regarding contradictoriness. For example, propositions embedded by conjectural evidentials (e.g. *-yooda*) may be resistant to the influence of context when it comes to the matter of whether such a proposition can be denied without contradictoriness. This possibility relates back to the notion that a conjectural evidential

is prone to an epistemic modal analysis; an epistemic statement is made given 'what is known' (or under the sincerity condition that the speaker believes that p is an epistemic possibility), and therefore, if one has arrived at p, there will be a categorical judgment of contradictoriness whenever the proposition is denied no matter the strength of the evidence.

§3.5 - 3.7 describe the experiment that tested these hypotheses.

3.5. Design

I conducted an Internet survey (chosen in order to recruit participants non-locally as well as locally) in which participants first read a context passage and were then asked to make (as quickly as possible) some sort of judgment on a follow-up sentence given this context. Each passage-sentence pair fit one of the four discourse environments illustrated in Table 3.1, which is the result of a 2 x 2 factorial design crossing (a) Strength of Evidence (strong vs. medium)[14] and (b) Speaker Conjecture (conjectural vs. reportative).[15]

The experiment consisted of two blocks. In the first, the discourse contexts in Table 3.1 were followed up by Person B writing down p in their notes, in one of six ways: (a) *p-rashii*, (b) *p-sooda*, (c) *p-yooda*, (d) bare p as a baseline, (e) matrix-clause hearsay as a phrasal evidentiality baseline, and (f) *p-kamoshirenai* as an epistemic modal baseline (equivalent to *It may be the case that p*). The participants were asked to rate the naturalness of the follow-up sentence on a 6-point scale (1 = very unnatural; 6 = very natural).

In the second block, the same discourse contexts were presented with a modified follow-up sentence–'p, but not p', again in one of six ways ('p'-*rashii*, 'but not p', and so on). In this block, the participants were asked to rate how contradictory the follow-up sentence was on a 6-point scale (1 = not contradictory at all; 6 = very contradictory). With this two-block design, the aim

[14]The factor of Strength of Evidence was operationalized via extensive norming, which is described in §3.6

[15]I do not employ the CNJ vs. NONCNJ labels from Chapter 2, as the current experiment also investigates NONFIRST contexts, and NONFIRST-NONCNJ contexts can be referred to as being reportative.

	STRONG	MEDIUM
CONJECTURAL	**STRONG-CNJ context:** Person A witnesses an event that provides strong visual information for conjecturing p. A tells Person B about the experience (but not p). **Follow-up:** B utters p or p, *but not p.*	**MEDIUM-CNJ context:** Person A witnesses an event that provides medium visual information for conjecturing p. A tells Person B about the experience (but not p). **Follow-up:** B utters p or p, *but not p.*
REPORTATIVE	**STRONG-RPT context:** Person A is a reliable source of information for asserting p, and Person B knows this. A tells B p. **Follow-up:** B utters p or 'p, but not p'.	**MEDIUM-RPT context:** Person A is a somewhat reliable source of information for asserting p, and Person B knows this. A tells B p. **Follow-up:** B utters p or 'p, but not p'.

Table 3.1. Design of current study

was to first test the influence of context on the felicity of evidential statements, and then on how contradictory it would be to subsequently negate the scope.

3.6. Participants and stimuli

Eighty-one native speakers of Japanese (self-reported) were paid $7 (or 850 yen) to participate in the experiment, for which the single criterion for participating was to have grown up speaking Japanese from birth. Participants were recruited via Facebook, Twitter, listservs (e.g. Teachers College Friends of Japan), online forums (e.g. the Chicago Japanese community Sumutoko forum), and word of mouth.[16] Participants were directed to email me indicating their interest, at which point I sent them an individualized link to an online survey hosted on Firebase (https://www.firebase.com/account/#/). The age range of the participants can be seen in Table 3.2.[17]

[16]A portion of participants received a physical flyer, which can be seen in Appendix E together with the translation.
[17]One of these participants turned out to be 16 years old, which led me to specify for the remainder of the experiment the requirement that participants needed to be 18 or older. In the end, this participant's data was thrown out as they re-started the experiment midway.

Age range	18-25	26-35	36-45	46-55	56-65	over 66
Participant count	16	38	13	10	3	1

Table 3.2. Age range of participants

When asked of their frequency of daily Japanese usage, 2 answered as rarely speaking Japanese, 9 as sometimes, 7 as often, and 63 as always.

In line with the design of the study (Table 3.1), each target sentence employed in the experiment, of which there were 24, was preceded by one of four potential contexts–strong-conjectural, medium-conjectural, strong-reportative, and medium-reportative (henceforth STRONG-CNJ, MEDIUM-CNJ, STRONG-RPT, and MEDIUM-RPT). These are exemplified in (15) to (18) for p = *An anonymous individual is moving to a new place*:[18]

(15) A-san-wa nanashi-san-no ie-ni iki-mashi-ta. Nanashi-san-no
A-POL-TOP anonymous-POL-GEN house-LOC go-POL-PST anonymous-POL-GEN
ie-ga uri-ni da-sare-tei-ru-no-ga mie-mashi-ta. A-san-wa
house-NOM sale-LOC out-PASS-PROG-NPST-LNK-NOM see-POL-PST A-POL-TOP
kono-koto-wo B-san-ni hanashi-mashi-ta.
this-thing-ACC B-POL-DAT tell-POL-PST
'Person A went to an anonymous individual's house. PRO could see the anonymous individual's house had been put up for sale. A told B this'.
(STRONG-CNJ)

(16) A-san-wa nanashi-san-no ie-ni ikimashi-ta. Teeburu-no ue-ni
A-POL-TOP anonymous-POL-GEN house-LOC go-POL-PST table-LOC top-LOC
atarashii manshon-no panfuretto-ga oi-tea-ru-no-ga mie-mashi-ta.
new condo-GEN pamphlet-NOM place-PROG-NPST-LNK-NOM see-POL-PST
A-san-wa kono-koto-wo B-san-ni hanashi-mashi-ta.
A-POL-TOP this-thing-ACC B-POL-DAT tell-POL-PST
'Person A went to an anonymous individual's house. PRO could see a pamphlet for a new condo had been placed on top of the table. A told B this'.
(MEDIUM-CNJ)

[18] *Nanashi-san* 'an anonymous individual' is the Japanese equivalent of *Jane/John Doe* in English.

(17) A-san-wa nanashi-san-no shinyuu-desu. B-san-wa kono-koto-wo
A-POL-TOP anonymous-POL-GEN close.friend-COP B-POL-TOP this-thing-ACC
shit-tei-masu. A-san-wa B-san-ni nanashi-san-ga hikkosu-to
know-PROG-POL A-POL-TOP B-POL-DAT anonymous-POL-NOM move-COMP
hanashi-mashi-ta.
tell-POL-PST
'Person A is close friends with an anonymous individual. Person B knows this. Person A told Person B that the anonymous individual was moving to a new place'.
(STRONG-RPT)

(18) A-san-wa nanashi-san-to mukashi isshoni sunde-i-mashi-ta. B-san-wa
A-POL-TOP anonymous-POL-with long.ago together live-PROG-POL-PST B-POL-TOP
kono-koto-wo shit-tei-masu. A-san-wa B-san-ni nanashi-san-ga
this-thing-ACC know-PROG-POL A-POL-TOP B-POL-DAT anonymous-POL-NOM
hikkosu-to hanashi-mashi-ta.
move-COMP tell-POL-PST
'Person A used to live with an anonymous individual long ago. Person B knows this. Person A told Person B that the anonymous individual was moving to a new place'.
(MEDIUM-RPT)

In all four contexts, Person B utters (= writes down) the follow-up sentence (i.e. *An anonymous individual is moving*), having had no firsthand access to p or any sensory information for conjecturing p. Similarly to the experiment in §2.1, modes of source (e.g. visual, auditory, olfactory) was controlled for by restricting to visual sources in order to assure comparability of results. It was ensured that any given participant would only see one discourse-evidential pair per proposition (e.g. only one stimulus related to moving).[19]

When creating specific stimuli, I took into account a number of considerations (see Appendix F for the list of Japanese stimuli and fillers and their English translations). For example, predicates of personal taste and other evaluative expressions (e.g. *utsukushii* 'is beautiful', *omoi* 'is heavy') were not used in order to eliminate potential confusion as to which individual in a given scenario judged that something had this particular subjective quality. In addition, a variety of

[19]In statistical terms, I employed a Youden's square, where each participant was presented with an equal amount and type of treatment combinations as applied to different items, as opposed to a Latin square design, where each participant sees every item rendered by all treatments.

grammatical constructions were employed for the embedded proposition, either ending in *-teiru* or *-u*. The former category included resultative (e.g. *kowareteiru* 'is broken') and progressive (e.g. *benkyooshiteiru* 'is studying') constructions, and the latter included stative (e.g. *oyogeru* 'can swim'), habitual (e.g. *amu* 'knits') and future (e.g. *hikkosu* 'will move / is moving') constructions. An alternative method would have been to employ a single grammatical construction type like the progressive, which is what I did for the experiment in §2.1; however, I opted for a more comprehensive approach in order for the results to be generalizable to a wider range of sentence types.

In order to operationalize the factor of Strength of Evidence (STRONG vs. MEDIUM), an extensive norming phase was undertaken with 46 paid participants ($7 or 850 yen) who did not participate in the main experiment. Participants were recruited via Facebook, listservs (e.g. Teachers College Friends of Japan), online forums (e.g. the Chicago Japanese community Sumutoko forum), Amazon Mechanical Turk, and word of mouth. For conjectural contexts, participants were asked to rate how reasonable a certain statement was given the context on a 7-point scale (1 = not reasonable at all; 4 = neither reasonable or unreasonable; 7 = extremely reasonable).[20] Visual sources were explicitly mentioned in these contexts to strengthen the idea that the information leading to the conjecture was seen but not the actual event corresponding to p (e.g., 'the wig was seen askew' vs. 'the wig was askew' for p = 'An anonymous individual is bald'). For reportative contexts, participants were asked to rate how reliable a certain individual was as an information source for making a certain statement, again on a 7-point scale (1 = not reliable at all; 4 = neither reliable or unreliable; 7 = extremely reliable).

Once the norming data was gathered, participants' performance on the filler items was examined, of which there were STRONG vs. MEDIUM vs. WEAK fillers. Focusing on the STRONG

[20]All stimuli were of the 'abductive' argument type, where "the conclusion can be viewed as the best explanation given the available evidence: it can be likely or possible, but nothing in the premises entails the conclusion" (Smirnova in prep:5). In contrast, the conclusion **is** entailed by the premises for 'deductive' arguments.

(24) and WEAK (48) fillers, most were found to be successful, in that for the STRONG fillers, the mean score across participants was 6 or more, and that for the WEAK fillers, the mean score was 2 or less. However, four of the STRONG and three of the WEAK fillers had deviant means, and these were removed from further analysis. Each norming participant was then examined for their performance across all STRONG vs. WEAK fillers. If a certain normer's mean score on STRONG fillers was less than 5, or for the WEAK fillers was more than 3, these participants' data were deemed unfit for further analysis and were removed. This process removed 22 participants, all of whom had been recruited via Amazon Mechanical Turk.[21]

After removing the above participants' data, I created a series of boxplots for each proposition, of which there were 48. A sample boxplot can be seen in Figure 3.1, for the proposition translated as 'The bento store is closed today'.[22] A proposition was included in the main experiment only if for both conjectural and reportative contexts there was a clear separation between the STRONG and MEDIUM contexts in the appropriate direction, as can be seen in Figure 3.1. Ideally, the means should have occurred in the appropriate range (i.e. 6-7 for STRONG and 3-5 for MEDIUM), but items were included even if otherwise was the case (e.g. 1-2 for MEDIUM), as priority was placed on there being a separation between the two levels of the factor. This process led to the removal of half of the normed propositions (24). In terms of the five proposition types described above, the final set of test items was composed of 7 resultative items, 6 progressive, 4 stative, 4 habitual, and 3 future. As a result, not all context types could be represented equally across grammatical constructions for each participant (e.g., a certain participant may

[21]The exact reason for why the attrition rate was so high for Mechanical Turk (only three participants could be retained) can only be speculated, but perhaps the reward payment had been set too high ($7), and perhaps the online survey I designed was too much of an easy target for non-earnest workers. I did employ a screening task where participants had to choose the correct string of Japanese and Chinese characters from a string of solely Japanese characters, which did effectively filter out a number of scammers. However, the screening task would need to be more rigorous in the future.

[22]Each point corresponds to a participant and the thick horizontal lines to the 50th percentile of the data. The shaded area corresponds to the 25th and 75th percentiles (this only applies to the RPT-MEDIUM context, where the 25th percentile is shaded). The lower whisker extends to the lowest value within 1.5 * the inter-quartile range. Any data beyond the whiskers are outliers.

not see a future construction proposition for the STRONG-CNJ context). However, as the sample size is large, the results should still be generalizable to the designated range of grammatical constructions.

Figure 3.1. Example boxplot from the norming procedures

Because the number of useable propositions were halved, I decided to separate the experiment into two sub-experiments, where the first only included half of the follow-up sentence types (*-rashii*, *-sooda*, and matrix-clause hearsay), and the second the rest (*-yooda*, *-kamoshirenai*, and bare *p*). This separation ensured that each participant would see a certain context-evidential combination (e.g. STRONG-CNJ with *-rashii*) at least twice, increasing statistical power and reliability of the results.

3.7. Procedure

The entire experiment including recruiting materials was conducted in Japanese. After an initial welcome screen followed by a consent form (see Appendix G for the Japanese consent form and English translation), participants responded to a simple Japanese screening task, which involved choosing the correct string of Japanese and Chinese characters that matched a string of Japanese syllabary.[23] Participants then read the instructions for the first block of items, translated here into English: "You will consider a series of contexts in which Person A is situated. Person A will relay information about a given situation to Person B. Person B has a habit of writing down everything they hear as they are extremely forgetful. Rate how natural Person B's note is given the situation (1 = extremely unnatural; 6 = extremely natural). Keep in mind to not consider whether you yourself would have written down such a note, but focus on how natural Person B's note is as a person who writes down everything. Do not overthink, and respond with your first intuition".

I follow the assumption that more felicitous contexts will yield higher scores on a naturalness scale (cf. Tiemann *et al.* 2015 for a similar use of acceptability ratings when investigating the phenomenon of presupposition). A 6-point scale was chosen in order to rule out participants' defaulting to a middle score in cases of uncertainty (i.e. 4 on a 7-point scale). Participants were presented with four example items, two designed to be very natural/unnatural in a conjectural context and the other two to be very natural/unnatural in a reportative context, to serve as end points of the scale.[24] All the scenario prompts (example and test items alike) were accompanied by a graphic representation of the scene, which was broken down into three sub-scenes, as can be seen in Figures 3.2 and 3.3. Each sentence of the prompt corresponded to a sub-scene or

[23]All participants passed the screening task.

[24]Several participants expressed in their feedback that they would have benefited from a 'somewhat natural' example. Although I can empathize with the difficulty they were experiencing, I do not feel that I could have provided a robust example of a 'somewhat natural' follow-up sentence, as this was the exact question that I was examining via the current experiment.

'koma' (frame). This graphic was implemented in response to participants' comments regarding the confusion they experienced with the non-firsthand contexts in the experiment in §2.1.

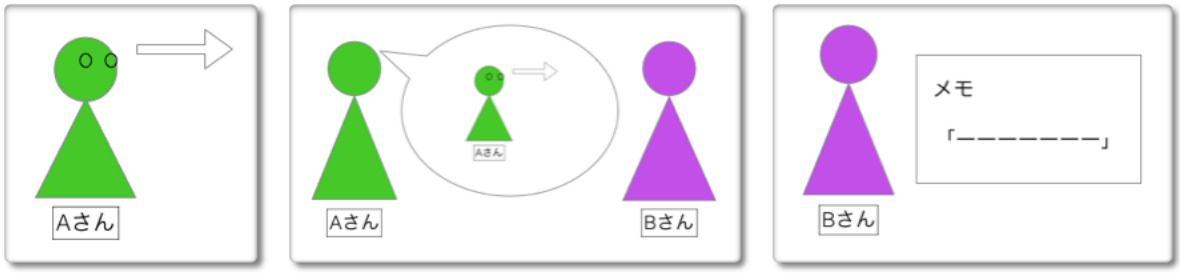

Figure 3.2. Graphic representation of conjectural scene

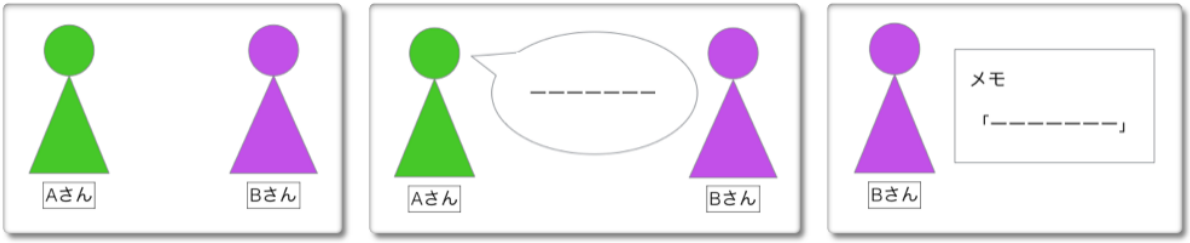

Figure 3.3. Graphic representation of reportative scene

One major difference between the experiment in §2.1 and the current experiment is that the context remained on the screen at the time of judging the follow-up sentence. This decision reflects the relative complexity of the current task, which also prompted the use of a graphic aid.

After completing the first block, which consisted of 24 test items and 48 fillers (all randomized), participants were encouraged to take a short break before moving onto the second block. The instructions for the second block were as follows, translated here into English: "For this set of items, there is no change in context from the first questionnaire; however, there is a change in what Person B has written down. For this questionnaire, you will be asked to rate how contradictory Person B's note is (1 = not contradictory at all; 6 = extremely contradictory). Again, do not consider whether you yourself would have written down such a note, but focus on how

contradictory Person B's note is as a person who writes down everything. Do not overthink, and respond with your first intuition". Participants were presented again with four example items and then with 24 test items and 24 fillers (all randomized).[25]

3.8. Results

After obtaining a full set of data, performance on STRONG and WEAK filler items was examined from the first block, similarly to the norming procedure. There were a total of 16 fillers (4 STRONG and 12 WEAK) that did not yield a mean score at the extreme ends of the scale (5-6 for strong and 1-2 for weak on a 6-point Likert scale) across participants;[26] these fillers were removed from further analysis. Using the remaining fillers (11 STRONG and 12 WEAK), participants' mean scores were calculated for each filler type, and any individual whose scores did not pattern appropriately (a mean of 4-6 for strong and 1-3 for weak items) was deemed unfit for further analysis. This process led to the removal of just one participant, whose mean score for the strong fillers was 2.25.[27]

3.8.1. Block 1 results - Naturalness of *p*

Figure 3.4 shows the mean Likert score value for each type of evidential in each of the four discourse environments (i.e. STRONG-CNJ, MEDIUM-CNJ, STRONG-RPT, MEDIUM-RPT), along with its 95% confidence interval.[28] The higher the mean, the higher its naturalness rating.

A set of ANOVAs confirmed that there were significant differences between the mean ratings of the evidential types for all four discourse environments ($p < 0.05$): (a) STRONG-CNJ $F(5,504)$

[25]The number of fillers is half that of the first block, as all items with WEAK evidence contexts were omitted. These were omitted to avoid the situation where participants would be confused as to how they were to approach the question of how contradictory a statement was that was based on extremely weak evidence.

[26]The 12 WEAK fillers were all reportative contexts. It seems that even if a certain individual is not at all a reliable information source for *p*, this has no direct influence on the naturalness of an evidential follow-up sentence.

[27]This participant informed me that they had switched the labels for the end points of the scale for part of the items.

[28]When the confidence intervals are small, they only appear as small ticks in the plots.

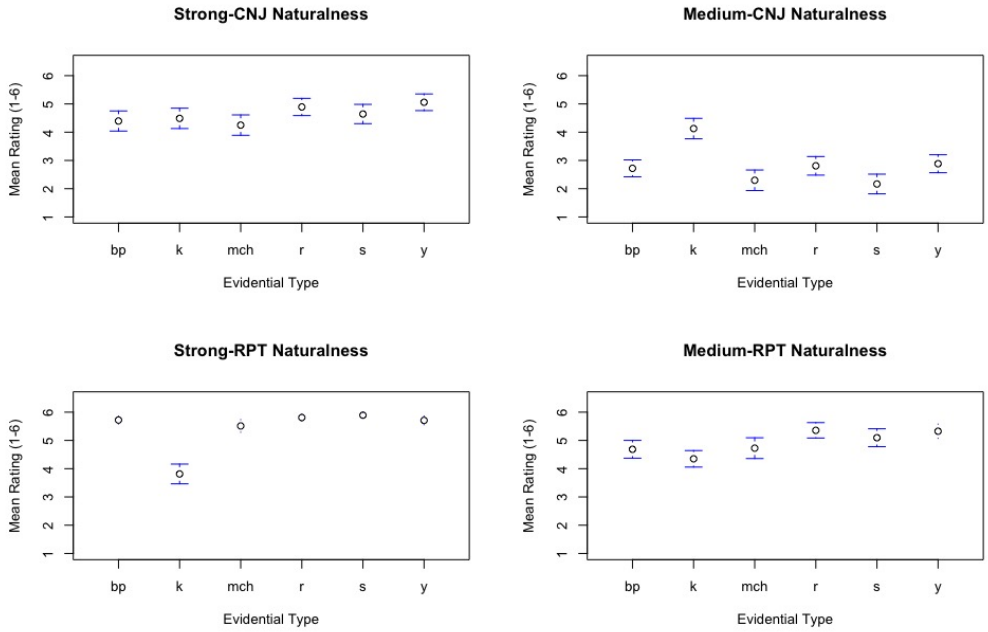

Figure 3.4. Mean Likert for evidential type across contexts: bp = bare *p*, k = *-kamoshirenai*, mch = matrix-clause hearsay, r = *-rashii*, s = *-sooda*, y = *-yooda*

= 3.28; (b) MEDIUM-CNJ $F(5,504) = 16.93$; (c) STRONG-RPT $F(5,504) = 62.75$; (d) MEDIUM-RPT $F(5,504) = 6.90$.[29]

Figures 3.5 to 3.10 show the interaction plots for the factors of Strength of Evidence and Speaker Conjecture for each type of follow-up:

[29]Bonferroni-corrected tests revealed the following significant differences between specific evidentials within each context ($p < 0.0033$): (i) MEDIUM-CNJ: *-kamoshirenai* vs. all other forms; (ii) STRONG-RPT: *-kamoshirenai* vs. all other forms; (iii) MEDIUM-RPT: *-kamoshirenai* vs. *-rashii* and *-yooda*.

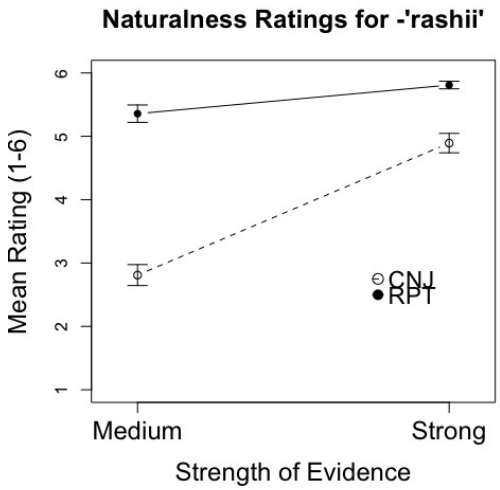

Figure 3.5. Strength of Evidence x Speaker Conjecture: -*rashii*

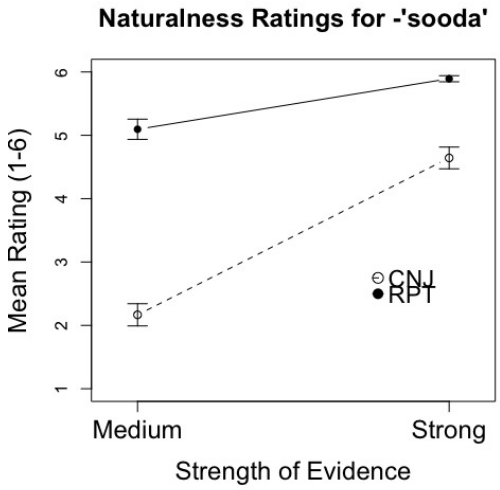

Figure 3.6. Strength of Evidence x Speaker Conjecture: -*sooda*

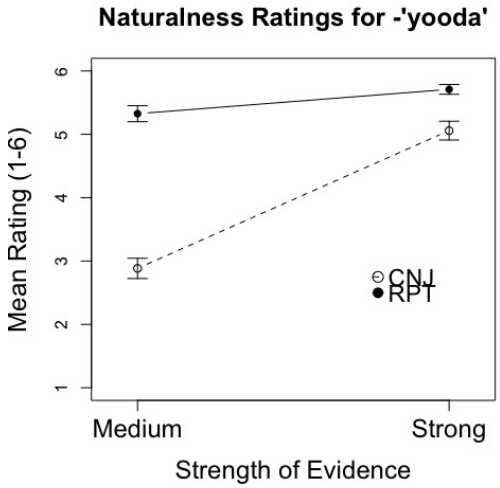

Figure 3.7. Strength of Evidence x Speaker Conjecture: -*yooda*

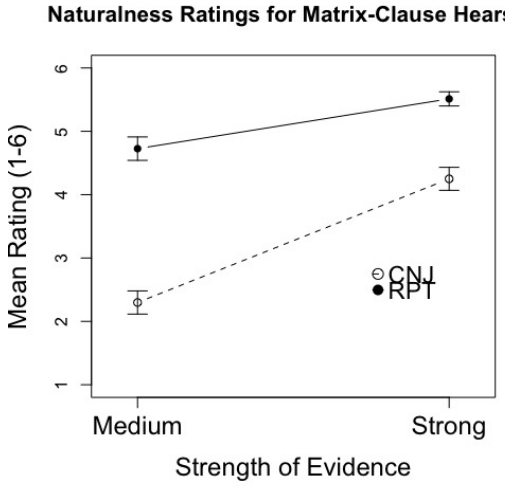

Figure 3.8. Strength of Evidence x Speaker Conjecture: matrix-clause hearsay

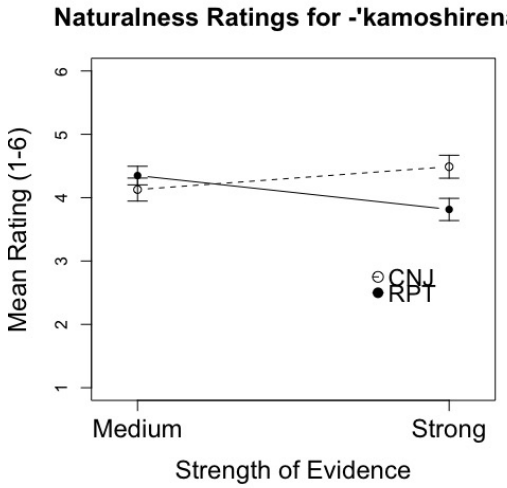

Figure 3.9. Strength of Evidence x Speaker Conjecture: -*kamoshirenai*

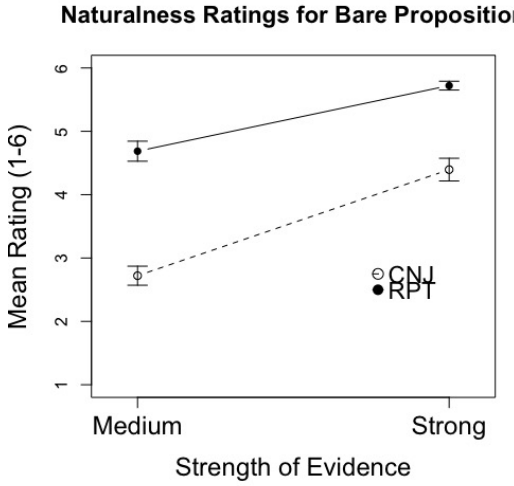

Figure 3.10. Strength of Evidence x Speaker Conjecture: Bare proposition

I built a linear mixed effects model encompassing all of the evidentials in order to determine which factors were the most crucial in predicting the naturalness of an evidential statement (Barr *et al.* 2013).[30] The factors that were included in the model were:

- Fixed effect for Strength of Evidence (STRONG-MEDIUM);
- Fixed effect for Speaker Conjecture (CNJ-RPT);
- Fixed effects for evidential type: (a) one effect for the contrast between bare *p* and everything else; (b) another effect for the contrast between -*kamoshirenai* and everything else excluding bare *p*;[31]
- The two- and three-way interactions for the above fixed effects;
- Random effect for participant (with random intercepts and slopes);
- Random effect for proposition (with random intercepts and slopes);[32]
- Control variables: (a) the character count of the context passage (see Mazuka *et al.* 2002:146-147 for the concern that longer sentences lead to a greater processing cost); (b) the character count of the follow-up sentence; (c) the age range of the participant; (d) frequency of Japanese usage in daily life for a participant.

Before building the models, I scaled all the variables (dependent and independent) to be centered around the mean. When a certain model did not converge, I simplified the random slopes structure one effect at a time. For overly complicated models, I removed all of the interactions within the random slopes structure.[33]

The significant predictors for the linear mixed effects model above are as follows ($p < 0.05$):

[30]Many thanks to Klinton Bicknell and Laurel Brehm for their advice on statistical modeling. The R code and output for the model can be seen in Appendix H.

[31]I did not include any other evidential contrasts, as Figures 3.5 - 3.10 gave me no reason to suspect any other inter-evidential differences.

[32]Random intercepts for participant/proposition were included in order to be able to generalize to the larger pool of participants/propositions. Random slopes were included for all fixed effects of interest by participant/proposition to account for any individual/propositional differences.

[33]Occasionally I would get an error stating that the 'maximum number of function evaluations' had been reached. In this case, I added code that increased the number of function evaluations.

- Strength of Evidence ($\beta = 1.15$, s.e.$\beta = 0.11$, $\chi^2(1) = 46.37$) (STRONG items were judged to be more natural overall);
- Speaker Conjecture ($\beta = 1.45$, s.e.$\beta = 0.13$, $\chi^2(1) = 47.42$)(RPT contexts were judged to be more natural overall);
- Evidential contrast (b) ($\beta = 0.80$, s.e.$\beta = 0.18$, $\chi^2(1) = 15.13$) (*-kamoshirenai* was judged to be different from other follow-ups excluding bare *p*);
- Two-way interaction between Strength of Evidence and Speaker Conjecture (β = -1.34, s.e.$\beta = 0.14$, $\chi^2(1) = 84.49$) (the effect of Strength of Evidence was not uniform across conjectures and reports);
- Two-way interaction between Speaker Conjecture and evidential contrast (a) (β = -0.62, s.e.$\beta = 0.26$, $\chi^2(1) = 5.67$) (bare proposition was judged to be different from the other follow-ups with regards to Speaker Conjecture);
- Two-way interaction between Strength of Evidence and evidential contrast (a) (β = -0.55, s.e.$\beta = 0.25$, $\chi^2(1) = 4.82$) (bare proposition was judged to be different from the other follow-ups with regards to Strength of Evidence);
- Two-way interaction between Strength of Evidence and evidential contrast (b) (β = 2.30, s.e.$\beta = 0.25$, $\chi^2(1) = 76.76$) (*-kamoshirenai* was judged to be different from the other follow-ups (excluding bare *p*) with regards to Strength of Evidence);
- Two-way interaction between Speaker Conjecture and evidential contrast (b) ($\beta = 2.95$, s.e.$\beta = 0.26$, $\chi^2(1) = 116.88$) (*-kamoshirenai* was judged to be different from the other follow-ups (excluding bare *p*) with regards to Speaker Conjecture);
- Three-way interaction between Strength of Evidence, Speaker Conjecture, and evidential contrast (a) (β = -1.21, s.e.$\beta = 0.47$, $\chi^2(1) = 6.44$)(bare *p* was judged to be different from all other follow-ups with regards to the interaction between Strength of Evidence and Speaker Conjecture);

- Three-way interaction between Strength of Evidence, Speaker Conjecture, and evidential contrast (b) (β = -0.99, s.e.β = 0.47, $\chi^2(1)$ = 4.47) (*-kamoshirenai* was judged to be different from other follow-ups (excluding bare *p*) with regards to the interaction between Strength of Evidence and Speaker Conjecture).

In addition, I built individual linear mixed effects models for each evidential in order to determine which factors were significant for predicting the naturalness for a certain follow-up type. Below were the significant factors ($p < 0.05$):

- *-rashii*: Strength of Evidence ($\beta = 1.32$, s.e.$\beta = 0.19$, $\chi^2(1) = 30.62$), Speaker Conjecture (β = 1.76, s.e.β = 0.19, $\chi^2(1)$ = 37.49), the two-way interaction between Strength of Evidence and Speaker Conjecture (β = -1.72, s.e.β = 0.47, $\chi^2(1)$ = 10.86);
- *-sooda*: Strength of Evidence ($\beta = 1.66$, s.e.$\beta = 0.20$, $\chi^2(1) = 38.82$), Speaker Conjecture (β = 2.07, s.e.β = 0.18, $\chi^2(1)$ = 49.35), the two-way interaction between Strength of Evidence and Speaker Conjecture (β = -1.66, s.e.β = 0.52, $\chi^2(1)$ = 9.15);
- *-yooda*: Strength of Evidence ($\beta = 1.37$, s.e.$\beta = 0.19$, $\chi^2(1) = 27.49$), Speaker Conjecture (β = 1.54, s.e.β = 0.18, $\chi^2(1)$ = 37.28), the two-way interaction between Strength of Evidence and Speaker Conjecture (β = -2.10, s.e.β = 0.38, $\chi^2(1)$ = 21.41), character count of context passage (β = -0.03, s.e.β = 0.01, $\chi^2(1)$ = 4.65);
- matrix-clause hearsay: Strength of Evidence (β = 1.39, s.e.β = 0.25, $\chi^2(1)$ = 19.93), Speaker Conjecture (β = 1.89, s.e.β = 0.19, $\chi^2(1)$ = 42.53), the two-way interaction between Strength of Evidence and Speaker Conjecture (β = -1.37, s.e.β = 0.43, $\chi^2(1)$ = 8.40);
- bare *p*: Strength of Evidence ($\beta = 1.38$, s.e.$\beta = 0.18$, $\chi^2(1) = 37.94$), Speaker Conjecture (β = 1.57, s.e.β = 0.22, $\chi^2(1)$ = 29.99), frequency of Japanese usage (β = 0.37, s.e.β = 0.16, $\chi^2(1)$ = 5.00);

- *-kamoshirenai*: the two-way interaction between Strength of Evidence and Speaker Conjecture (β = -1.14, s.e.β = 0.41, $\chi^2(1) = 6.45$); age range of participant (β = 0.27, s.e.β = 0.11, $\chi^2(1) = 5.68$).

These results will be discussed in conjunction with those in §3.8.2 in §3.9.

3.8.2. Block 2 results - Semantic anomaly of '*p*, but not *p*'

Figure 3.11 shows the mean rating for each type of evidential in each of the four discourse environments (i.e. STRONG-CNJ, MEDIUM-CNJ, STRONG-RPT, MEDIUM-RPT), along with its 95% confidence interval.[34] The higher the mean, the more contradictory the evidential expression was judged when subsequently negated.

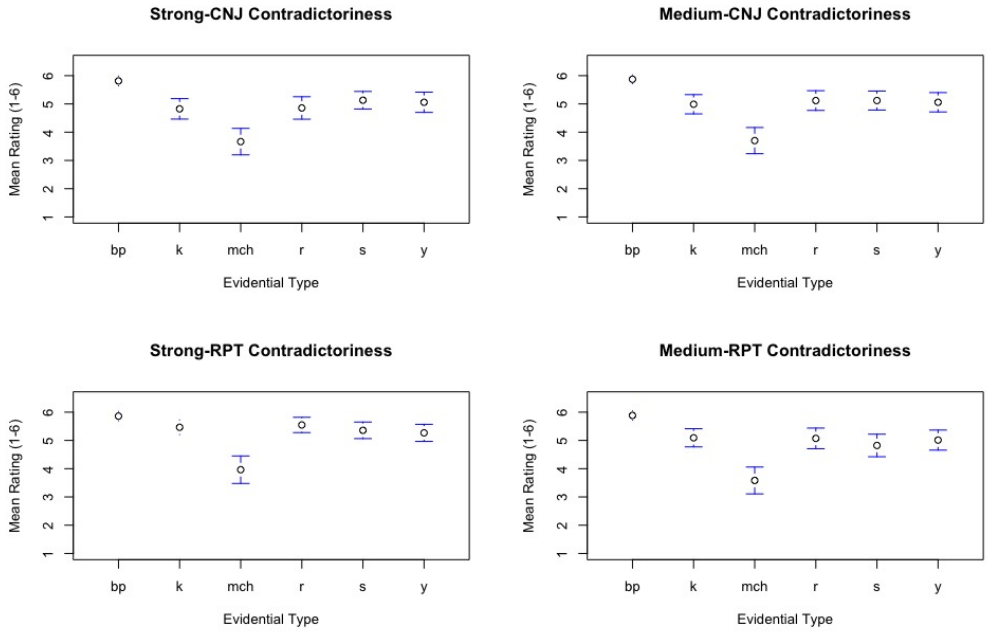

Figure 3.11. Mean Likert for evidential type across contexts: bp = bare *p*, k = *-kamoshirenai*, mch = matrix-clause hearsay, r = *-rashii*, s = *-sooda*, y = *-yooda*

[34]When the confidence intervals are small, they only appear as small ticks in the plots.

A set of ANOVAs confirmed that there were significant differences between the mean ratings of the evidential types for all four discourse environments ($p < 0.05$): (a) STRONG-CNJ $F(5,504) = 15.21$; (b) MEDIUM-CNJ $F(5,504) = 16.66$; (c) STRONG-RPT $F(5,504) = 17.77$; (d) MEDIUM-RPT $F(5,504) = 17.14$.[35]

Figures 3.12 to 3.17 shows the interaction plots for the factors of Strength of Evidence and Speaker Conjecture for each type of follow-up:

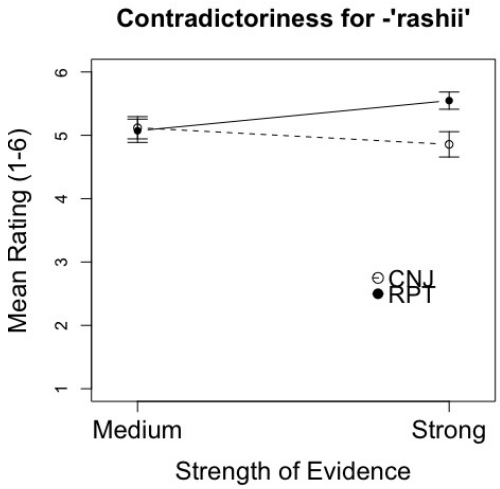

Figure 3.12. Strength of Evidence x Speaker Conjecture: *-rashii*

[35]Bonferroni-corrected tests revealed the following significant differences between specific evidentials within each context ($p < 0.0033$): (i) STRONG-CNJ: bare *p* vs. <*-kamoshirenai*, *-rashii*>; matrix-clause hearsay vs. all other forms; (ii) MEDIUM-CNJ: matrix-clause hearsay vs. all other forms; (iii) STRONG-RPT: matrix-clause hearsay vs. all other forms; (iv) MEDIUM-RPT: bare *p* different from *-sooda*; matrix-clause hearsay different from all other forms.

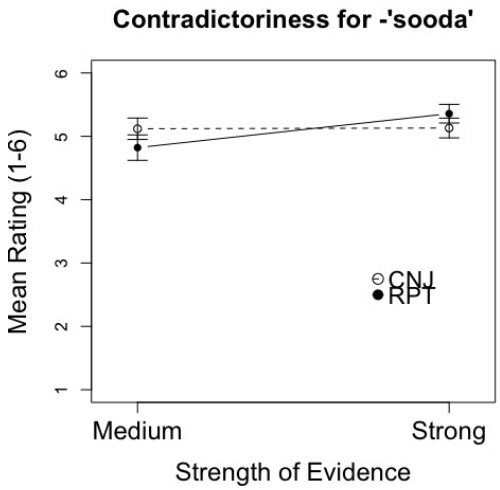

Figure 3.13. Strength of Evidence x Speaker Conjecture: -*sooda*

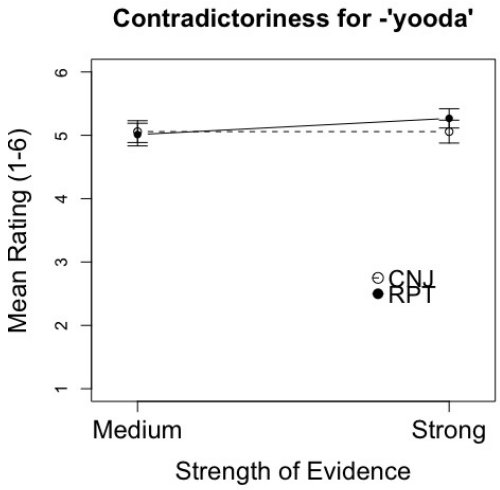

Figure 3.14. Strength of Evidence x Speaker Conjecture: -*yooda*

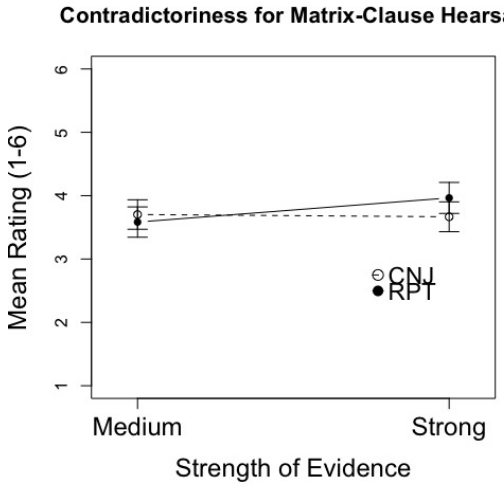

Figure 3.15. Strength of Evidence x Speaker Conjecture: matrix-clause hearsay

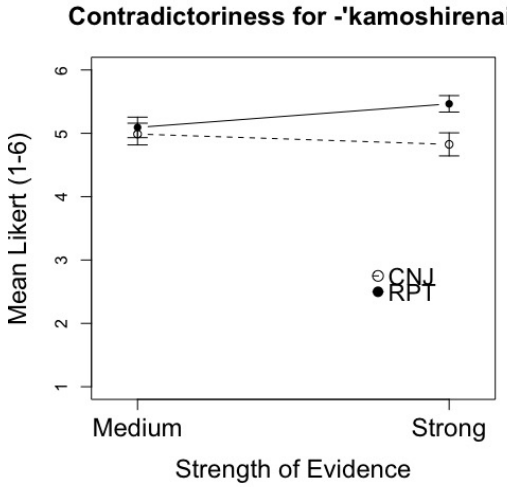

Figure 3.16. Strength of Evidence x Speaker Conjecture: *-kamoshirenai*

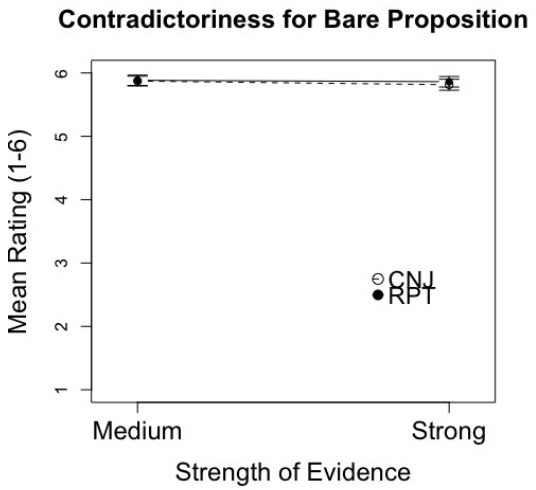

Figure 3.17. Strength of Evidence x Speaker Conjecture: Bare proposition

I built a linear mixed effects model encompassing all of the evidentials in order to determine which factors were the most crucial in predicting the contradictoriness of an evidential statement that was subsequently negated (Barr *et al.* 2013).[36] The factors included in the model were:

- Fixed effect for Strength of Evidence (STRONG-MEDIUM);
- Fixed effect for Speaker Conjecture (CNJ-RPT);
- Fixed effects for evidential type: (a) one effect for the contrast between the bare *p* baseline and all other forms; (b) another effect for the contrast between matrix-clause hearsay vs. the other forms aside from bare *p* (This contrast corresponds to Hypothesis 1a); (c) a third contrast between matrix-clause hearsay and *-sooda* vs. *-kamoshirenai*, *-rashii*, and *-yooda* (This contrast corresponds to Hypothesis 1b);
- The two- and three-way interactions for the above fixed effects;
- Ratings from Block 1 (This factor was included to mitigate the concern that participants had seen the same contexts and propositions in the first block – if being exposed to the

[36]Many thanks to Klinton Bicknell and Laurel Brehm for their advice on statistical modeling. The R code and output for the model can be seen in Appendix H.

stimuli in Block 1 had any influence on the Block 2 responses, the effect could be accounted for this way);

- Random effect for participant (with random intercepts and slopes);
- Random effect for proposition (with random intercepts and slopes);[37]
- Control variables: (a) the character count of the context passage (see Mazuka *et al.* 2002:146-147 for the concern that longer sentences lead to a greater processing cost); (b) the character count of the follow-up sentence; (c) the age range of the participant; (d) frequency of Japanese usage in daily life for a participant.

The significant predictors for the linear mixed effects model above are as follows ($p < 0.05$):

- Evidential contrast (a) (β = -1.81, s.e.$\beta = 0.16$, $\chi^2(1) = 102.55$) (bare *p* was significantly judged to be different from the other forms);
- Evidential contrast (b) ($\beta = 2.20$, s.e.$\beta = 0.17$, $\chi^2(1) = 169.08$) (matrix-clause hearsay was significantly judged to be different from the other forms aside from bare *p*);
- The two-way interaction between Strength of Evidence and Speaker Conjecture ($\beta = 0.50$, s.e.$\beta = 0.14$, $\chi^2(1) = 11.60$) (Strength of Evidence affected the judgment of CNJ vs. RPT utterances differently).

In addition, I built individual linear mixed effects models for each evidential in order to determine which factors were significant for predicting the contradictoriness for a certain follow-up type (when denying the proposition). Below were the significant factors ($p < 0.05$):

- -*rashii*: there were no significant factors;
- -*sooda*: The two-way interaction between Strength of Evidence and Speaker Conjecture ($\beta = 080$, s.e.$\beta = 0.35$, $\chi^2(1) = 4.49$);
- -*yooda*: there were no significant factors;

[37]Random intercepts for participant/proposition were included in order to be able to generalize to the larger pool of participants/propositions. Random slopes were included for all fixed effects of interest by participant/proposition to account for any individual/propositional differences.

- matrix-clause hearsay: the two-way interaction between Strength of Evidence and Speaker Conjecture ($\beta = 0.79$, s.e.$\beta = 0.36$, $\chi^2(1) = 4.61$), naturalness ratings from Block 1 ($\beta = 0.23$, s.e.$\beta = 0.06$, $\chi^2(1) = 12.97$);
- bare *p*: there were no significant factors;
- *-kamoshirenai*: there were no significant factors.

In §3.9, I consolidate all of the results and discuss them in light of the theoretical framework of the study.

3.9. Discussion

In this section, I return to the original statement of the hypotheses and accompanying predictions from §3.4 and discuss the relevant results for each.

Hypothesis 1a: *-rashii*, *-sooda*, and *-yooda* are all best analyzed as epistemic evidentials.

Prediction: The use of *-rashii*, *-sooda*, and *-yooda* will be judged to be contradictory when a speaker immediately denies the scope.

Hypothesis 1b: *-rashii* and *-yooda* are best analyzed as epistemic evidentials, but *-sooda* needs a separate analysis as an illocutionary evidential.

Prediction: The use of *-rashii* and *-yooda* will be judged to be contradictory when a speaker immediately denies the scope. However, the use of *-sooda* will be judged to be non-contradictory.

Outcome: The use of *-rashii*, *-sooda*, and *-yooda* were judged to be contradictory when a speaker immediately denied the scope. A linear mixed effects model showed that evidential type was a significant predictor for the contrast condition where there was a significant difference between matrix-clause hearsay vs. <*-rashii*, *-yooda*, *-sooda*, and the epistemic modal *-kamoshirenai*>. Therefore, the results support Hypothesis 1a: *-rashii*, *-sooda*, and *-yooda* are all best analyzed as epistemic evidentials, contrary to McCready & Ogata's (2007) claim that *-sooda* is similar to the Cuzco Quechua illocutionary reportative evidential *-si*.

Hypothesis 2a: Strength of evidence is a significant and differentiating factor when interpreting evidential statements in Japanese.

Prediction: The use of any evidential statement (whether or not it is immediately followed by a denial of the scope) will be influenced by the factor of Strength of Evidence when examining judgments regarding felicity or contradictoriness.

Hypothesis 2b: Strength of evidence is a significant and differentiating factor when interpreting some, but not all, evidential statements in Japanese.

Prediction: The use of some, but not all, evidential statements (whether or not it is immediately followed by a denial of the scope) will be influenced by the factor of Strength of Evidence when examining judgments regarding felicity or contradictoriness.

Outcome for naturalness: Strength of evidence was overall a significant predictor for the model encompassing all of the evidentials follow-ups–stronger evidence led to higher degrees of naturalness. In addition, there was an interaction between Strength of Evidence and Speaker Conjecture, where the effect of Speaker Conjecture was not uniform across MEDIUM and STRONG items. The interactions between Strength of Evidence and the evidential contrasts between (i) bare *p* vs. other follow-ups and (ii) -*kamoshirenai* vs. other follow-ups excluding bare *p*. Finally, the three-way interactions between Strength of Evidence, Speaker Conjecture, and the two evidential contrasts was significant. When breaking down the results by evidential, Strength of Evidence was found to be a significant predictor for all evidential follow-ups except -*kamoshirenai*, and the two-way interaction between Strength of Evidence and Speaker Conjecture was significant for all forms. Therefore, the results for the naturalness ratings support Hypothesis 2a: Strength of Evidence is a significant and differentiating factor when interpreting evidential statements in Japanese.

Outcome for contradictoriness: Strength of Evidence was overall not a significant predictor for the model encompassing all evidentials. However, the two-way interaction between Strength

of Evidence and Speaker Conjecture was significant, where the Strength of Evidence affected the judgment of CNJ vs. RPT utterances differently. When breaking down the results by evidential, Strength of Evidence was not a significant main effect for any evidential follow-up, but the two-way interaction between Strength of Evidence and Speaker Conjecture was significant for *-sooda* and matrix-clause hearsay. With regards to the hypotheses, the results for contradictoriness partially support Hypothesis 2b: Strength of Evidence contributes to a significant and differentiating interactional factor when interpreting some, but not all, evidential statements in Japanese.

3.10. Interim summary

As seen in §3.8 and §3.9, the sentence frame '*p*-EVID, but not *p*' was contradictory for *-rashii*, *-sooda*, and *-yooda*, similarly to the epistemic modal *-kamoshirenai*, and in contrast to matrix-clause hearsay. These results indicate that the use of these Japanese evidentials conveys speaker commitment to the possibility of *p*, which in turn supports the hypothesis that they are best analyzed as epistemic evidentials. However, as seen in §3.1, both the possible worlds and illocutionary analyses have been employed for modeling epistemic evidentials (e.g. Izvorski 1997, Faller 2002, respectively). Adapting these previous analyses, a preliminary possible worlds analysis for the three evidentials could be given as in (19):

(19) Assertion: $\Box p$ in view of the speaker's knowledge state
Modal force = $\Box$ ('It is necessary that')
Modal Base = in view of the speaker's knowledge state
Ordering source = stereotypical

Alternatively, a preliminary illocutionary analysis could be given as in (20):

(20) ame-ga fut-teir-u-**rashii**/-**sooda**/-**yooda**
rain-NOM fall-PROG-NPST-**EVID**
q = 'It is raining'.
$p = \Diamond q$
ILL = $\text{ASSERT}_s(\Diamond q)$
SINC = $\{Bel(s,\Diamond q),\ Rea(s,\ Bel(s,\ \Diamond q))\}$
STRENGTH = -1

In Chapter 4, I will delve deeper into the question of how best to analyze the epistemic evidentials -*rashii*, -*sooda*, and -*yooda*, by more closely examining the available analyses and explicating their strengths and weaknesses when applying them to Japanese evidentiality. In addition, I will explore the option of an analysis that does not subscribe to the dichotomy of an evidential element being analyzed either as an epistemic modal or a speech act operator. Instead, I will (re-)identify certain features that are useful for analyzing the epistemic and evidential status of any linguistic element that can be used to express evidentiality, such as the diagnostic that was employed in the current chapter.

CHAPTER 4

The semantics of Japanese evidentiality

4.1. Introduction

In recent research on evidentiality, there has evolved a body of work that attempts to categorize evidentiality based on what I argue is an overly simplistic epistemic vs. illocutionary operator dichotomy (Faller 2002, Matthewson *et al.* 2007, Murray 2010, *inter alia*). Resulting epistemic analyses often employ a possible worlds analysis, while illocutionary analyses, a speech act one. One key diagnostic used by such studies for this categorization is the degree of infelicity when a speaker denies the contents of a clause that she uttered under the scope of an evidential (e.g., '*p*-EVID, but not *p*'). This diagnostic takes advantage of a modified version of Moore's paradox (Linville & Ring 1991, *inter alia*), where there intuitively seems to be a contradiction when one utters the sentence, '*p and I believe that not p*' or '*p and not* [*I believe that p*]'. "Explanations offered of that [contradiction]...rest on one or another version of the doctrine that saying or asserting implies believing" (295).[1]

How the implicature of belief arises from assertion has been explained for example by using a Gricean account (Grice 1989 [1967]), but what is important for the purposes of this dissertation is that Moore's paradox has been utilized for the study of epistemic modality (e.g., #'*It may be raining, but it is not raining*')(Faller 2002, Matthewson *et al.* 2007, Murray 2010, *inter alia*).[2]

[1]However, consider the utterance, 'Trump won! I don't believe it,' where Moore's paradox does not seem to arise. (Thank you to Gregory Ward for this example.) Searle (1983:9) notes that these are "cases where one dissociates oneself from one's speech act, as in, e.g., 'It is my duty to inform you that *p*, but I don't really believe that *p*'...In such cases it is as if one were mouthing a speech act on someone else's behalf. The speaker utters the sentence but dissociates [herself] from the commitments of the utterance". See also AnderBois (2014) for a discussion on perspective shift.

[2]Some researchers make the '*I believe that not p*' explicit in the second clause, whereas others assume that the assertion of *not p* implies not believing *p* (Linville & Ring 1991).

And, in turn, evidentiality researchers have claimed that if a similar intuition of contradiction arises with an evidential element (e.g., 'It is raining-EVID, but it is not raining'), the proper analysis for such an element is an epistemic modal treatment (Faller 2002, Matthewson *et al.* 2007, Murray 2010, *inter alia*). When no contradiction arises, the proper treatment is taken to be an illocutionary one (Faller 2002, Matthewson *et al.* 2007, Murray 2010, *inter alia*).[3]

As described in Chapter 3, I utilized the above diagnostic to design an experiment that tested a modified Moore's paradox with the Japanese evidentials *-rashii*, *-sooda*, and *-yooda*. The results showed a clear divide between these evidentials vs. the matrix-clause hearsay expression *-to kiita* (the epistemic modal *-kamoshirenai* and bare propositions also patterned with the evidentials). This led to the interim conclusion that the preferred analysis for the three evidentials was an epistemic one. Given this conclusion, how can we best analyze these epistemic evidentials and, more generally, how can we best model Japanese evidentiality semantico-pragmatically? When exploring this question, one thing that we must keep in mind is that the determination of an evidential as an epistemic modal does not necessitate a particular semantic analysis, as both a possible worlds and an illocutionary analysis have been applied to epistemic evidentials, as repeated in (1) and (2) from §3.1 respectively:

(1) Interpretation of an indirect evidentiality operator
Assertion: $\Box p$ in view of the speaker's knowledge state[4]
Modal force = $\Box$ ('It is necessary that')
Modal Base = in view of the speaker's knowledge state
Ordering source = stereotypical
(Izvorski 1997:226)

[3]Ultimately, I will propose an analysis that lies outside this dichotomous system; however, I will first examine on which side of the dichotomy Japanese evidentiality would fall according to the reasoning of these researchers.
[4]Presupposition: Speaker has indirect evidence for p.

(2) Representation of Cuzco Quechua -*chá*
para-sha-n-**chá**
rain-PROG-3-**CNJ**
q = 'It is raining'.
$p = \Diamond q$
ILL = $\text{ASSERT}_s(\Diamond q)$
SINC = $\{Bel(s,\Diamond q),\ Rea(s,\ Bel(s,\ \Diamond q))\}$
STRENGTH = -1
(Faller 2002:184, example 146)

What the above examples show is that epistemic evidentials are not tied to a particular analysis.[5] And, in fact, possible worlds and speech act theory are not the only available analyses.[6] Whichever analysis is ultimately chosen, the goal will be to generate accurate predictions and to account for the results from Chapters 2 and 3 as much as possible.

4.2. The data

In this section, I summarize the key findings from Chapters 2 and 3 regarding -*rashii*, -*sooda*, and -*yooda*. The question to keep in mind is, what does the semantic model need to look like to be able to account for these data?

Data regarding Sensory Information x Speaker Conjecture – measured by felicity:

- The evidential -*sooda* was judged to be more felicitous with NONFIRST info sources than FIRST;[7,8]
- The evidential -*rashii* was judged to be more felicitous with NONFIRST info sources than FIRST; within the latter, -*rashii* was judged to be more felicitous with FIRST-CNJ than FIRST-NONCNJ contexts;

[5]Another point to keep in mind is that the tools for a certain analysis (e.g. possible worlds) can be applied to different kinds of elements, such as modals and illocutionary operators.
[6]See Kalsang *et al.* (2013) for a situation-theoretic analysis of Tibetan illocutionary evidentials and Goodman & Lassiter (2015) for probabilistic semantico-pragmatic models.
[7]As we will see in §4.5.2, the use of -*sooda* also requires that the speaker report the content of a communicative act.
[8]Matrix-clause hearsay was also judged to be more felicitous with NONFIRST than FIRST contexts, but was judged to be more felicitous with NONFIRST-NONCNJ contexts than NONFIRST-CNJ ones.

- The evidential *-yooda* was judged to be realtively felicitous in all contexts (i.e. (NON)FIRST-(NON)CNJ contexts); but it was judged to be more felicitous in FIRST-CNJ than FIRST-NONCNJ contexts and more felicitous with CNJ than NONCNJ contexts.[9]

Data regarding Strength of Evidence (quality of information) x Speaker Conjecture (when restricted to NONFIRST contexts) – measured by felicity:

- The evidentials *-rashii*, *-sooda*, and *-yooda* (along with bare *p* and matrix-clause hearsay) were judged to be (a) more felicitous in RPT contexts than CNJ ones, (b) more felicitous with STRONG evidence than MEDIUM, and (c) less felicitous with MEDIUM-CNJ contexts than STRONG-CNJ.[10]

Data regarding Strength of Evidence (quality of information) x Speaker Conjecture – assessed by the degree to which Moore's paradox was judged contradictory:

- The evidentials *-rashii*, *-sooda*, and *-yooda* (along with bare *p* and the epistemic modal *-kamoshirenai*) were judged to be contradictory when presented under Moore's paradox.[11]

4.3. The illocutionary analysis and its limitations

As briefly explained in §3.1, epistemic and illocutionary evidentials alike have been analyzed under speech act theory by Faller (2002). To reiterate, within this analysis, an utterance consists of propositional content and illocutionary force, the latter defined in terms of seven features by Searle & Vanderveken (1985) (see Green 2015 for a summary):

- Illocutionary point (the aim of a speech act, such as an assertion or a promise);

[9]Bare propositions were also judged to be relatively felicitous in all contexts but were judged most felicitous with FIRST-NONCNJ contexts.
[10]There was no dip in felicity for MEDIUM-CNJ contexts for the epistemic modal *-kamoshirenai*.
[11]Matrix-clause hearsay was also judged to be contradictory but to a much less degree.

- Degree of strength of the illocutionary point (e.g., insisting is stronger than requesting in terms of attempting to get the addressee to do something);
- Mode of achievement (e.g., to testify is to assert in one's capacity as a witness);
- Content conditions (e.g., one can only promise what is in the future and under their control);
- Preparatory conditions (e.g., one cannot bequeath an object they do not own unless they have power of attorney);
- Sincerity conditions (e.g., an assertion expresses belief, whereas a promise expresses intention);
- Degree of strength of the sincerity conditions (e.g., imploring is stronger than requesting in terms of desire).

Utilizing these features, Faller defined the illocutionary force of a conjectural Cuzco Quechua utterance (e.g. *para-sha-n-**chá***) as having the illocutionary point of asserting the possibility of *p*. In contrast, a reportative Cuzco Quechua utterance's (e.g. *para-sha-n-**si***) illocutionary point is that of presenting *p*. According to Faller, these two illocutionary points correspond to two differing sincerity conditions, the former being that the speaker believes in the possibility of *p* and that this belief is based on her own reasoning, and the latter being that a secondary speaker (who is not the current speaker or hearer) has asserted *p* (but where the current speaker is not interpreted to believe in the possibility of *p*).

Even though these illocutionary definitions may suffice for Cuzco Quechua, they miss the mark for Japanese evidentiality, which cannot be clearly distinguished based on Faller's (2002) conjectural vs. reportative categorization. For example, even though *-sooda* has traditionally been categorized as being reportative, it was judged to be felicitous with conjectural contexts as well, as long as the information source was non-firsthand (see Chapter 2). In other words, the semantic interpretation for *-sooda* seems to be overlapping with both that of Cuzco Quechua *-chá* and *-si*.

In addition to this, it was found that regardless of the context being reportative/conjectural, the speaker who uttered *p-sooda* was interpreted to believe in the possibility of *p* (see Chapter 3).[12] In other words, the speaker was not interpreted to be merely presenting *p*, as in Faller's analysis of *-si*. And, in fact, what has been said here about *-sooda* applies to *-rashii* and *-yooda* as well (i.e., they are judged to be felicitous in both reportative/conjectural contexts, and the speaker is interpreted to be committed to the possibility of *p*).[13]

One possible way out of this conundrum would be to treat strong evidence for *p* as basically being equivalent to *p* for all intents and purposes. For example, both linguistic forms *rain*, and *people holding umbrellas open outside*, correspond to a raining event, and that is why we see no difference between the conjectural and reportative contexts (for the experiment in Ch 2). It is true that the conjectural contexts were normed to include only highly probable inferences, but the main problem with this account is that the use of matrix-clause hearsay does not show the same reportative-conjectural equivalency across the non-firsthand contexts. In addition, it is unclear when such an equivalence would arise, i.e. when there is no relation of entailment between *p* and the evidence for *p*.

Regardless of whether there is such an equivalence, a speaker's being committed to the possibility of *p* when using an evidential in a reportative context poses a problem for Faller's (2002) analysis. An ad hoc solution may be to include both sincerity conditions for *-chá* and *-si* when defining *-rashii*, *-sooda*, and *-yooda*, as shown in (3):

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[12]For our purposes, believing in the possibility of *p* will be equivalent to being committed to the possibility of *p*.
[13]One exception has been noted by Saito (2004) for the use of *-rashii*: In a context where the information source is not of sound mind, the speaker is able to "dissociate [herself] from the commitments of the [*rashii*-]utterance" (Searle 1983:9). For example, if the information source is a patient suffering from hallucinations, their apparently false utterance that a child is dancing on the desk can be relayed by the nurse to the doctor using *-rashii* (and followed up with a denial of the existence of a dancing child without contradiction) (Saito 2004:46).

(3) ame-ga fut-teir-u-**rashii**/-**sooda**/-**yooda**
rain-NOM fall-PROG-NPST-**EVID**
q = 'It is raining'.
$p = \Diamond q$
ILL = $\text{ASSERT}_s(\Diamond q)$
SINC = $\{Bel(s,\Diamond q), Rea(s, Bel(s,\Diamond q))\}$ or $\{Bel(s,\Diamond q), \exists s_2[Assert(s_2, p) \wedge s_2 \notin \{h, s\}]\}$
STRENGTH = -1

However, this solution appears unmotivated. It seems that we need more semantic grounding for the Japanese evidentials before considering what kind of illocutionary analysis might be appropriate for Japanese evidentiality.

4.4. An epistemic analysis and its advantages

We now turn to the epistemic analysis, which was introduced briefly in §3.1. Epistemic evidentials have been analyzed extensively within possible worlds semantics (e.g. Kratzer 1991, Izvorski 1997, Garrett 2000). When considering modals in general, Kratzer (2012b:8) states that they "are inherently relational. To be semantically complete, a modal requires two arguments: a restriction and a scope". For example, the "semantic core" of the English epistemic modal *must* is represented by the relative modal phrase *must in view of*, which in turn requires the modal restriction[14] 'what is known' and the modal scope (the proposition denoted by the prejacent).

According to Kratzer (1991:649), "the differences between modal expressions in different languages can be captured in terms of three dimensions": (i) modal force (e.g. necessity, possibility), (ii) modal base (e.g. epistemic, circumstantial), and (iii) ordering source (e.g. deontic, stereotypical). Under this framework, Izvorski (1997:222) analyzes the perfect of evidentiality, as found in Turkish, Bulgarian, and Norwegian, which "allows both a report and an inference reading", as an epistemic modal with the following interpretation (= (1)):

[14]According to Kratzer (2012b:20), modal restrictions are "function[s] from worlds to premise sets...Such functions are often called 'conversational backgrounds' [or accessibility relations]".

(4) Interpretation of perfect of evidentiality in Turkish/Bulgarian/Norwegian (and *-rashii*/ *-yooda*)
Assertion: $\Box p$ in view of the speaker's knowledge state[15]
Modal force = $\Box$ ('It is necessary that')
Modal Base = in view of the speaker's knowledge state
Ordering source = stereotypical
(Izvorski 1997:226)

The analysis in (4) could also be applied to the Japanese conjectural evidentials *-rashii* and *-yooda* (and English *p*, *it seems*). And, given the results from Chapters 2 and 3, it may seem that (4) is sufficient for the Japanese reportative evidential *-sooda* as well. However, as I will explicate in §4.5, *-sooda* (and English *p*, *I hear*) requires a modification to emphasize the property of there being a communicative act (Grice 1957, Strawson 1964, *inter alia*). Therefore, we must change the modal base to 'in view of the speaker's knowledge state, which is based on the content of the speaker's information source', to arrive at (5):[16]

(5) Interpretation of *-sooda*
Assertion: $\Box p$ in view of **the speaker's knowledge state, which is based on the content of the speaker's information source**[17]
Modal force = $\Box$ ('It is necessary that')
Modal Base = in view of **the speaker's knowledge state, which is based on the content of the speaker's information source**
Ordering source = stereotypical

Given the above, the possible worlds analysis is advantageous to the illocutionary one (at least when considering the system in Faller 2002) in three regards: (a) there is more uniformity across conjectural vs. reportative evidentials, as we maintain the same framework but only change the modal base; (b) there is no need to explicitly build in the speaker's belief in the possibility of *p* (for either conjectural or reportative evidentials), as this belief or commitment will fall out from

[15]Presupposition: Speaker has indirect evidence for *p*.
[16]The presupposition has been modified as well.
[17]Presupposition: Speaker has accessed the content of an information source via indirect evidence.

the interaction between the context and the modal base; and (c) for reportative evidentials, there is no need to explicitly build in the property that a second individual other than the speaker has asserted p. Although it is theoretically possible to adapt Faller's analysis to accommodate the property that the use of *-sooda* does not require an assertion of p by the information source, this modification would be ad hoc.

4.5. Conversational backgrounds

In §4.4 I claimed that the epistemic analysis of the Japanese reportative evidential *-sooda* requires a modification to emphasize the property of there being a communicative act. In this section, I provide the linguistic analysis that motivates this modification.[18]

4.5.1. 'Given' vs. 'according to'

Take the two examples in (6) and (7), which provide an appropriate case study for our purposes (adapted from Kratzer 2012a:21):

(6) **Given** the article in the Hampshire Gazette, Mary Clare Higgins **must** have been re-elected.

(7) **According to** the article in the Hampshire Gazette, Mary Clare Higgins was **reportedly** re-elected.[19]

Kratzer (22) states that the difference between these two examples is that in the first, the accessible worlds "are worlds with certain kinds of counterparts of the article in the Hampshire Gazette", and in the second, "the accessible worlds are worlds that are compatible with the

[18]Admittedly, these observations have not been examined empirically, as in Chapters 2 and 3. However, I believe that the observations are compelling and provide the motivation to modify the semantic analyses accordingly.
[19]This is Kratzer's translation of the German sentence *Dem artikel in der Hampshire Gazette nach, soll Mary Clare Higgins wiedergewählt worden sein.*

content of the report". Put differently, we could label the first as being conjectural in that there is some kind of judgment on the part of the speaker, and the second as being reportative in that the speaker is simply relaying the contents of a communicative act.

For Kratzer (2012a:21), (6) is 'epistemic', as its assertion "would commit [the speaker] to the truth of what the article says, and continuing with [(8)] would be infelicitous":[20]

(8) ...but I wouldn't be surprised if she wasn't. The Gazette is usually too quick to draw conclusions from projected election results.[21]

However, (7) is 'evidential', which according to Kratzer leads to a contrast and that one could continue with (8) without contradiction.

As argued in previous sections, I claim that the Japanese evidentials *-rashii*, *-sooda*, and *-yooda* are epistemic, which should lead to a similar contradiction as (8) following (6) as applied to the re-election example. And indeed, this contradiction does arise:

(9) gazette-no kiji-wo yomu **kagiri**, higgins-wa
gazette-GEN article-ACC read **extent** higgins-TOP
saitousenshi-ta-**rashii**/-**sooda**/-**yooda**. #daga, saitousenshi-tei-naku-temo
reelect-PST-**EVID** but reelect-RES-NEG-even.if
fushigi-de-wa-nai. gazette-wa touei-sareta senkyo-kekka-kara ketsuron-wo
strange-COP-TOP-NEG gazette-TOP project-PASS election-results-from conclusion-ACC
hayaku dasiteshimai-gachi-da.
quickly produce-tend-COP
'**Given** what I've read in the Gazette article, **it seems** / **I hear** Higgins got re-elected. But it wouldn't be strange if she in fact wasn't. The Gazette tends to draw conclusions too quickly from projected election results'.

[20]We will see in §4.5.2 that there are cases where the speaker is not necessarily committed to the truth of what the article says, such as when the speaker has deduced the opposite of what the article says based on her knowledge (from her perspective) that the Hampshire Gazette is untrustworthy. However, it still stands that the speaker is committed to the possibility of the scope of the evidential being true.

[21]The question of why an utterance of (8) as a follow-up for (6) is contradictory returns to the pragmatic notion that an assertion of p commits the speaker to believing p, even though this is not a logical necessity. Similarly, an assertion of an epistemic statement (in view of the speaker's knowledge state or in view of the content of the speaker's information source) commits the speaker to believing in the possibility of p.

Moreover, unlike in (7), this contradiction is maintained even with the adverbial corresponding to 'according to', as shown in (10):

(10) gazette-no kiji-ni-**yoruto**, higgins-wa saitousenshi-ta-**rashii**/-**sooda**/-**yooda**.
gazette-GEN article-to-**according** higgins-TOP reelect-PST-**EVID**
#daga, saitousenshi-tei-naku-temo fushigi-de-wa-nai. gazette-wa touei-sareta
but reelect-RES-NEG-even.if strange-COP-TOP-NEG gazette-TOP project-PASS
senkyo-kekka-kara ketsuron-wo hayaku dasiteshimai-gachi-da.
election-results-from conclusion-ACC quickly produce-tend-COP
'**According to** the Gazette article, **it seems** / **I hear** Higgins got re-elected.
But it wouldn't be strange if she in fact wasn't. The Gazette tends to draw conclusions too quickly from projected election results'.

Compare this to a context in which no evidential or adverbial is used, and instead it is asserted that it is written in the Gazette article that Higgins has been re-elected:

(11) gazette-no kiji-ni-wa higgins-ga saitousenshi-ta-to **kaitearu**. daga,
gazette-GEN article-in-top higgins-NOM reelect-PST-LNK **written** but
saitousenshi-tei-naku-temo fushigi-de-wa-nai. gazette-wa touei-sareta
reelect-RES-NEG-even.if strange-COP-TOP-NEG gazette-TOP project-PASS
senkyo-kekka-kara ketsuron-wo hayaku dasiteshimai-gachi-da.
election-results-from conclusion-ACC quickly produce-tend-COP
'In the Gazette article **it is written that** Higgins got re-elected.
But it wouldn't be strange if she in fact wasn't. The Gazette tends to draw conclusions too quickly from projected election results'.

No contradiction arises in (11).

4.5.2. Non-alignment of the information content with *p*

So far, the story is the same as the results from Chapters 2 and 3: *-rashii*, *-sooda*, and *-yooda* are all epistemic evidentials, and Kratzer's (2012a) examples do not reveal any distinctions among them. However, interesting patterns emerge when we alter the context slightly. In the above examples, the Gazette article presumably reports the re-election of Higgins. Consider, instead,

the situation in which the article instead reported the non-election of Higgins, and the speaker and potential hearer are aware that (a) the Gazette is a right-wing extremist newspaper that does not fact-check its articles, and that (b) Higgins is a liberal. In other words, the Gazette is a consistent source of anti-liberal, inaccurate information from the perspective of the speaker and hearer. In this context, we find the following:

(12) gazette-no kiji-wo yomu **kagiri**, higgins-wa
gazette-GEN article-ACC read **extent** higgins-TOP
saitousenshi-ta-**rashii**/-**yooda**/#-**sooda**.
reelect-PST-**EVID**
'**Given** what I've read in the Gazette article, Higgins got re-elected, **it seems** / **I hear**'.

We see that in this kind of context, the use of *-sooda* is infelicitous, whereas *-rashii* and *-yooda* are fine.[22]

In contrast, here is the outcome when the 'given' adverbial is replaced with 'according to':

(13) gazette-no kiji-ni-**yoruto**, higgins-wa
gazette-GEN article-to-**according** higgins-TOP
saitousenshi-ta#-**rashii**/#-**yooda**/#-**sooda**.
reelect-PST-**EVID**
'**According to** the Gazette article, Higgins got re-elected, **it seems** / **I hear**'.

In this case, no evidential is felicitous with the adverbial 'according to' because the Gazette article did not report that Higgins was re-elected.

What this shows is that with 'given the article', the use of *-rashii* and *-yooda* are felicitous in any context in which there is some kind of information on which the speaker bases her utterance. However, for *-sooda* (and the 'according to' adverbial *yoruto*), the entity that comprises the

[22]Although the use of *-rashii* and *-yooda* in (12) is felicitous, (i) is still contradictory as a follow-up:
(i) daga, saitousenshi-tei-naku-temo fushigi-de-wa-nai. gazette-ga notto-rareta kanousei-ga aru.
but reelect-RES-NEG-even.if strange-COP-TOP-NEG gazette-NOM taken.over-PASS possibility-NOM EXIS
'But it wouldn't be strange if she hadn't gotten re-elected. It's possible that the Gazette was taken over'.

information source must be in a position to conclude what is denoted by the prejacent.[23] In other words, in the right-wing Gazette example, the Gazette is not in a position to justify its assertion of Higgins' re-election, and that is why the speaker is not able to utter this statement with *-sooda* (or *yoruto* 'according to').[24] Put differently, the Gazette was not 'trying to communicate' that Higgins got re-elected (Grice 1957, Strawson 1964, *inter alia*).[25]

Examples (14) – (17) further enforce this notion that the use of *-sooda* must be accompanied with a presumed endorsement of p by the speaker, if not an intention to communicate p. If we take a slightly modified context in which there is a report that Higgins was involved with corruption, and the speaker/hearer considered this source to be reliable, *-rashii*, *-yooda*, and *-sooda* would all be felicitous with both the 'given' *kagiri* and 'according to' *yoruto* adverbials, as shown in (14) and (15):

(14) houkoku-wo yomu **kagiri**, higgins-wa oshokushi-teir-u-**rashii**/-**yooda**/-**sooda**.
report-ACC read **extent** higgins-TOP corruption-PROG-NPST-**EVID**
'**Given** what I've read in the report, **it seems** / **I hear** Higgins is corrupt'.

(15) houkoku-ni-**yoruto**, higgins-wa oshokushi-teir-u-**rashii**/-**yooda**/-**sooda**.
report-to-**according** higgins-TOP corruption-PROG-NPST-**EVID**
'**According to** the report, **it seems** / **I hear** Higgins is corrupt'.

[23]It is fascinating that the lexical semantics of *-sooda* are more restrictive in terms of the content of the information source, even though the use of *-yooda* and *-rashii* have both been found to be compatible with reportative contexts in Chapters 2 and 3. It would be interesting to see whether this pattern can be found in other languages with reportative vs. conjectural epistemic evidentials

[24]This also explains the results from Ch 2, in which it was found that it was felicitous to say *p-sooda* even when the speaker has only heard the evidence for p (but not p). This felicity can be explained that there was an understanding that the source who provided the evidence for p would not object to the conjecture that p.

[25]Strawson (1964:446-447) defines 'trying to communicate' as the following: "[speaker] S intends (i_1) to produce by uttering [an utterance] x a certain response (r) in [a hearer H] and intends (i_2) that [H] shall recognize S's intention (i_1) and intends (i_3) that this recognition on the part of [H] of S's intention (i_1) shall function as [H]'s reason, or a part of his reason, for his response r...[in addition,] S should have the further intention (i_4) that [H] should recognize [S's] intention (i_2)". However, as Searle (1983:9-10) notes, this is "not to say that one always has to have the Intentional state that one expresses. It is always possible to lie or otherwise perform an insincere speech act. But a lie or other insincere speech act consists in performing a speech act, and thereby expressing an Intentional state, where one does not have the Intentional state that one expresses". In this case, it is useful to distinguish between public and private intentions.

Furthermore, both (14) and (15) would be felicitous even if the report did not directly state that Higgins was involved in corruption but only presented evidence for such corruption (e.g. Higgins taking friendly photos with big business tycoons).

However, if the speaker and hearer are aware that the report was written by an individual who had been bought out by Higgins, and this report stated that Higgins was not involved with corruption, the felicity judgments of the three evidentials shift, as shown in (16) and (17):

(16) houkoku-wo yomu **kagiri**, higgins-wa oshokushi-teir-u-**rashii**/-**yooda**/#-**sooda**.
report-ACC read **extent** higgins-TOP corruption-PROG-NPST-**EVID**
'**Given** what I've read in the report, **it seems** / **I hear** Higgins is corrupt'.

(17) houkoku-ni-**yoruto**, higgins-wa oshokushi-teir-u#-**rashii**/#-**yooda**/#-**sooda**.
report-to-**according** higgins-TOP corruption-PROG-NPST-**EVID**
'**According to** the report, **it seems** / **I hear** Higgins is corrupt'.

And, the felicity judgments in (16) and (17) remain the same even if the report (which was written by a corrupt individual) does not directly state that Higgins was not involved in corruption but only presented evidence for non-corruption (e.g. an analysis that the friendly photos of Higgins and the tycoons had been photoshopped).

The above discussion shows that *-sooda* is more restricted regarding the contexts in which it can be used felicitously, in that the content of the report must not clash with the (public) intentions of the information source (e.g. Grice 1957, Strawson 1964, Searle 1983). In addition, we see that the adverbials *kagiri* 'given' and *yoruto* 'according to' have a big impact on which evidentials are rendered (in)felicitous in a given context. The interaction of the use of such adverbials with the use of evidentials (along with their respective modal bases) is underappreciated and in need of further investigation.

What impact does the above discussion have on the formal semantics of *-sooda* when compared to that of *-rashii* and *-yooda*? This topic will be pursued in §4.6.

4.6. The lexical semantics for *-rashii*, *-sooda*, and *-yooda*

In §4.4, we showed that there is no need within a possible worlds analysis for an explicit designation of what the speaker believes (which **is** necessary for the analysis in Faller 2002), as this belief is built in as a natural consequence of the interaction between the context and the modal base. How would this translate to the lexical semantics for *-rashii*, *-sooda*, and *-yooda*? Here, I follow von Fintel & Heim (2011) closely for this exercise (numbers in parentheses are page numbers from von Fintel & Heim):

- Modals are expressions that take a full sentence as a semantic argument (30);
- Epistemic modals are quantifiers over possible worlds that are compatible with the evidence available to the speaker (33);
- (Some) reportative evidentials are quantifiers over possible worlds that are compatible with the content of the information source available to the speaker (adaptation of previous point);
- Modal force refers to the existentially quantified claim about possible worlds (e.g. existential/universal) (34);
- What worlds a modal quantifies over is determined by context; the context supplies the restriction (35);
- The ordering source will be a function that assigns to any evaluation world a set of propositions whose truth depend on the evidence available to the speaker or the content of the information source available to the speaker (61);
- It is assumed "that the [strict partial order] relation [required to derive an ordering source] has minimal elements, that there always are accessible worlds that come closest to the [ideal], worlds that are better than any world they can be compared with via [the strict partial order]" (61). This is referred to as the Limit Assumption.

Let's start with the interpretation of ⟦must⟧ provided by von Fintel & Heim (2011), which is a function that takes three arguments (two conversational backgrounds and a proposition):

(18) $[\![\text{must}]\!]^{w,g} = \lambda f \in D_{\langle s,\langle\langle s,t\rangle,t\rangle\rangle} \,.\, \lambda g \in D_{\langle s,\langle\langle s,t\rangle,t\rangle\rangle} \,.\, \lambda p \in D_{\langle s,t\rangle} \,.\, \forall w' \in max_w(\cap f(w)) : p(w') = 1.$

Strictly speaking, the semantic value of *must* in w is the function from conversational backgrounds to functions from conversational backgrounds to functions from propositions to truth values. More specifically, it is the function mapping the triplets f, g, and p to truth values, where f and g are conversational backgrounds representing the modal base and ordering source respectively and p is a proposition, and the value of the function is 1 if and only if p is true at all worlds w' that are 'best' (minimal) among the modal-base worlds at w according to the ordering source at world w.

We would now be able to build on (18) by specifying the accessibility relation; each attitude has a different accessibility relation (von Fintel & Heim 2011:22), such as what is compatible with the speaker's beliefs or knowledge. The accessibility relation for ⟦must⟧ would be that of evidence, where $wR^E_x w'$ holds iff w' is compatible with the evidence available to x in evaluation world w. This same accessibility relation could be applied to the interpretation of ⟦rashii⟧ and ⟦yooda⟧.

However, we must adapt the interpretation of ⟦must⟧ (and ⟦rashii⟧ and ⟦yooda⟧) to ⟦sooda⟧ by the introduction of the accessibility relation $wR^I_x w'$, where this relation holds iff w' is compatible with the content of the information source available to x in evaluation world w.

Figure 4.1 is a schematization of the interpretation of the evidentials ⟦rashii⟧ and ⟦yooda⟧. W is the set of all possible worlds, and E in yellow is the set of modal-base worlds $\cap f(w)$ (i.e. in view of the evidence available to the speaker). This E set aligns with the accessibility relation

of evidence described above; p corresponds to the scope of the evidential (e.g. 'It is raining'). The green area corresponds to the worlds in which the evidence is the strongest ($max_w(\cap f(w))$), which is determined by the ordering source (stereotypical). When one utters 'It is raining'-*yooda*, she is expressing the notion that all worlds in the green area are worlds in which it is raining.

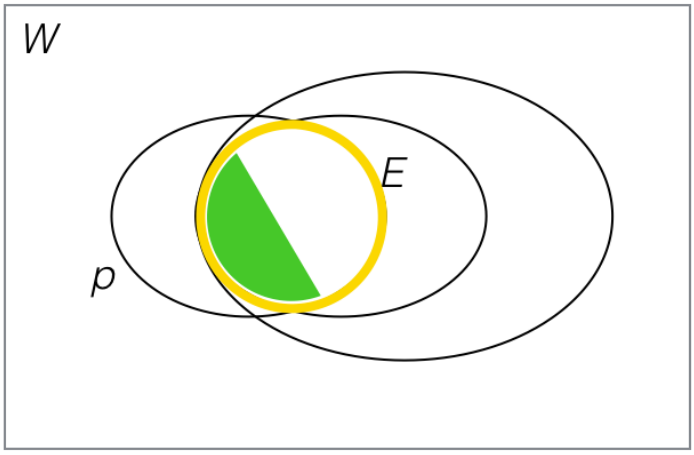

Figure 4.1. Schematization of ⟦rashii⟧ and ⟦yooda⟧

The schematization for -*sooda*, which builds on Figure 4.1, can be seen in Figure 4.2. We can see that from a certain world in the best worlds, we access a second modal base I in blue (i.e. in view of the content of the information source available to the speaker), which again aligns with the accessibility relation of information source described above. When one utters 'It is raining'-*sooda*, she is expressing the notion that all worlds in the green area are worlds in which it is raining, and that from one of these best worlds, she has accessed another set of worlds in which the content of a certain information source is compatible with the proposition 'It is raining'. This double quantification is necessary for reportative epistemic evidentials (i.e. -*sooda*) to account for the communicative content of the information source.

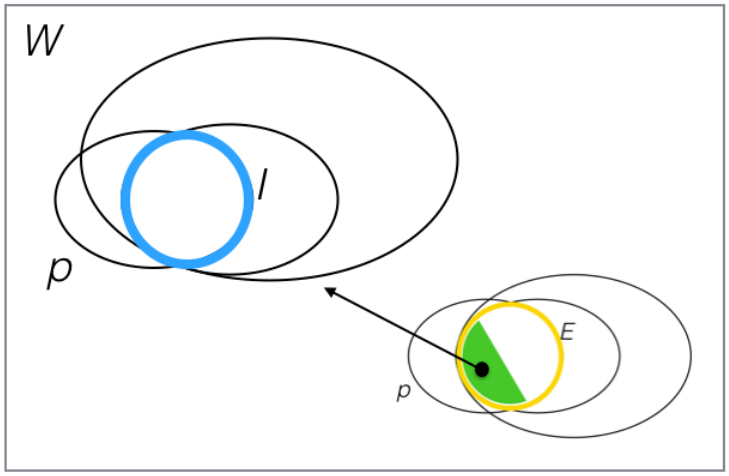

Figure 4.2. Schematization of ⟦sooda⟧

4.7. Re-framing the analysis of evidentiality

In this dissertation, I have mostly subscribed to the view that evidentials can be categorized as being epistemic or illocutionary. However, there are two limitations with this dichotomous system: (a) This system does not capture the differences exemplified in §4.5 that can exist within the category of epistemic evidentials, and (b) This system does not capture any similarities that may exist between elements that have been categorized as 'evidentials' vs. other linguistic elements that express evidentiality such as matrix-clause units (e.g. *-to kiita* 'I heard that'). Therefore, I propose an alternative analysis that employs the diagnostics identified in §2.2 as features of the epistemic status of a certain utterance, and the observation in §4.5 as a feature of the evidential (source) status of that utterance. In other words, I argue that instead of determining whether a certain linguistic element that expresses evidentiality is an epistemic modal or an illocutionary operator, we can determine the epistemic and evidential status of any utterance that includes such a linguistic element, as will be explicated in §4.7.1 and 4.7.2.

4.7.1. Features of the epistemic stance

In this section, I review the diagnostics for epistemic modality initially presented in §2.2 and reframe them as features of the epistemic stance, as applied to *-rashii*, *-sooda*, *-yooda*, *-kamoshirenai*, *-to kiita*, and one additional evidential expression, *-to suisokuru* 'I infer that'.

4.7.1.1. Epistemic feature: (In)felicitous if embedded proposition known to be false. For a given evidential statement, if embedding a proposition known to be false (by the speaker) results in infelicity (i.e., # '*p*-EVID, but not *p*'), the evidential element is interpreted as having the modal base 'in view of the speaker's knowledge state'. The results in Chapter 3 showed that embedding a proposition known to be false was judged as being contradictory for *-rashii*, *-sooda*, *-yooda*, and *-kamoshirenai*. Embedding such a proposition under *-to kiita* was comparatively non-contradictory, though not completely (judgments remained in the middle of the contradictoriness scale). The matrix clause *-to suisokuru* was not tested, but my intuitions have it patterning with the Japanese evidentials (and *-kamoshirenai*).[26] These judgments are summarized in (19), (20), and (21):

(19) #ame-ga fut-teir-u-**rashii**/**-sooda**/**-yooda**/**-kamoshirenai**-ga, fut-tei-nai
rain-NOM fall-PROG-NPST-**EVID**/**MOD**-CONJ fall-PROG-NEG
'It is raining, **it seems** / **I hear** / **it may be**, but it is not raining.'

(20) ame-ga fut-teir-u-**to** **kiita**-ga, fut-tei-nai
rain-NOM fall-PROG-NPST-**CMPL** **heard**-CONJ fall-PROG-NEG
'**I heard that** It is raining, but it is not raining.'

(21) #ame-ga fut-teir-u-**to** **suisokusuru**-ga, fut-tei-nai
rain-NOM fall-PROG-NPST-**CMPL** **infer**-CONJ fall-PROG-NEG
'**I infer that** It is raining, but it is not raining.'

[26] All subsequent judgments in this chapter remain to be systematically examined as well.

4.7.1.2. Epistemic feature: (In)felicitous if embedded proposition known to be true. For a given evidential statement, if embedding a proposition known to be true (by the speaker) results in infelicity (i.e., # '*p*-EVID, and *p*'), the evidential element is again interpreted as having the modal base 'in view of the speaker's knowledge state', and the evidential is also interpreted as having the presupposition 'the evidence for *p* is indirect'. In other words, the speaker is bound to the epistemic stance she presented as being the basis for her evidential statement. This infelicity could be explained as a violation of the Cooperative Principle (Grice 1989 [1967]:26), which states: "Make your conversational contribution such as is required, at the stage at which it occurs, by the accepted purpose or direction of the talk exchange in which you are engaged". In this case, it could be said that using an evidential that presupposes indirect evidence when knowing the embedded proposition to be true violates the Cooperative Principle. The application of this feature to the relevant evidential expressions can be seen in (22), (23), and (24):[27]

(22) #ame-ga fut-teir-u-**rashii**/**sooda**/-**yooda**/-**kamoshirenai**-shi, jissaini
rain-NOM fall-PROG-NPST-**EVID**/**MOD**-CONJ really
fut-tei-ru
fall-PROG-NPST
'It is raining, **it seems** / **I hear** / **it may be**, and it really is raining.'

(23) ame-ga fut-teir-u-**to** **kiita**-shi, jissaini fut-tei-ru
rain-NOM fall-PROG-NPST-**CMPL** **heard**-CONJ really fall-PROG-NPST
'**I heard that** It is raining, and it really is raining.'

(24) #ame-ga fut-teir-u-**to** **suisokusuru**-shi, jissaini fut-tei-ru
rain-NOM fall-PROG-NPST-**CMPL** **infer**-CONJ really fall-PROG-NPST
'**I infer that** It is raining, and it really is raining.'

[27]As seen in the results of Chapter 2, the use of *-yooda* was judged to be relatively natural with direct (firsthand-nonconjectural) evidence, which causes one to wonder why the hearer may not consider this use to be a violation of the Cooperative Principle. Researchers such as Kasioka (1980) have pointed out that *-yooda* (and *-rashii*) can be used in such situations if the speaker intends to present *p* in a roundabout way for some purpose (which may be known or accommodated by the listener). I suspect that the acceptability of such roundabout statements is context-sensitive–this question is worth further exploration via a systematic investigation.

4.7.1.3. Epistemic feature: Indirect evidence cancelable? If an evidential element is indeed interpreted as having the presupposition 'the evidence for p is indirect' as in §4.7.1.2, then it should not be possible to cancel the indirect nature of the evidence. The application of this feature to the relevant evidential expressions can be seen in (25), (26), and (27):[28]

(25) #ame-ga fut-teir-u-**rashii**/-**sooda**/-**yooda**/-**kamoshirenai**; watashi-wa ame-wo
rain-NOM fall-PROG-NPST-**EVID/MOD** I-TOP rain-ACC
mi-teir-u.
see-PROG-NPST
'It is raining, **it seems / I hear / it may be**; I see it raining.'

(26) ame-ga fut-teir-u-**to** **kiita**; watashi-wa ame-wo mi-teir-u.
rain-NOM fall-PROG-NPST-**CMPL** **heard** I-TOP rain-ACC see-PROG-NPST
'**I heard that** It is raining; I see it raining.'

(27) #ame-ga fut-teir-u-**to** **suisokusuru**; watashi-wa ame-wo mi-teir-u.
rain-NOM fall-PROG-NPST-**CMPL** **infer** I-TOP rain-ACC see-PROG-NPST
'**I infer that** It is raining; I see it raining.'

4.7.1.4. Epistemic feature: Challengeability. As explained in §2.2.4, the evidential (conjectural/reportative) meaning of -*rashii*, -*sooda*, and -*yooda* cannot be directly challenged.[29] However, the modal reasoning of the speaker **can** be challenged. This pattern holds for the epistemic modal -*kamoshirenai*, as exemplified in (28) and (29):

[28]The same caveat as in §4.7.1.2 exists for -*yooda*. On the other hand, even though (26) does not sound infelicitous per say, there would not be many contexts in which this utterance would be felicitous. For example, perhaps the speaker is simply listing some observations that lead her to conclude that it is raining: 'I heard that it is raining; I hear it raining; I see it raining; it's raining'.

[29]Some researchers such as Faller (2002) claim that only linguistic elements that can be directly challenged contribute to the truth conditions of the proposition expressed. However, other researchers such as Murray (2010) contest this claim. I do not delve into this question in this dissertation but do think it is a question worth exploring especially in relation to at-issueness (e.g. Murray 2010).

(28) Context: Person A and B are inside and hear a pit-pattering sound on the roof.

A: ame-ga fut-teir-u-**rashii**/-**sooda**/-**yooda**/-**kamoshirenai**.

rain-NOM fall-PROG-NPST-**EVID/MOD**

'It is raining, **it seems / I hear / it may be**.'

B: # sore-ha chigau, anata-ha kiite/suisokushite-inai.

that-TOP wrong you-TOP hear/infer-NEG

'That's not true, you didn't hear/infer that.'

(29) Context: Person A and B are inside and hear a pit-pattering sound on the roof.

A: ame-ga fut-teir-u-**rashii**/-**sooda**/-**yooda**/-**kamoshirenai**.

rain-NOM fall-PROG-NPST-**EVID/MOD**

'It is raining, **it seems / I hear / it may be**.'

B: sore-ha chigau, hoosu-kamoshirenai

that-TOP wrong hose-may

'That's not true, it may be the hose.'

For the matrix-clause expressions -*to kiita* and -*to suisokusuru*, **both** the evidential meaning and the modal reasoning can be directly challenged, as exemplified in (30) and (31):

(30) Context: Person A and B are inside and hear a pit-pattering sound on the roof.

A: ame-ga fut-teir-u-**to** **kiita**/**suisokusuru**.

rain-NOM fall-PROG-NPST-**CMPL** **heard/infer**

'**I heard/infer that** it is raining.'

B: sore-ha chigau, anata-ha kiite/suisokushite-inai.

that-TOP wrong you-TOP hear/infer-NEG

'That's not true, you didn't hear/infer that.'

(31) Context: Person A and B are inside and hear a pit-pattering sound on the roof.

A: ame-ga fut-teir-u-**to** **kiita**/**suisokusuru**.
rain-NOM fall-PROG-NPST-**CMPL** **heard/infer**
'**I heard/infer that** it is raining.'

B: sore-ha chigau, hoosu-kamoshirenai
that-TOP wrong hose-may
'That's not true, it may be the hose.'

As seen above, in general the three Japanese evidentials -*rashii*, -*sooda*, and -*yooda*, the epistemic modal -*kamoshirenai*, and the matrix-clause conjectural -*to suisokusuru* pattern together (c.f. §4.7.1.1, 4.7.1.2, 4.7.1.3); an utterance with these elements binds the speaker to the epistemic stance she presented as being the basis for her evidential statement. As for challengeability, the evidential meaning of matrix-clause evidential expressions could be directly challenged, while this was not the case for the Japanese evidentials (and -*kamoshirenai*). On the other hand, the modal reasoning of the speaker could be challenged for all of the evidential expressions.

4.7.2. Features of the evidential (source) status

In this section, I review the discussion in §4.5 regarding the restriction on the information source and whether a speaker's utterance must not clash with the (public) intentions of the source. Examples (32) and (33) are felicitous utterances given the context that there is a report that Higgins was involved with corruption, and the speaker/hearer considered this source to be reliable:[30]

(32) higgins-wa oshokushi-teir-u-**rashii**/**-yooda**/**-sooda**/**-kamoshirenai**.
higgins-TOP corruption-PROG-NPST-**EVID**/**MOD**
'Higgins is corrupt, **it seems** / **I hear** / **it may be**'.

[30]I have simplified the examples by removing the adverbials *kagiri* 'given' and *yoruto* 'according to'.

(33) higgins-wa oshokushi-teir-u-**to** **kiita/suisokusuru**.
higgins-TOP corruption-PROG-NPST-**CMPL** **heard/infer**
'**I heard/infer that** Higgins is corrupt'.[31]

On the other hand, if the speaker and hearer are aware that the report was written by an individual who had been bought out by Higgins, and this report stated that Higgins was not involved with corruption, the felicity judgments shift, as shown in (34) and (35):

(34) higgins-wa oshokushi-teir-u-**rashii**/-**yooda**/#-**sooda**/-**kamoshirenai**.
higgins-TOP corruption-PROG-NPST-**EVID/MOD**
'Higgins is corrupt, **it seems** / **I hear** / **it may be**'.

(35) higgins-wa oshokushi-teir-u-**to** #**kiita/suisokusuru**.
higgins-TOP corruption-PROG-NPST-**CMPL** **heard/infer**
'**I heard/infer that** Higgins is corrupt'.

We see that both *-sooda* and *-to kiita* are restricted to contexts where the content of the report does not clash with the (public) intentions of the information source. Therefore, the common property leading to this pattern is the reportative nature of the evidential expression, in contrast to the epistemic stance that was driving the pattern in §4.7.1. A summary of the discussion in §4.7.1 and 4.7.2 can be seen in Table 4.1.

4.8. Conclusion

In this chapter, I analyzed the semantics of the Japanese evidentials *-rashii*, *-sooda*, and *-yooda*. I showed that the categorization of evidentiality based on an epistemic (possible worlds) vs. illocutionary (speech act) operator dichotomy (e.g. Faller 2002, Matthewson *et al.* 2007, Murray 2010) was not useful for Japanese evidentiality and that a possible worlds analysis would provide the kind of flexibility needed for *-rashii*, *-sooda*, and *-yooda*, specifically to account for

[31]It should be noted that if the report did not directly state that Higgins was involved in corruption but only presented evidence for such corruption (e.g. Higgins taking friendly photos with big business tycoons), the use of *-to kiiita* would not be as natural, as supported by the results in Chapter 2.

Epistemic/Evidential Feature	*-rashii*	*-sooda*	*-yooda*	*-kamoshirenai*	*-to kiita*	*-to suisokusuru*
Embedded proposition known to be false	#	#	#	#		#
Embedded proposition known to be true	#	#	#	#		#
Canceling indirect evidence	#	#	#	#		#
Challenging evidential meaning	#	#	#	#		
Challenging modal reasoning						
Alignment between speaker's utterance and intentions of source						
Clash between speaker's utterance and intentions of source		#			#	

Table 4.1. Summary of epistemic/evidential feature analysis

speaker commitment to the possibility of p even in reportative contexts. In §4.5, I provided a case study for the purpose of identifying a context in which not all of the Japanese evidentials in question are judged equally felicitous: the context in which the information source is not interpreted to endorse what the speaker is asserting. This observation needs to be validated via further empirical investigation, but I believe I have successfully identified a minimally different lexical semantics between conjectural vs. reportative epistemic evidentials in Japanese. And finally, in §4.7, I proposed an alternative analysis that determines the epistemic **and** evidential status of any utterance that includes a linguistic element that expresses evidentiality (or epistemic modality). The advantages of this analysis are that it captures the differences exemplified in §4.5 that can exist within the category of epistemic evidentials, and it captures any similarities that may exist between elements that have been categorized as 'evidentials' vs. other linguistic elements that express evidentiality (e.g. matrix-clause units like *-to kiita/suisokusuru* 'I heard/infer that').

CHAPTER 5

Conclusion and future directions

This dissertation set out to tell a story regarding the semantics, pragmatics, and experimental pragmatics of Japanese evidentiality. In §2.1, I provided the results of a typological study testing the effects of access to Sensory Information and Speaker Conjecture on the felicitous use of *-rashii*, *-sooda*, and *-yooda*. Both factors and their interaction were significant predictors for the use of *-rashii*, while speaker conjecture and its interaction with sensory information were significant for the use of *-yooda*. Surprisingly, the use of *-sooda* was significantly predicted only by sensory information, and speaker conjecture played no role. Specifically, both conjectural and non-conjectural contexts were equally felicitous in non-firsthand scenarios for the use of *-sooda*.

The results for *-sooda* were especially surprising given the contrast with those for matrix-clause hearsay, in which sensory information, speaker conjecture, and their interaction were all significant predictors. This contrast led to the semantic analysis of the three Japanese evidentials in §2.2, focusing on the question of whether *-sooda* (and *-rashii* and *-yooda*) were most appropriately analyzed as epistemic or illocutionary evidentials. McCready & Ogata (2007) argued that *-sooda* should be analyzed as an illocutionary operator, but given that I encountered mixed judgments when presenting native Japanese-speaking consultants with sample sentences testing a variation of Moore's paradox (e.g., *ame-ga futteiru-sooda-ga, futteinai* 'It is raining-EVID, but it is not raining'), I decided that a large-scale empirical study was necessary, which is described in Chapter 3.

I concluded in Chapter 3 that *-sooda*, along with *-rashii* and *-yooda*, were most appropriately analyzed as epistemic evidentials. I then showed in Chapter 4 that a possible worlds analysis

(e.g. Izvorski 1997, Kratzer 1991) was necessary to model Japanese evidentiality, as it provided the flexibility needed to account for speaker commitment to the possibility of p in reportative contexts. Additionally, I provided a case study that differentiated *-sooda* from *-rashii* and *-yooda*, namely whether an evidential could be used felicitously when the information source could not be interpreted to be aligned with what the speaker is stating. The use of *-sooda* was not felicitous in such contexts when compared to the other evidentials. And finally, I proposed an alternative analysis that determines the epistemic **and** evidential status of any utterance that includes a linguistic element that expresses evidentiality (or epistemic modality).

As a final exercise, I would like to present below the complete range of contexts that were considered in this dissertation that were (in)felicitous with the Japanese evidentials in question.

5.1. Summary of (in)felicitous contexts for *-rashii*, *-sooda*, and *-yooda*

The first set of examples (1) and (2) concern the firsthand contexts and differ in terms of speaker conjecture:

(1) ame-ga fut-teir-u-#**rashii**/-#**sooda**/-**yooda**
rain-NOM fall-PROG-NPST-**EVID**
'It is raining, **I hear / it seems**'.
[Firsthand-nonconjectural context: Speaker sees it raining outside.]

(2) ame-ga fut-teir-u-**rashii**/-#**sooda**/-**yooda**
rain-NOM fall-PROG-NPST-**EVID**
'It is raining, **I hear / it seems**'.
[Firsthand-conjectural context: People are holding umbrellas outside. The speaker sees this and has no other information to indicate an unusual context.]

In (1), the use of *-yooda* was found to be more felicitous when compared to that of *-rashii* and *-sooda*. In fact, the use of *-yooda* was largely felicitous in all contexts that crossed the factors of (i) access to sensory information and (ii) speaker conjecture. In (2), the use of *-rashii* and

-*yooda* are felicitous when compared to that of -*sooda*, as the last-mentioned requires an act of communication on the part of the information source.

The next four examples (3) - (6) focus on non-firsthand contexts and are manipulated for (i) Speaker Conjecture and (ii) Source Reliability / Strength of Evidence:

(3) ame-ga fut-teir-u-**rashii**/-**sooda**/-**yooda**
rain-NOM fall-PROG-NPST-**EVID**
'It is raining, **I hear / it seems**'.
[Nonfirsthand-nonconjectural-strong context: Speaker hears from another individual who was outside until just moments ago that it is raining outside.][1]

(4) ame-ga fut-teir-u-**rashii**/-**sooda**/-**yooda**
rain-NOM fall-PROG-NPST-**EVID**
'It is raining, **I hear / it seems**'.
[Nonfirsthand-nonconjectural-medium context: Speaker hears from another individual who is in a room with no window that it is raining outside.]

(5) ame-ga fut-teir-u-**rashii**/-**sooda**/-**yooda**
rain-NOM fall-PROG-NPST-**EVID**
'It is raining, **I hear / it seems**'.
[Nonfirsthand-conjectural-strong context: An individual sees people holding umbrellas open outside and tells the speaker. No other information is available to indicate an unusual context.]

(6) ame-ga fut-teir-u-#**rashii**/-#**sooda**/-#**yooda**
rain-NOM fall-PROG-NPST-**EVID**
'It is raining, **I hear / it seems**'.
[Nonfirsthand-conjectural-medium context: An individual sees the sidewalk wet outside and tells the speaker. No other information is available to indicate an unusual context.]

What is notable is that the use of all three evidentials was judged to be relatively felicitous except when the speaker was perceived to make a conjecture based on medium-strength evidence, in (6).

[1]This context was actually not used for the Chapter 3 experiment because it did not pass the criteria that had been set for the norming task. See §3.6 for details.

Example (7) embodies the concept of the unusual context, in which the speaker has additional information regarding the use of umbrellas in the area:

(7) soto-wo mir-u kagiri mata roke-wo shi-teir-u-**rashii**/-#**sooda**/-**yooda**
outside-ACC see-NPST given again photo.shoot-ACC do-PROG-NPST-**EVID**
'Given what I see outside, **it seems** / **I hear** there is a photo shoot going on again'.
[Firsthand-conjectural-unusual context: People are holding umbrellas open outside. The speaker sees this. The speaker knows that it is not raining and that the area is often used for photo shoots.]

Similarly to (2), the use of -*sooda* is infelicitous when compared to that of -*rashii* and -*yooda*, as there is no act of communication on the part of the information source.

Examples (8) and (9) involve an additional individual when compared to (7), and the adverbials *kagiri* 'given' and *yoruto* 'according to' refer to this individual:

(8) kanojo-no it-ta-koto-wo kik-u **kagiri** mata roke-wo
she-GEN say-PAST-thing-ACC hear-NPST **given** again photo.shoot-ACC
shi-teir-u-**rashii**/-**sooda**/-**yooda**
do-PROG.NPST-**EVID**
'**Given** what I heard from her, **I hear** / **it seems** there is a photo shoot going on again'.
[Nonfirsthand-conjectural-unusual-given context: People are holding umbrellas outside. An individual sees this and tells the speaker. The individual and speaker both know that it is not raining and that the area is often used for photo shoots.]

(9) soto-wo mi-ta hito-ni-**yoruto** mata roke-wo
outside-ACC see-PAST person-to-**according** again photo.shoot-ACC
shi-teir-u-**rashii**/-**sooda**/-**yooda**
do-PROG.NPST-**EVID**
'**According to** someone who looked outside, **I hear** / **it seems** there is a photo shoot going on again'.
[Nonfirsthand-reportative-unusual-according context: People are holding umbrellas outside. An individual sees this and tells the speaker. The individual and speaker both know that it is not raining and that the area is often used for photo shoots.]

As the source knows of the unusual circumstance and can be presumed to endorse the speaker's utterance, the use of *-rashii*, *-sooda*, and *-yooda* are all felicitous with both *kagiri* 'given' (conjectural) and *yoruto* 'according to' (reportative) contexts.

However, if the source is not aware of the special circumstances and the speaker knows this, the use of *-sooda* and/or *yoruto* 'according to' are rendered infelicitous, as in (10) and (11):

(10) kanojo-no it-ta-koto-wo kik-u **kagiri** mata roke-wo
she-GEN say-PAST-thing-ACC hear-NPST **given** again photo.shoot-ACC
shi-teir-u-**rashii**/-#**sooda**/-**yooda**
do-PROG.NPST-**EVID**
'**Given** what I heard from her, **I hear / it seems** there is a photo shoot going on again'.
[Nonfirsthand-conjectural-unusual-given-unaware context: People are holding umbrellas outside. An individual sees this and tells the speaker. The speaker knows that it is not raining and that the area is often used for photo shoots, but the individual is not aware of this, and the speaker knows of this unawareness.]

(11) soto-wo mi-ta hito-ni-**yoruto** mata roke-wo
outside-ACC see-PAST person-to-**according** again photo.shoot-ACC
shi-teir-u-#**rashii**/-#**sooda**/-#**yooda**
do-PROG.NPST-**EVID**
'**According to** someone who looked outside, **I hear / it seems** there is a photo shoot going on again'.
[Nonfirsthand-reportative-unusual-according-unaware context: People are holding umbrellas outside. An individual sees this and tells the speaker. The speaker knows that it is not raining and that the area is often used for photo shoots, but the individual is not aware of this, and the speaker knows of this unawareness.]

And finally, (12) presents a context where there is no actual utterance by the source individual, and yet the use of the Japanese evidentials is still felicitous (contra McCready & Ogata 2007):

(12) soto-wo mir-u **kagiri** junbi-ga deki-ta-**rashii**/-**sooda**/-**yooda**
outside-ACC see-NPST **given** preparation-NOM ready-PAST-**EVID**
'**Given** what I see outside, **I hear / it seems** the preparations are ready'.
[Nonfirsthand-conjectural-unusual-no utterance by source context: A woman in a red dress (source) is holding an umbrella outside. The speaker sees this. The speaker knows that it is not raining, the speaker is a spy, and the speaker has been told that a woman in a red dress holding an umbrella would be the signal to start the mission.]

In (12), it seems that the woman may or may not be aware of these special circumstances, as she could have been simply paid and instructed to wear a red dress and hold an umbrella without the knowledge that this would indicate the start of a mission. Therefore, if the woman is aware of the situation, she is the source, whereas if she is not, the spy organization is the source.

For extra measure, (13) and (14) are the contexts where an additional individual is involved in the relaying of the message:

(13) kanojo-no it-ta-koto-wo kik-u **kagiri** junbi-ga
she-GEN say-PAST-thing-ACC hear-NPST **given** preparation-NOM
deki-ta-**rashii**/-**sooda**/-**yooda**
ready-PAST-**EVID**
'**Given** what I heard from her, **I hear / it seems** the preparations are ready'.
[Nonfirsthand-conjectural-unusual-no utterance by source context: A woman in a red dress (source) is holding an umbrella outside. An individual sees this and tells the speaker. The speaker knows that it is not raining, the speaker is a spy, and the speaker has been told that a woman in a red dress holding an umbrella would be the signal to start the mission.]

(14) soto-wo mi-ta hito-ni-**yoruto** junbi-ga
outside-ACC see-PAST person-to-**according** preparation-NOM
deki-ta-#**rashii**/-#**sooda**/-#**yooda**
ready-PAST-**EVID**
'**According to** someone who looked outside, **I hear / it seems** the preparations are ready'.
[Nonfirsthand-reportative-unusual-no utterance by source context: A woman in a red dress (source) is holding an umbrella outside. An individual sees this and tells the speaker. The speaker knows that it is not raining, the speaker is a spy, and the speaker has been told that a woman in a red dress holding an umbrella would be the signal to start the mission.]

In (13) (*kagiri* 'given'), the use of *-sooda* is interesting, as it could be referring to either the red woman or the other individual as the source. If it is the latter, the individual must be in the know for the use of *-sooda* to be felicitous. For (14) (*yoruto* 'according to'), none of the utterances are felicitous if the additional individual is not in the know, as they are explicitly designated as the source.

What the above examples show is that felicity of evidential statements is highly context-sensitive, and therefore context must be tightly controlled for (in experiments) or described accurately (for fieldwork).

5.2. Implications

This dissertation offered a novel methodology for examining evidentiality, which involved systematic investigation via a controlled experiment. Although it may not always be possible to secure enough participants for all languages with (morphosyntactic) evidentials, the strength of this approach lies in the ability to build statistical models that predict the felicitous uses of evidential elements. In addition, the experimental approach is useful when there is a discrepancy in the literature or between judgments of native speaker consultants, such as was the case for the use of the reportative Japanese evidential *-sooda* in this dissertation. Therefore, when researchers have the means, they are encouraged to supplement their typological and theoretical work with experimental data.

One key finding of this dissertation is the infelicity that arises when attempting to negate the embedded proposition of an evidential statement. One area that this finding could have an impact on is language education. Currently, when evidentials are taught in Japanese classes, some students are told that reportative uses of the evidentials (i.e. *-rashii* and *-sooda*) do not convey speaker commitment to the possibility of p being true (personal communication with the Northwestern University Japanese Programs). Given the findings in this dissertation, I would

suggest that Japanese language educators provide a little more nuance when describing the uses of *-rashii* and *-sooda*, especially to advanced students.

Another area that this dissertation could inform is that of Law, where the interpretation of the level of speaker commitment to one's statement has concrete consequences. For example, determining the effect of 'the reliability of an information source' on how committed a witness is to their testimony would be crucial for success in the courtroom. And, lawyers may want to suggest that their clients use less-commitment-inducing expressions such as matrix-clause hearsay to maximally distance themselves from the information source, when this tactic is advantageous to their case.

As exemplified above, there are many arenas where investigating the influence of context on the felicity and/or conveyance of speaker commitment to the truth of p holds promising value.

5.3. Future directions

The most immediate follow-up work for the current dissertation involves empirically testing the claims in §4.5, as they are based on the intuitions of several native Japanese-speaking consultants. I am also highly interested in replicating the empirical studies in Chapters 2 and 3 with evidentials in other languages such as Cuzco Quechua, St'át'imcets, and Cheyenne, in order to strengthen the validity of the methodology that I used and to further support the claims I've made for *-rashii*, *-sooda*, and *-yooda*.

Additionally, in this dissertation, I completely avoided predicates of personal taste and other evaluative expressions (e.g. *utsukushii* 'is beautiful', *omoi* 'is heavy') in order to eliminate potential confusion as to which individual in a given scenario believed that something had this particular subjective quality. However, I would be interested in extending the current analysis to such predicates and devising a methodology that could successfully tease apart the mental states for each participant in an evidential scenario (e.g. the information source and the speaker).

Another factor that I am interested in exploring involves the nature of the reliability with regards to the information source. For example, is the information source trying to deceive the speaker? This factor was briefly considered in §4.5 with the introduction of an information source who was bought out by a politician to write a report that provided evidence that said politician was **not** involved in corrupt activities. However, in my Chapter 3 experiment, I did not specify the mental state of the information source, assuming that participants would adopt a neutral, non-deceptive mental state for the source individual.

Another variation of the information source could involve whether the individual is of sound mind. Take an example context from Saito (2004:46), which was mentioned in footnote 13 of ch 4:

(15) A-san-ni-yoruto sakki tsukue-no ue-de kodomo-ga
A-POL-to-according just.now desk-GEN top-on child-NOM
odot-tei-ta-**rashii**-desu
dance-PROG-PAST-**EVID**-POL
'According to Person A, **I hear** that a child was dancing on top of the desk just now'.
[Context: A nurse is taking care of a patient who is known to have hallucinations. There happens to be a desk with nothing on it, but the patient states that 'a child is dancing on top of the desk'. The nurse is reporting what happened to the physician in this scene.]

Saito claims that the nurse can felicitously utter (15), and that an utterance of a variation of the Moore's paradox would be felicitous as well, shown in (16):

(16) A-san-ni-yoruto sakki tsukue-no ue-de kodomo-ga
A-POL-to-according just.now desk-GEN top-on child-NOM
odot-tei-ta-**rashii**-desu. shikashi jissai-ni-wa kodomo-wa
dance-PROG-PAST-**EVID**-POL. however actual-DAT-TOP child-NOM
odot-tei-masen-deshi-ta.
dance-PROG-NEG-POL-PAST
'According to Person A, **I hear** that a child was dancing on top of the desk just now. However, in actuality there was no dancing child'.
[Same context as (15)]

These observations directly challenge what I am claiming and have found in Chapter 3. However, I did not employ any information sources who were not assumed to be of sound mind. This would be an interesting factor to manipulate in future studies.

5.4. Final words

This dissertation explored the semantic, pragmatic, and experimental pragmatics of Japanese evidentiality. I believe I have contributed to the typological, empirical, and theoretical studies on evidentiality in general and that my methods and analyses can be easily applied to evidentials in other languages.

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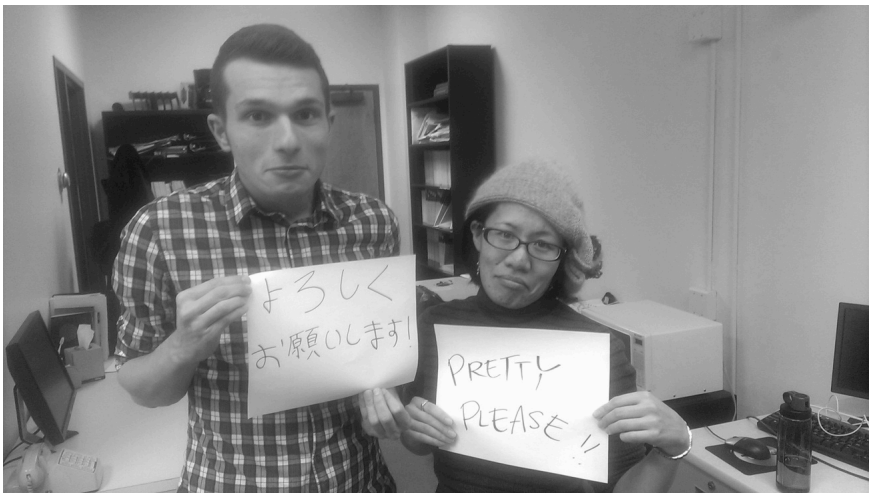
APPENDIX A

Recruitment flyer for Chapter 2 experiment

RECRUITING: JAPANESE SPEAKERS

We are currently doing some Linguistics research on the Japanese language at Northwestern University. If you grew up speaking Japanese and are willing to give us 30-45 minutes of your time, please email Julie Matsubara at jmatsubara@u.northwestern.edu

Thank you for your consideration!
Julie Matsubara and Michael Blasingame



APPENDIX B

Linguistic stimuli and translation for Chapter 2 experiment

FIRSTHAND-CONJECTURE contexts with follow-up sentences

context	context_translation	proposition	proposition_t
伊藤さんはアイスクリームを買いました。しかしそれを冷凍庫に入れるのを忘れました。キッチンに戻ってきたときにアイスクリームがテーブルの上にあるのが見えました。	Ito bought some ice cream. (PRO) forgot to put it in the freezer. When (PRO) came back to the kitchen (PRO) noticed that the ice cream was on the table.	アイスクリームは溶けています。	The ice cream is melted.
本田さんは観光地の温泉に行きました。ある観光地では温泉がボコボコと泡立っているのが見えました。そして温泉の周りに縄があるのが見えました。	Honda went on a hot springs sightseeing trip. At one location, (PRO) noticed that the spring was bubbling with a sputtering noise. And (PRO) noticed that there was a rope that encircled the hot spring.	温泉は立ち入り禁止になっています。	The hot spring is restricted.
鈴木さんは上田さんが産婦人科から出てくるところを見ました。上田さんのお腹が膨らんでいるのが見えました。	Suzuki saw Ueda come out from the obstetrician's office. (PRO) noticed that Ueda's belly was expanding.	上田さんは妊娠しています。	Ueda is pregnant.
木村さんは昼休みに弁当屋に行きました。お店の駐車場には車が一台も見えませんでした。	Kimura went to the bento store during lunch break. (PRO) noticed that there wasn't a single car in the parking lot.	お店は閉まっています。	The store is closed.
福井さんは窓の方を見ました。窓のカーテンが揺れているのが見えました。	Fukui looked towards the window. (PRO) noticed the window's curtains wavering.	窓は開いています。	The window is open.
秋山さんは外を見ました。一人の女性が傘をさしているのが見えました。	Akiyama looked outside. (PRO) noticed that a lady was holding an umbrella (open).	雨が降っています。	It is raining.
上野さんはコンロで魚を焼いていました。彼女がテレビに気を取られていると、コンロから煙りが出てくるのが見えました。	Ueno was cooking fish on the stove. She was distracted by the TV, and noticed that smoke was coming out from the stove.	魚は焦げています。	The fish is burnt.
加藤さんは鏡を落としました。地面にガラスの破片があるのが見えました。	Kato dropped a mirror. (PRO) noticed a piece of glass on the ground.	鏡は割れています。	The mirror is broken.
中原さんは壁に絵を掛けました。あとで彼が壁を見ると、絵の右端が左端より下がってるように思えました。	Nakahara hung a picture on the wall. Later when he looked at the wall, the right side of the picture appeared to be lower than the left side.	絵は傾いています。	The picture is crooked.

松浦さんは花壇に花を植えました。一ヶ月後、全ての葉っぱの色が茶色になっているのが見えました。	Matsuura planted flowers in the flower bed. One month later, (PRO) noticed that all the leaves had turned brown.	花は枯れています。	The flower plants are dead.
後藤さんは松本さんと一緒に遊園地に行きました。松本さんは遊園地までの行き方を紙に書いて後藤さんに渡しました。	Goto and Matsumoto went to an amusement park together. Matsumoto wrote down directions to the amusement park and gave the piece of paper to Goto.	松本さんは遊園地までの道を知っています。	Matsumoto knows the way to the amusement park.
佐々木さんはバケツを落としました。あとで彼がそのバケツに水を入れて持ち上げると、床に水があるのが見えました。	Sasaki dropped a bucket. Later when he put water in the bucket and picked it up, (PRO) noticed that there was water on the floor.	バケツに穴が開いています。	There is a hole in the bucket.
竹中さんは銀山町に行きました。その町の人がスタバのコーヒーを飲みながら歩いているのが見えました。	Takenaka went to Kanayama. (PRO) noticed that the people there were walking around drinking Starbucks coffee.	銀山町にはスタバがあります。	There is a Starbucks in Kanayama.
服部さんはサボテンを育てています。彼がサボテンの手入れをしていると、指に痛みが走りました。指を見ると、何かが皮膚の表面に刺さっているのが見えました。	Hattori is growing a cactus. When he was taking care of the cactus, (PRO) felt pain in (PRO) finger. When (PRO) looked at (PRO) finger, (PRO) noticed something stuck in (PRO) finger.	サボテンのとげが刺さっています。	(PRO) have a cactus thorn in (PRO) finger.
土屋さんが乗っている飛行機が空港に着きました。荷物受取所に行くと、彼女のスーツケースが見当たりませんでした。	The airplane that Tsuchiya was on arrived at the airport. When (PRO) went to baggage claim, her suitcase could not be seen.	スーツケースが届いていません。	(PRO) suitcase has not arrived.
渡辺さんは四川麻婆豆腐を注文しました。出てきた麻婆豆腐の色が真っ赤であるのが見えました。	Watanabe ordered Shisen mabo tofu. (PRO) noticed that the mabo tofu that was brought out was bright red.	四川麻婆豆腐には唐辛子が入っています。	There is red pepper in Shisen mabo tofu.
小林さんはケーキ屋でチョコレートケーキを買いました。ケーキの箱の上に重い本が落ちるのが見えました。	Kobayashi bought a chocolate cake at the bakery. (PRO) noticed that a heavy book dropped on the cake box.	ケーキはつぶれています。	The cake is crushed.
西村さんはご飯を炊きました。彼は残ったご飯を冷蔵庫に入れませんでした。次の日、ご飯の色が変わってねばねばしているのが見えました。	Nishimura made some rice. He did not put the leftover rice in the fridge. The next day, (PRO) noticed that the rice had changed color, and that it was sticky.	ご飯は腐っています。	The rice is spoiled.

川口さんはアボカドを買いました。買ったアボカドは他のよりも色が黒く見えました。そして表面が膨らんでいるのが見えました。	Kawaguchi bought an avocado. (PRO) noticed that the avocado he bought was darker than other ones. And (PRO) noticed that the surface was swelling.	アボカドは熟しています。	The avocado is ripe.
川瀬さんは山本さんのアパートを訪れました。山本さんのアパートの明かりがついていないのが見えました。	Kawase went to Yamamoto's apartment. (PRO) noticed that there were no lights on in Yamamoto's apartment.	山本さんはアパートにいません。	Yamamoto is not at his apartment.
坂井さんは森の中を歩いていました。すると森の中で倒れている女の人を発見しました。坂井さんは女の人がまったく動かず、息をしていないのを見ました。	Sakai was walking in the forest. (PRO) found a woman lying in the forest. Sakai saw that the woman was motionless and that she was not breathing.	女の人は死んでいます。	The woman is dead.
藤岡さんは道端で倒れている男の人を発見しました。男の人の指がピクッと動くのが見えました。	Fujioka found a man lying on the sidewalk. (PRO) noticed that the man's finger suddenly twitched.	男の人は生きています。	The man is alive.
藤本さんは鍵を探していました。普段から鍵を入れてある箱がテーブルの上にあるのが見えました。	Fujimoto was looking for his key. (PRO) noticed that the box that usually contains the key was on the table.	鍵はテーブルの上にあります。	The key is on the table.
菊池さんは斉藤さんのアパートを訪れました。斉藤さんのアパートの窓から光が漏れているのが見えました。	Kikuchi went to Saito's apartment. (PRO) noticed that there was light filtering out from Saito's apartment window.	斉藤さんのアパートの明かりがついています。	Saito's apartment light is on.
浜崎さんは黒沢さんのアパートに行きました。浜崎さんは黒沢さんがくしゃみをするのを見ました。そして黒沢さんの熱を測ると、３９度ありました。	Hamasaki went to Kurosawa's apartment. Hamasaki saw Kurosawa sneeze. And (PRO) checked Kurosawa's temperature, which was 39C.	黒沢さんは風邪を引いています。	Kurosawa has a cold.
山内さんは赤ちゃんのおもりをしていました。ミルクの時間になると、赤ちゃんは泣きだしました。	Yamauchi was watching the baby. When 'milk time' came, the baby started crying.	赤ちゃんはお腹を空かせています。	The baby is hungry.
田中さんはリンゴの皮をキッチンで剥いていました。すると流しに血のしずくが落ちているのが見えました。	Tanaka was peeling an apple in the kitchen. (PRO) noticed that there were drops of blood in the sink.	指から血が出ています。	Finger is bleeding.
川崎さんは金庫にお金を入れました。後日帰宅すると、自宅の窓ガラスが割られているのが見えまし	Kawasaki put money into (PRO) safe. Some days later when (PRO) came home, (PRO)	お金は無くなっています。	The money is gone.

た。そして金庫の扉が開いているのが見えました。	noticed that a window had been broken. And (PRO) noticed that the safe door was open.		
三浦さんは教室へ向かいました。教室の窓のカーテン越しに人影が見えました。	Miura was on (PRO) way to the classroom. (PRO) noticed that there was a figure behind the curtains in the window of the classroom.	教室に誰かいます。	There is someone in the classroom.
大西さんは矢野さんを街で見かけました。矢野さんが停車している車の運転席に座っているのが見えました。そして白いシャツに黒いベストを着ているのが見えました。	Onishi saw Yano in town. (PRO) noticed that Yano was sitting in the driver's seat of a parked car. And (PRO) noticed that (PRO) was wearing a white shirt and black vest.	矢野さんは運転手をしています。	Yano is a driver.
遠藤さんは中野さんの部屋へ向かいました。部屋のドアは開いていました。中野さんがビデオゲームコントローラーを持っているのが見えました。	Endo went to Nakano's room. The door was open. (PRO) noticed that Nakano was holding a video game controller.	中野さんはビデオゲームをして遊んでいます。	Nakano is playing video games
吉村さんはひかり動物園に行きました。動物園では虎のポスターがいっぱいあるのが見えました。	Yoshimura went to Hikari Zoo. At the zoo (PRO) noticed that there were lots of posters with tigers.	ひかり動物園には虎がいます。	There are tigers at Hikari Zoo.
池田さんは小山さんと会いました。小山さんのバッグの中にスマホがあるのが見えました。	Ikeda met with Koyama. (PRO) noticed that there was a smartphone in Koyama's bag.	小山さんはスマホを持っています。	Koyama owns a smartphone.
太田さんはお店で青いドレスを見つけました。ハンガーラックの前にあるサインに「シルクドレス」と書いてあるのが見えました。	Ota found a blue dress at a shop. (PRO) noticed that the sign in front of the dress rack said, 'silk dresses'.	青のドレスは絹で出来ています。	The blue dress is made of silk.
介護士の吉川さんは、村上さんを普段の浴槽の水量でお風呂に入れました。吉川さんは水が今回溢れるのを見ました。	Kikkawa the caregiver gave Murakami a bath with the usual amount of water in the tub. Kikkawa saw the water overflow this time.	村上さんの体重が増えています。	Murakami has gained weight.
武田さんはコンピュータにファイルを保存しました。あとでコンピュータを確認するとファイルのアイコンがデスクトップにあるのが見えました。	Takeda saved a file to (PRO) computer. Later when (PRO) checked (PRO) computer, (PRO) noticed that an icon for the file was on the desktop.	最新のファイルが保存されています。	The most recent version of the file is saved.

石田さんはコンピュータの「すべてのプログラム」リストをチェックしました。探していたプログラムがその一覧にあるのが見えました。	Ishida checked the "All Programs" list on (PRO) computer. (PRO) noticed that the program (PRO) was looking for was on the list.	プログラムは正常にインストールされています。	The program is properly installed.
広瀬さんは医者です。彼が患者の脳のＭＲＩをチェックすると、影が映っているのが見えました。	Hirose is a doctor. When he checked an MRI of a patient's brain, (PRO) noticed that there was a shadow (on the patient's brain).	患者の脳に腫瘍があります。	There is a tumor in the patient's brain.
大野さんは田口さんのカツラがずれているところを見ました。ずれている箇所は頭皮が見えました。	Oono saw that Taguchi's wig was slightly off. (PRO) noticed that his scalp could seen In the places it was off.	田口さんはハゲています。	Taguchi is bald.
丸山さんは岩本さんに会いました。岩本さんの目の色は灰色です。この日の岩本さんの目の色は青色であるのが見えました。	Maruyama met with Iwamoto. Iwamoto's eyes are gray. On this day (PRO) noticed that Iwamoto's eyes were blue.	岩本さんはコンタクトをつけています。	Iwamoto is wearing contacts.
中山さんは高校の同窓会で原田さんに会いました。原田さんの髪に緑のメッシュが入っているのが見えました。	Nakayama saw Harada at the highschool reunion. (PRO) noticed that Harada had green strips of hair.	原田さんは髪を染めています。	Harada has dyed (PRO) hair.
大島さんは一緒に住んでいる横山さんの部屋に行きました。横山さんがベッドの中にいないのが見えました。	Oshima went to (PRO) roommate Yokoyama's room. (PRO) noticed that Yokoyama was not in bed.	横山さんはすでに家を出ています。	Yokoyama has already left the house.
安田さんは整形外科医である竹内さんの患者です。今日の検診で竹内さんが安田さんの足のレントゲンを見ると、安田さんの足の骨に入っていた亀裂が見えなくなっていました。	Yasuda is a patient of Takeuchi, who is an orthopedic surgeon. During today's examination, Takeuchi looked at an x-ray of Yasuda's foot, and (PRO) noticed that the cracks that were in Yasuda's foot could not be seen anymore.	安田さんの足の骨は治っています。	Yasuda's foot bone has healed.
足立さんは桶に水を汲みました。あとで桶を見ると、中に水がないのが見えました。そして床がぬれているのが見えました。	Adachi drew water in a (JPN) bucket. Later when (PRO) looked at the (JPN) bucket, (PRO) noticed that there was no water inside. And (PRO) noticed that the floor was wet.	桶から水が漏れています。	Water is leaking from the (JPN) bucket.

川村さんは下田さんを合コンに誘いました。すると下田さんが自分のしている指輪を指さすのが見えました。	Kawamura invited Shimoda to a (JPN) dating party. Then (PRO) noticed that Shimoda pointed to a ring on (PRO) finger.	下田さんは合コンに興味がないです。	Shimoda is not interested in (JPN) dating parties.
松尾さんは携帯をチェックしました。通知の光がピカピカ光っているのが見えました。	Matsuo checked (PRO) cellphone. (PRO) noticed that the notification light was blinking.	新着メールが届いています。	New messages have arrived.
西田さんは星野さんの爪を見ました。星野さんの爪はとても光沢があるのが見えました。そして爪が紫色であるのが見えました。	Nishida looked at Hoshino's nails. (PRO) noticed that Hoshino's nails were very shiny. And (PRO) noticed that the nails were purple.	星野さんはマニキュアをしています。	Hoshino has nail polish on.
藤田さんは車を運転していました。車のボンネットの下から煙が出始めたのを見て、急いで車を停めました。	Fujita was driving (PRO) car. (PRO) saw that smoke started coming out from under the hood of the car, so (PRO) quickly parked the car.	エンジンから煙が出ています。	Smoke is coming out of the engine.

Sample of NONFIRSTHAND-CONJECTURE context with follow-up sentence.

南さんはアイスクリームを買いました。しかしそれを冷凍庫に入れるのを忘れました。キッチンに戻ってきたときにアイスクリームがテーブルの上にあるのが見えました。南さんはこのことを伊藤さんに話しました。	Minami bought some ice cream. (PRO) forgot to put it in the freezer. When (PRO) came back to the kitchen (PRO) noticed that the ice cream was on the table. Minami told Ito about this.	アイスクリームは溶けています。	The ice cream is melted.

FIRSTHAND-NONCONJECTURE contexts with follow-up sentences

context	context_translation	proposition	proposition_t
伊藤さんはアイスクリームを買いました。しかしそれを冷凍庫に入れるのを忘れました。アイスクリームは溶けていました。	Ito bought some ice cream. (PRO) forgot to put it in the freezer. The ice cream was melted.	アイスクリームは溶けています。	The ice cream is melted.
本田さんは観光地の温泉に行きました。ある観光地では、温泉が立ち入り禁止になっていました。	Honda went on a hot springs sightseeing trip. At one location, the hot spring was restricted.	温泉は立ち入り禁止になっています。	The hot spring is restricted.
鈴木さんは上田さんと産婦人科に行きました。上田さんは妊娠していました。	Suzuki went to the obstetrician's office with Ueda. Ueda was pregnant.	上田さんは妊娠しています。	Ueda is pregnant.

木村さんはお店に行きました。お店は閉まっていました。	Kimura went to the store. The store was closed.	お店は閉まっています。	The store is closed.
福井さんは窓の方を見ました。窓は開いていました。	Fukui looked towards the window. The window was open.	窓は開いています。	The window is open.
秋山さんは外に出ました。雨が降っていました。	Akiyama went outside. It was raining.	雨が降っています。	It is raining.
上野さんはコンロで魚を焼いていました。彼女がテレビに気を取られていると、魚は焦げていました。	Ueno was cooking fish on the stove. She was distracted by the TV, and the fish was burnt.	魚は焦げています。	The fish is burnt.
加藤さんは鏡を落としました。鏡は割れていました。	Kato dropped a mirror. The mirror was broken.	鏡は割れています。	The mirror is broken.
中原さんは壁に絵を掛けました。あとで彼が壁を見ると、絵は傾いていました。	Nakahara hung a picture on the wall. Later when he looked at the wall, the picture was crooked.	絵は傾いています。	The picture is crooked.
松浦さんは花壇に花を植えました。一ヶ月後、花が枯れているのが見えました。	Matsuura planted flowers in the flower bed. One month later, the flower plants were dead.	花は枯れています。	The flower plants are dead.
後藤さんは松本さんと一緒に遊園地に行きました。松本さんは遊園地までの道を知っていました。	Goto and Matsumoto went to an amusement park together. Matsumoto knew the way to the amusement park.	松本さんは遊園地までの道を知っています。	Matsumoto knows the way to the amusement park.
佐々木さんはバケツを落としました。バケツには穴が開いていました。	Sasaki dropped a bucket. There was a hole in the bucket.	バケツに穴が開いています。	There is a hole in the bucket.
竹中さんは銀山町に行きました。その町にはスタバがあるのが見えました。	Takenaka went to Kanayama. There was a Starbucks there.	銀山町にはスタバがあります。	There is a Starbucks in Kanayama.
服部さんはサボテンを育てています。彼がサボテンの手入れをしていると、指に痛みが走りました。指を見ると、サボテンのとげが刺さっていました。	Hattori is growing a cactus. When he was taking care of the cactus, (PRO) felt pain in (PRO) finger. When (PRO) looked at (PRO) finger, (PRO) had a cactus thorn in (PRO) finger.	サボテンのとげが刺さっています。	(PRO) have a cactus thorn in (PRO) finger.
土屋さんが乗っている飛行機が空港に着きました。荷物受取所に行くと、彼女のスーツケースは届いていませんでした。	The airplane that Tsuchiya was on arrived at the airport. When (PRO) went to baggage claim, her suitcase was missing.	スーツケースが届いていません。	(PRO) suitcase has not arrived.
渡辺さんは四川麻婆豆腐を注文しました。麻婆豆腐には唐辛子が入	Watanabe ordered Shisen mabo tofu. There was red pepper in the	四川麻婆豆腐には	There is red pepper in

っていました。	mabo tofu.	唐辛子が入っています。	Shisen mabo tofu.
小林さんはケーキ屋でチョコレートケーキを買いました。彼女はケーキの箱の上に座ってしまいました。ケーキはつぶれていました。	Kobayashi bought a chocolate cake at the bakery. She accidentally sat on the cake box. The cake was crushed.	ケーキはつぶれています。	The cake is crushed.
西村さんはご飯を炊きました。彼は残ったご飯を冷蔵庫に入れませんでした。次の日ご飯は腐っていました。	Nishimura made some rice. He did not put the leftover rice in the fridge. The next day the rice was spoiled.	ご飯は腐っています。	The rice is spoiled.
川口さんはアボカドを買いました。家に帰って切ってみると、アボカドは熟していました。	Kawaguchi bought an avocado. When (PRO) cut it at home, the avocado was ripe.	アボカドは熟しています。	The avocado is ripe.
川瀬さんは山本さんのアパートを訪れました。山本さんはアパートにいませんでした。	Kawase went to Yamamoto's apartment. Yamamoto was not at his apartment.	山本さんはアパートにいません。	Yamamoto is not at his apartment.
坂井さんは森の中を歩いていました。すると森の中で倒れている女の人を発見しました。女の人は死んでいました。	Sakai was walking in the forest. (PRO) found a woman lying in the forest. The woman was dead.	女の人は死んでいます。	The woman is dead.
藤岡さんは道端で倒れている男の人を発見しました。男の人は生きていました。	Fujioka found a man lying on the sidewalk. The man was alive.	男の人は生きています。	The man is alive.
藤本さんは鍵を探していました。鍵はテーブルの上にありました。	Fujimoto was looking for his key. The key was on the table.	鍵はテーブルの上にあります。	The key is on the table.
菊池さんは斉藤さんのアパートを訪れました。斉藤さんのアパートの明かりはついていました。	Kikuchi went to Saito's apartment. Saito's apartment light was on.	斉藤さんのアパートの明かりがついています。	Saito's apartment light is on.
浜崎さんは黒沢さんのアパートに行きました。黒沢さんは風邪を引いていました。	Hamasaki went to Kurosawa's apartment. Kurosawa had a cold.	黒沢さんは風邪を引いています。	Kurosawa has a cold.
山内さんは赤ちゃんのおもりをしていました。しばらくすると、赤ちゃんはお腹を空かしていました。	Yamauchi was watching the baby. After awhile, the baby was hungry.	赤ちゃんはお腹を空かせています。	baby is hungry

田中さんはリンゴの皮をキッチンで剥いていました。すると指から血が出ていました。	Tanaka was peeling an apple in the kitchen. Then (PRO) finger was bleeding.	指から血が出ています。	Finger is bleeding.
川崎さんは金庫にお金を入れました。後日金庫を開けると、お金は無くなっていました。	Kawasaki put money into (PRO) safe. Some days later, (PRO) opened the safe and the money was gone.	お金は無くなっています。	The money is gone.
三浦さんは教室へ向かいました。教室には誰かいました。	Miura was on (PRO) way to the classroom. There was someone in the classroom.	教室に誰かいます。	There is someone in the classroom.
大西さんは矢野さんを街で見かけました。矢野さんは車の運転手をしていました。	Onishi saw Yano in town. Yano was a driver.	矢野さんは運転手をしています。	Yano is a driver.
遠藤さんは中野さんの部屋へ向かいました。部屋のドアは開いていました。中野さんはビデオゲームをして遊んでいました。	Endo went to Nakano's room. The door was open. Nakano was playing video games.	中野さんはビデオゲームをして遊んでいます。	Nakano is playing video games
吉村さんはひかり動物園に行きました。動物園には虎がいました。	Yoshimura went to Hikari Zoo. There were tigers at the zoo.	ひかり動物園には虎がいます。	There are tigers at Hikari Zoo.
池田さんは小山さんと会いました。小山さんはスマホを持っていました。	Ikeda met with Koyama. Koyama owned a smartphone.	小山さんはスマホを持っています。	Koyama owns a smartphone.
太田さんは青いドレスを買いました。ドレスは絹で出来ていました。	Ota bought a blue dress. The dress was made of silk.	青のドレスは絹で出来ています。	The blue dress is made of silk.
吉川さんは村上さんと健康診断に行きました。村上さんは去年より体重が増えていました。	Kikkawa went with Murakami for a physical. Murakami had gained weight compared to last year.	村上さんの体重が増えています。	Murakami has gained weight.
武田さんはコンピュータにファイルを保存しました。あとでコンピュータを確認すると最新のファイルが保存されていました。	Takeda saved a file to (PRO) computer. Later when (PRO) checked (PRO) computer, the most recent version of the file was saved.	最新のファイルが保存されています。	The most recent version of the file is saved.

石田さんはコンピュータをチェックしました。コンピュータには探していたプログラムが正常にインストールされていました。	Ishida checked (PRO) computer. The program that (PRO) was looking for was properly installed on the computer.	プログラムは正常にインストールされています。	The program is properly installed.
広瀬さんは医者です。彼が患者の脳のＭＲＩを見ると、腫瘍がありました。	Hirose is a doctor. When he looked at an MRI of a patient's brain, there was a tumor.	患者の脳に腫瘍があります。	There is a tumor in the patient's brain.
大野さんは田口さんに１０年ぶりに会いました。田口さんはハゲていました。	Oono saw Taguchi for the first time in ten years. Taguchi was bald.	田口さんはハゲています。	Taguchi is bald.
丸山さんは岩本さんに会いました。普段岩本さんはメガネをかけています。この日彼女はコンタクトをつけていました。	Maruyama met with Iwamoto. Iwamoto normally wears glasses. On this day she was wearing contacts.	岩本さんはコンタクトをつけています。	Iwamoto is wearing contacts.
中山さんは高校の同窓会で原田さんに会いました。原田さんは髪を染めていました。	Nakayama saw Harada at the highschool reunion. Harada had dyed (PRO) hair.	原田さんは髪を染めています。	Harada has dyed (PRO) hair.
大島さんは一緒に住んでいる横山さんの部屋に行きました。横山さんはすでに家を出ていました。	Oshima went to (PRO) roommate Yokoyama's room. Yokoyama had already left the house.	横山さんはすでに家を出ています。	Yokoyama has already left the house.
安田さんは整形外科医である竹内さんの患者です。今日の検診で竹内さんが安田さんの足を診ると、安田さんの足の骨は治っていました。	Yasuda is a patient of Takeuchi, who is an orthopedic surgeon. During today's examination, Takeuchi looked at Yasuda's foot, and Yasuda's foot had healed.	安田さんの足の骨は治っています。	Yasuda's foot bone has healed.
足立さんは桶に水を汲みました。あとで桶を見ると、桶から水が漏れていました。	Adachi drew water in a (JPN) bucket. Later when (PRO) looked at the (JPN) bucket, water was leaking from the (JPN) bucket.	桶から水が漏れています。	Water is leaking from the (JPN) bucket.
川村さんは下田さんを合コンに誘いました。下田さんは合コンに興味がありませんでした。	Kawamura invited Shimoda to a (JPN) dating party. Shimoda was not interested in (JPN) dating parties.	下田さんは合コンに興味がないです。	Shimoda is not interested in (JPN) dating parties.
松尾さんは携帯をチェックしまし	Matsuo checked (PRO)	新着メー	New

た。新着メールが三通届いていました。	cellphone. Three new messages had arrived.	ルが届いています。	messages have arrived.
西田さんは星野さんの爪を見ました。星野さんは紫色のマニキュアをしていました。	Nishida looked at Hoshino's nails. Hoshino had on purple nail polish.	星野さんはマニキュアをしています。	Hoshino has nail polish on.
藤田さんは車を運転していました。車から煙が出始めたので、急いで車を停めて調べました。エンジンから煙が出ていました。	Fujita was driving (PRO) car. Smoke started coming out of the car, so (PRO) quickly parked the car and checked it. The smoke was coming out of the engine.	エンジンから煙が出ています。	Smoke is coming out of the engine.

Sample of NONFIRSTHAND-REPORT context with follow-up sentence.

南さんはアイスクリームを買いました。しかしそれを冷凍庫に入れるのを忘れました。アイスクリームは溶けていました。南さんはこのことを伊藤さんに話しました。	Minami bought some ice cream. (PRO) forgot to put it in the freezer. The ice cream was melted. Minami told Ito about this.	アイスクリームは溶けています。	The ice cream is melted.

Fillers

context	context_translation	proposition	proposition_t
中田さんはネットでニュースをチェックしていました。有名な映画監督が亡くなったとネットのニュースに書かれてありました。	Nakata was checking the news on the Internet. It was written in the news that a famous movie director had died.	有名な映画監督が亡くなったとネットで見ました。	I saw on the Internet that a famous movie director had died.
浅田さんはネットで交通情報を調べていました。名神高速に１０ｋｍの渋滞が発生しているという情報がネットで表示されていました。	Asada was looking up traffic information on the Internet. It said that the Meishin Highway was backed up with a 10-km traffic jam.	名神高速に１０ｋｍの渋滞が発生しているとネットで見ました。	I saw on the Internet that the Meishin Highway was backed up with a 10-km traffic jam.
戸田さんはネットで天気予報を調べていました。次の日の降水確率は５０％とネットに表示されていました。	Toda was looking up the weather on the Internet. It said there was a 50% chance of rain the next day.	明日の降水確率は５０％とネットで見ました。	I saw on the Internet that there is a 50% chance of rain tomorrow.

二宮さんはネットで地図を調べていました。行き先のレストランに辿り着くまで３０分かかるとネットで表示されました。	Ninomiya was looking up a map on the Internet. It said it would take 30 minutes to get to the restaurant to which they were going.	レストランに辿り着くまで３０分かかると友人から聞きました。	I heard from a friend that it would take 30 minutes to get to the restaurant.
松島さんは友人とサニー・バーガーショップに行く約束をしました。その店には裏メニューがあると友人が言っていました。	Matsushima promised a friend that they would go to Sunny Burger Shop. The friend said that the shop had a secret menu.	サニー・バーガーショップに裏メニューがあると友人から聞きました。	I heard from a friend that Sunny Burger Shop has a secret menu.
宮川さんは友人とスーパーに買い物に行きました。友人はナッツが体にいいと言っていました。	Miyagawa went shopping with a friend to the supermarket. The friend said that nuts were good for you.	ナッツは体にいいと友人から聞きました。	I heard from a friend that nuts are good for you.
岩井さんは友人と服を買いに行きました。この秋はオリーブ色が流行ると友人は言っていました。	Iwai went shopping for clothes with a friend. The friend said that the olive color would be in fashion this fall.	この秋はオリーブ色が流行ると友人から聞きました。	I heard from a friend that the olive color would be in fashion this fall.
桑原さんはニューヨークに住んでいる友人と電話で話しました。その友人はニューヨークのミュージカルが素晴らしいと言っていました。	Kuwabara talked on the phone with a friend who lives in New York. That friend was saying that the musicals in New York were brilliant.	ニューヨークのミュージカルは素晴らしいとネットで見ました。	I saw on the Internet that the musicals in New York are brilliant.
松崎さんは新しい学校に転校しました。その学校では、夜の理科室にお化けが出ると言われていました。	Matsuzaki transferred to a new school. It was said at that school that the science lab was haunted at night.	夜の理科室にお化けが出ると言われています。	It is said that the science lab is haunted at night.
荒川さんはある病院を訪れました。その病院にはどんな難病も治すことが出来る名医がいると言われていました。	Arakawa visited a hospital. It was said that at that hospital there was a great doctor who could cure any disease.	どんな難病も治すことが出来る名医がいると言われています。	It is said that there is a great doctor who can cure any disease.
片岡さんは恋人と幸せの鐘がある場所に行きました。その鐘は恋	Kataoka went to a certain place that had a bell of happiness with	ある鐘は恋人と二人で	It is said that a pair of

人と二人で鳴らすと永遠に幸せになれると言われていました。	(PRO) partner. It was said that a pair of lovers would live happily ever after if they rang that bell together.	鳴らすと永遠に幸せになれると言われています。	lovers would live happily ever after if they rang a certain bell together.
川島さんはある陶芸家に弟子入りしようとしました。その陶芸家はとても厳しいと言われていました。	Kawashima tried to apprentice under a certain potter. It was said that that potter was extremely strict.	ある陶芸家はとても厳しいとテレビで見ました。	I saw on TV that a certain potter is extremely strict.
藤村さんは新聞を読んでいました。日本に新しいパンダが二頭到着すると新聞に書かれてありました。	Fujimura was reading the newspaper. It was written in the newspaper that two new pandas were going to arrive in Japan.	日本に新しいパンダが二頭到着すると新聞で読みました。	I read in the newspaper that two new pandas were going to arrive in Japan.
富沢さんは新聞のスポーツ欄を読んでいました。なでしこジャパンの調子がとても良いと新聞に書かれてありました。	Tomizawa was reading the sports column in the newspaper. It was written in the newspaper that Nadeshiko Japan were doing very well.	なでしこジャパンの調子がとても良いと新聞で読みました。	I read in the newspaper that Nadeshiko Japan were doing very well.
若林さんは新聞のエンタメ欄を読んでいました。人気芸人が電撃結婚をしたと新聞に書かれてありました。	Wakabayashi was reading the entertainment column in the newspaper. It was written in the newspaper that a popular comedian had suddenly gotten married.	人気芸人が電撃結婚をしたと新聞で読みました。	I read in the newspaper that a popular comedian had suddenly gotten married.
中園さんは新聞の一面を読んでいました。首相が重大な発表をしたと新聞に書かれてありました。	Nakazono was reading the front page of the newspaper. It was written in the newspaper that the prime minister had made a very important announcement.	首相が重大な発表をしたとラジオで聞きました。	I heard on the radio that the prime minister had made a very important announcement.
北川さんはテレビで動物番組を	Kitagawa was watching an	犬のしつけ	I saw on TV

見ていました。犬のしつけはいつからでも遅くないとそのテレビ番組で言っていました。	animal program on TV. The TV program was saying that it was never too late to start training your dog.	はいつからでも遅くないとテレビで見ました。	that it's never too late to start training your dog.
黒田さんはテレビで健康番組を見ていました。キンカンが喉に良いとそのテレビ番組で言っていました。	Kuroda was watching a health program on TV. The TV program was saying that kinkan were good for your throat.	キンカンが喉に良いとテレビで見ました。	I saw on TV that kinkan are good for your throat.
堀江さんはテレビで旅番組を見ていました。和歌山に日本一大きな露天風呂があるとそのテレビ番組で言っていました。	Horie was watching a travel program on TV. The TV program was saying that Wakayama has the biggest outdoor bath in Japan.	和歌山に日本一大きな露天風呂があるとテレビで見ました。	I saw on TV that Wakayama has the biggest outdoor bath in Japan.
金本さんはテレビで園芸番組を見ていました。ポピーの種は９月中旬にまくのがいいとそのテレビ番組で言っていました。	Kanemoto was watching a gardening program on TV. The TV program was saying that poppy seeds should be planted in the middle of September.	ポピーの種は９月中旬にまくのがいいと新聞で読みました。	I saw on TV that poppy seeds should be planted in the middle of September.
平山さんはラジオで交通情報を聞いていました。湾岸線で大きな交通事故があったとそのラジオ番組で言っていました。	Hirayama was listening to traffic information on the radio. The radio program was saying that there was a big accident on the Wangan highway.	湾岸線で大きな交通事故があったとラジオで聞きました。	I heard on the radio that there was a big accident on the Wangan highway.
荻野さんはラジオで音楽番組を聞いていました。レディー・ガガが冬に来日するとそのラジオ番組で言っていました。	Ogino was listening to a music program on the radio. The radio program was saying that Lady Gaga was coming to Japan in the winter.	レディー・ガガが冬に来日するとラジオで聞きました。	I heard on the radio that Lady Gaga is coming to Japan in the winter.
隅田さんはラジオでニュースを聞いていました。大型の台風が日本に接近しているとそのラジオ番組で言っていました。	Sumida was listening to the news on the radio. The radio program was saying that a large typhoon was approaching Japan.	大型の台風が日本に接近しているとラジオで聞きました。	I heard on the radio that a large typhoon is approaching Japan.
柳原さんはラジオでお笑い番組を聞いていました。夏に芸人が開催するフェスがあるとそのラジオ番組で言っていました。	Yanagihara was listening to a comedy program on the radio. The radio program was saying that there was going to be a comedy festival in the summer.	夏に芸人が開催するフェスがあると言われています。	It is said that there is going to be a comedy festival in the summer.

APPENDIX C

Consent form and translation for Chapter 2 experiment

ノースウェスタン大学
言語学部
同意書：ボランティア参加者

プロジェクトタイトル：ウェブ上での言語学の実験

主任調査官：ブレーディー・クラーク（Brady Clark）

共同研究者：ハンナ・ローダスポンサー（Hannah Rohde Sponsor）：ノースウェスタン大学

紹介・目的：
あなたが参加を求められているこの研究は、人間が言語に関するタスクをこなす際に、個人の特性や言語学的要素がどう相呼応するかをリサーチしています。あなたがリクルートされた理由は、あなたが言語学の研究に参加することに興味があると表明したからです。この研究の目的は、あらゆる言語スキル（例：単語の識別、文の解釈）がインプットの言語的要素や個人の認知機能とどう相呼応しているかを調べることです。この研究から収集された情報や知識は言語能力や認知能力がどう相呼応するかを理解するのに役立ちます。

手順：
この研究の参加者として、あなたは下記のタスクを１つ以上こなします：

検証
コンピュータスクリーン上に（またはオーディオを用いて）音、文字、言葉、絵、または文が提示されます。それらの提示されたものに対して何らかの判断を下します（例：文法性、意味）。コンピュータで入力されたあなたの回答はあとで分析されます。

コンピュータでのリーディング
コンピュータスクリーン上にあらゆる文が表示されます。それらの文の意味に関する質問に答える、もしくはそれらの文を完成させます。

アンケート
１つ以上のアンケートに答えて頂きます。２タイプあるアンケートの中で、１つのアンケートは、文や文章を完成させる、またはそれらの意味について答えるタイプのアンケートです。もう１つは、認知的、もしくは心理的なファクター（例：記憶力、性格）を調べるアンケートです。アンケートの答えは紙かコンピュータで記録されます。

参加は最大６０分かかります。この研究はウェブ上で行われます。

リスク：
この研究への参加は物理的リスクを伴いません。ヘッドフォンを使って再生された音の強さは弱く設定され、耳への損傷、痛み、不快感は一切ありません。実験の手順は反復的なので、退屈と感じるかもしれません。

利得：
この研究への参加はあなたにとって直接的な利得はないかもしれません。あなたの参加はことばがどうやって習得されるのか、どう進化するのか、トラウマ後にはどう修復されるのか、こういった質問を答える手助けになるかもしれません。

代替手段：
あなたにはこの研究に参加しない選択権があります。

守秘義務：
直接の研究者たち以外の人も研究記録を見る場合、この研究への参加はプライバシーの喪失に繋がる可能性があります。法的に必須でない限り、研究記録を見る権限があるのは：実験研究者、研究スタッフ、ナショナル・インスティチュート・オブ・ヘルス（National Institutes of Health）の代表者、そしてノースウェスタン大学のインスティシューナル・レビュー・ボード（Institutional Review Board）のみです。あなたのアイデンティティについては守秘義務を守るのが必須とされています。

この実験の結果は教育、研究、書籍、そして学会の発表に役立てられるかもしれません。あなた個人の結果が議論される場合は、あなたのアイデンティ

ティが分からないように指名やその他の識別情報は使わず、研究コード番号を用います。

金銭的情報：
この研究に参加する際にはあなたに金銭的な負担はかかりません。研究参加の支払いもありません。

被験者の権利：
この実験への参加は自発的であり、何時でも参加をやめることができます。参加を承諾しなくても、途中で参加を取り下げても、あなたの被験者としての権利に影響はありませんし、今現在、そしてこれからのノースウェスタン大学の研究者とのコンタクトにも影響はありません。

連絡担当者：
この実験に関する質問などがあれば、ブレーディー・クラーク、博士号（Brady Clark, Ph.D.）までいつでもお問い合わせください：+1(847) 491-5880。あなたの被験者としての権利について質問などがあれば、「The Office for the Protection of Research Subjects of Northwestern University」までお問い合わせください：+1(312) 503-9338。

同意：
わたしはこの用紙を読み、この研究について説明を受けました。わたしは質問をする機会を与えられ、質問は全て答えられました。他に質問がある際に問い合わせをする担当者を教えられました。わたしは上記の研究に参加することに同意します。同意書にサインした後は、同意書のコピーを与えられます。

_____ _____
参加者の氏名 日付

_____ _____
同意を取得する者の氏名 日付

Northwestern University
Department of Linguistics
CONSENT FORM: VOLUNTEER PARTICIPANTS

Project Title: Web-based Linguistics Experimentation

Principal Investigator: Brady Clark

Co-Investigator(s): Hannah Rohde Sponsor: Northwestern University

Introduction/Purpose:
You are being asked to participate in a research study about how various features of individuals and linguistic forms interact during linguistic tasks. You are being asked to participate in this study because you expressed an interest in participating in linguistic research. The purpose of this research study is to investigate how various linguistic skills, such as word identification or sentence interpretation, interact with linguistic features of the input or cognitive features of individuals. The information gathered from this study will increase our understanding of how linguistic and other cognitive abilities interact.

Procedures
As a participant in this study, you will be asked to perform one or more of the following tasks:

VERIFICATION
You will be presented with sets of sounds, letters, words, pictures, or sentences on a computer screen or auditorily. Then you will be asked to make judgments about their grammaticality or meaning. Your responses- entered through a computer-- will be analyzed later.

COMPUTER-BASED READING
You will be presented with a series of sentences on a computer screen and will be asked to either answer questions about their meaning or to read and complete the sentences.

QUESTIONNAIRE
You will be asked to fill out one or more types of questionnaires. One type of questionnaire contains either sentences or brief stories for which you will provide written completions or answers about their meaning. The other type of questionnaire examines other cognitive or psychological factors, such as working memory ability or personality type. Responses for these types of questionnaires will be recorded either on paper or through a computer interface.

Your participation will take up to 60 mins. This research will be conducted over the web.

Risks:
Your participation in this study does not involve any physical risk to you. Any sound played out over headphones will be low in intensity and in no way damaging, painful, or uncomfortable. Since the testing procedure is repetitive, you may find it somewhat boring.

Benefits:
There may be no direct benefit to you by your participation in this research study. Your participation in this study may aid in our understanding of how language are learned, how they evolve, and how they can be repaired following trauma.

Alternatives:
You have the alternative to choose not to participate in this research study.

Confidentiality:
Participation in this research study may result in a loss of privacy, since persons other than the investigator(s) might view your study records. Unless required by law, only the study investigator, members of the investigator's staff, representatives of the National Institutes of Health and the Northwestern University Institutional Review Board will have authority to review your study records. They are required to maintain confidentiality regarding your identity.

Results of this study may be used for teaching, research, publications, or presentations at scientific meetings. If your individual results are discussed, your identity will be protected by using a study code number rather than your name or other identifying information.

Financial Information:
You will not be charged for any study-related procedures, and you will not be paid for your participation in this study.

Subjects' Rights:
Your participation in this study is voluntary and you are free to withdraw at any time. Choosing not to participate or withdrawing from this study will not affect any rights to which you are entitled, nor will it affect your present or future contact with investigators of Northwestern University.

Contact Persons:
Any questions you may have about this study may be directed to Brady Clark, Ph.D. at (847) 491-5880 at any time. Questions about your rights as a research subjects rights may be directed to The Office for the Protection of Research Subjects of Northwestern University, at (312) 503-9338.

Consent:
I have read this form and the research study has been explained to me. I have been given the opportunity to ask questions and my questions have been answered. If I have additional questions, I have been told whom to contact. I agree to participate in the research study described above and will receive a copy of this consent form after I sign it.

Your Name: _____ Date: _____

Person Obtaining Consent: _____ Date: _____

APPENDIX D

Linear regression modeling R code and output for Chapter 2 experiment

Key: 'Rating' - naturalness rating; 'CNJ' - speaker conjecture; 'SI' - sensory information; 'UI' - unique identifiability; 'LC' - length of context; 'LF' - length of follow-up; 'O' - order of presentation

Bare proposition model: lmerBmax = lmer(Rating ~ CNJ * SI * UI + LC + LF + O + (1 + CNJ * SI * UI | Participant) + (1 + CNJ * SI * UI | Proposition), control = lmerControl(optimizer="bobyqa"), data=data, subset=type=="b", REML=F)

Matrix-clause hearsay model: lmerEmax = lmer(Rating ~ CNJ * SI + CNJ * UI + LC + LF + O + (1 + CNJ * SI + CNJ * UI | Participant) + (1 + CNJ * SI + CNJ * UI | Proposition), control = lmerControl(optimizer="bobyqa"), data=data, subset=type=="e", REML=F)

Fixed	Estimate	SE	t-value	*Random*	Effect	Variance	Std. Dev.
CNJ	-0.234022	0.196293	-1.192	Participant	(Intercept)	0.39835	0.6312
SI	0.639362	0.232980	2.744*		CNJ	0.49774	0.7055
UI	-0.234878	0.209297	-1.122		SI	0.62590	0.7911
LC	-0.016177	0.008841	-1.830		UI	0.30550	0.5527
LF	0.071598	0.030125	2.377*	Proposition	(Intercept)	0.07733	0.2781
O	-0.166335	0.163915	-1.015		CNJ	0.34212	0.5849
CNJ:SI	-0.683239	0.241262	-2.832*		SI	0.02093	0.1447
CNJ:UI	0.278153	0.309074	0.900		UI	0.21030	0.4586
SI:UI	0.490508	0.264737	1.853				
CNJ:SI:UI	0.151484	0.513545	0.295				

Table D.1. Bare proposition output

Fixed	Estimate	SE	t-value	*Random*	Effect	Variance	Std. Dev.
CNJ	-0.433285	0.164021	-2.642*	Participant	(Intercept)	0.575946	0.75891
SI	-1.791221	0.242340	-7.391*		CNJ	0.491695	0.70121
UI	-0.229066	0.183140	-1.251		SI	1.489573	1.22048
LC	0.005579	0.007750	0.720		UI	0.213554	0.46212
LF	0.024830	0.027542	0.902		CNJ:SI	1.884832	1.37289
O	-0.163337	0.149029	-1.096		CNJ:UI	0.194485	0.44100
CNJ:SI	0.935415	0.265683	3.521*	Proposition	(Intercept)	0.137762	0.37116
CNJ:UI	0.488002	0.239366	2.039(*)		CNJ	0.045035	0.21222
					SI	0.189785	0.43564
					UI	0.001028	0.03206
					CNJ:SI	0.188886	0.43461
					CNJ:UI	0.024548	0.15668

Table D.2. Matrix-clause hearsay output

Fixed	Estimate	SE	t-value	*Random*	Effect	Variance	Std. Dev.
CNJ	0.11924	0.20179	0.591	Participant	(Intercept)	0.8224	0.9069
SI	-1.37404	0.28960	-4.745*		CNJ	0.2572	0.5072
UI	-0.15980	0.22976	-0.696		SI	1.0710	1.0349
LC	-0.01111	0.01038	-1.070	Proposition	(Intercept)	0.2379	0.4878
LF	0.09372	0.03632	2.580*		CNJ	0.3202	0.5659
O	-0.44265	0.19882	-2.226*		SI	0.5513	0.7425
SI:UI	0.34189	0.34897	0.980				

Table D.3. Output for *-sooda*

Model for *-sooda*: lmerSHmax = lmer(Rating ~ CNJ + SI * UI + LC + LF + O + (1 + CNJ + SI * UI | Participant) + (1 + CNJ + SI * UI | Proposition), control = lmerControl(optimizer="bobyqa"), data=data, subset=type=="sh", REML=F)

Model for *-yooda*: lmerYmax = lmer(Rating ~ CNJ * SI + UI + LC + LF + O + (1 + CNJ * SI | Participant) + (1 + CNJ * SI | Proposition), control = lmerControl(optimizer="bobyqa"), data=data, subset=type=="y", REML=F)

Model for *-rashii*: lmerRmax = lmer(Rating ~ CNJ * SI + SI * UI + LC + LF + O + (1 + CNJ * SI + SI * UI | Participant) + (1 + CNJ * SI + SI * UI | Proposition), control = lmerControl(optimizer="bobyqa"), data=data, subset=type=="r", REML=F)

Fixed	Estimate	SE	t-value	*Random*	Effect	Variance	Std. Dev.
CNJ	0.530678	0.212318	2.499*	Participant	(Intercept)	0.2917	0.5401
SI	0.148351	0.264112	0.562		CNJ	0.3460	0.5882
UI	-0.674097	0.222333	-3.032*		SI	0.6093	0.7806
LC	0.006318	0.010089	0.626		CNJ:SI	1.2953	1.1381
LF	0.040487	0.035707	1.134	Proposition	(Intercept)	0.2403	0.4902
O	-0.430124	0.195169	-2.204(*)		CNJ	0.4220	0.6496
CNJ:SI	0.694360	0.306723	2.264*		SI	0.1396	0.3736
					CNJ:SI	0.4028	0.6346

Table D.4. Output for -*yooda*

Fixed	Estimate	SE	t-value	*Random*	Effect	Variance	Std. Dev.
CNJ	0.65350	0.25264	2.587*	Participant	(Intercept)	0.3535	0.5946
SI	-1.48502	0.27715	-5.358*		CNJ	0.6767	0.8226
UI	-0.38401	0.23434	-1.639		SI	0.2924	0.5407
LC	-0.02000	0.01110	-1.802	Proposition	(Intercept)	0.2514	0.5014
LF	0.09961	0.03736	2.666*		CNJ	0.9659	0.9828
O	-0.40082	0.20322	-1.972		SI	0.2708	0.5204
CNJ:SI	0.68215	0.26323	2.591*				
SI:UI	0.88890	0.31706	2.804*				

Table D.5. Output for -*rashii*

APPENDIX E

Recruitment flyer and translation for Chapter 3 experiment

ノースウェスタン大学・言語学科
主任研究員：グレゴリー・ワード
研究倫理審査委員会コード：STU00201044

被験者募集

対象：
日本語のネイティブ・スピーカー（幼少期から日本語を話している方）、
かつ日本語での標準読解力（漢字の知識含む）が備わっている方

内容：
ウェブ上のアンケートにて日本語の文章を読み、
それらの表現についての解釈や許容性の判断

所要時間：
４５−６０分

謝金：
Amazon e-ギフト券で＄７（Amazon JPN の場合は８５０円）

実験参加登録方法：
ノースウェスタン大学の松原珠里（jmatsubara@u.northwestern.edu）まで
件名「STU00201044 実験登録」のメールを送信。
ウェブ上のアンケート個別 URL が送られます。

たくさんのご応募をお待ちしております！

Northwestern University Linguistics Department
Principal investigator: Gregory Ward
IRB code: STU00201044

Participant recruitment

Requirements:
Native knowledge of Japanese (Has grown up speaking Japanese)
Standard reading proficiency in Japanese including Chinese characters (kanji)

Description:
Participants will be asked to read Japanese sentences via an online survey and give judgments about the acceptability and/or interpretation of language expressions.

Time:
45-60 minutes

Compensation:
7 US dollars paid via an Amazon e-gift card (850 yen if Amazon Japan)

Contact:
Email Julie Matsubara at Northwestern University at jmatsubara@u.northwestern.edu with the subject 'STU00201044 実験登録'.
You will receive an individualized URL for the online survey.

Thank you for your consideration!

APPENDIX F

Linguistic stimuli and translation for Chapter 3 experiment

STRONG-CONJECTURE contexts with follow-up sentences

context	context_translation	proposition	proposition_t
A さんは名無しさんのカツラがずれているのを見ました。ずれている箇所は頭皮が見えました。A さんはこのことを B さんに話しました。	A saw Anonymous's wig slightly askew. His scalp could be seen where the wig was askew. A told B this.	名無しさんはハゲている。	Anonymous is bald.
A さんは四川麻婆豆腐を注文しました。出てきた料理には赤くて大きな実がたくさん入っているのが見えました。A さんはこのことを B さんに話しました。	A ordered Szechuan. It could be seen that there were many big and red seed-like things in the dish. A told B this.	四川麻婆豆腐には赤唐辛子が入っている。	Szechuan mabo tofu has red chili pepper.
A さんは名無しさんのアパートを訪れました。明かりはついておらず、名無しさんの車が駐車場にないのが見えました。A さんはこのことを B さんに話しました。	A visited Anonymous's apartment. It could be seen that the lights weren't on and that Anonymous's car was not in the lot. A told B this.	名無しさんは出かけている。	Anonymous is out.
A さんが名無しさんとスキーをしていると、名無しさんがゲレンデを転び落ちました。名無しさんの足が通常ではない曲がり方をしているのが見えました。A さんはこのことを B さんに話しました。	A was skiing with Anonymous, and Anonymous fell down the slope. It could be seen that Anonymous's leg was bent in a non-normal way. A told B this.	名無しさんの足の骨は折れている。	Anonymous's leg is broken.
A さんは花壇に花を植えました。一ヶ月後、全ての葉っぱが茶色になっているのが見えました。A さんはこのことを B さんに話しました。	A planted (a) flower(s) in the flower bed. One month later, it could be seen that all the leaves had turned brown. A told B this.	庭の花は枯れている。	The flowers in the garden are dead.
A さんは名無しさんが産婦人科から出てくるところを見ました。名無しさんのお腹が膨らんでいるのが見えました。A さんはこのことを B さんに話	A saw Anonymous come out from the obstetrician's office. It could be seen that Anonymous's belly was expanding. A told B	名無しさんは妊娠している。	Anonymous is pregnant.

しました。	this.		
A さんはお昼休みにお弁当屋さんに行きました。お店のシャッターが閉まっているのが見えました。A さんはこのことを B さんに話しました。	A went to the bento store during lunch break. It could be seen that the store shutter was lowered. A told B this.	お弁当屋さんは今日、閉まっている。	The bento store is closed today.
A さんは名無しさんを居酒屋で見かけました。名無しさんの顔は赤く、足がふらついているのが見えました。 A さんはこのことを B さんに話しました。	A happened to see Anonymous at an izakaya (=Japanese bar). It could be seen that Anonymous's face was red and that (PRO) was staggering. A told B this.	名無しさんは飲んでいる。	Anonymous is drinking.
A さんはショッピングモールに行きました。それぞれのショップの店頭に水玉模様がおいてあるのが見えました。A さんはこのことを B さんに話しました。	A went to the mall. Polka dots could be seen in the front area of the shops. A told B this.	水玉模様が流行っている。	Polka dots are in.
A さんは図書館で名無しさんを見かけました。名無しさんが山積みの参考書の前で座って「必勝のハチマキをしているのが見えました。A さんはこのことを B さんに話しました。	A happened to see Anonymous at the library. Anonymous could be seen sitting in front of a pile of reference books with a bandana that said "victory". A told B this.	名無しさんは勉強している。	Anonymous is studying.
A さんはカフェで名無しさんを見かけました。名無しさんが便箋に「拝啓という文字を書いているのが見えました。A さんはこのことを B さんに話しました。	A happened to see Anonymous at a cafe. Anonymous could be seen writing the word 'haikei' (='Dear') on stationary. A told B this.	名無しさんは手紙を書いている。	Anonymous is writing a letter.
A さんはジムで名無しさんを見かけました。名無しさんがマラソントレーナーと走っているのが見えました。A さんはこのことを B さんに話しま	A happened to see Anonymous at the gym. Anonymous could be seen running with a marathon trainer. A told B	名無しさんはマラソンのトレーニングをしている。	Anonymous is training for a marathon.

した。	this.		
A さんは整骨院で名無しさんを見かけました。名無しさんが足を引きずりながら、病院のスタッフとおしゃべりをしているのが見えました。A さんはこのことを B さんに話しました。	A happened to see Anonymous at an osteopathic clinic. Anonymous could be seen dragging (PRO) foot and chatting with the hospital staff. A told B this.	名無しさんは整骨院に通っている。	Anonymous is regularly attending an osteopathic clinic.
A さんは教室へ向かいました。教室の窓から人影が見えました。A さんはこのことを B さんに話しました。	A headed to the classroom. 'Human-shaped shadows' could be seen through the classroom window. A told B this.	教室に人がいる。	There is someone in the classroom.
A さんはひかり動物園に行きました。虎のイラストが園内にたくさんあるのが見えました。A さんはこのことを B さんに話しました。	A went to Hikari Zoo. Numerous illustrations of tigers could be seen throughout the park. A told B this.	ひかり動物園には虎がいる。	Hikari Zoo has a tiger.
A さんは名無しさんのブログをチェックしました。名無しさんの子どもが飛び込み台からプールに飛び込んでいる写真が見えました。A さんはこのことを B さんに話しました。	A checked Anonymous's blog. A picture of Anonymous's child jumping into the pool from the diving board could be seen. A told B this.	名無しさんの子どもは泳げる。	Anonymous's kid(s) can swim.
A さんは名無しさんのマンションに行きました。洗面台には歯ブラシとタオルが２つずつあるのが見えました。A さんはこのことを B さんに話しました。	A went to Anonymous's condo. In the bathroom could be seen two toothbrushes and two towels. A told B this.	名無しさんには同居人がいる。	Anonymous has a housemate.
A さんは名無しさんの部屋に行きました。名無しさんがバイオリンの弦を張り替えて調律しているのが見えました。A	A went to Anonymous's room. Anonymous could be seen restringing (PRO) violin and tuning it. A told	名無しさんはバイオリンを弾く。	Anonymous plays the violin.

さんはこのことを B さんに話しました。	B this.		
A さんは名無しさんの家に行きました。テーブルの上にワインテイスティングのチケットが置いてあるのが見えました。A さんはこのことを B さんに話しました。	A went to Anonymous's home. A winetasting ticket could be seen on the table. A told B this.	名無しさんはワインを飲む。	Anonymous drinks wine.
A さんは名無しさんの家に行きました。名無しさんがイナゴの佃煮を作っているのが見えました。A さんはこのことを B さんに話しました。	A went to Anonymous's house. Anonymous could be seen cooking soy-boiled grasshoppers. A told B this.	名無しさんはイナゴの佃煮を食べる。	Anonymous eats soy-boiled grasshoppers.
A さんはカフェで名無しさんを見かけました。名無しさんが毛糸と編み棒を持っているのが見えました。A さんはこのことを B さんに話しました。	A happened to see Anonymous at a cafe. Anonymous could be seen with yarn and knitting needles. A told B this.	名無しさんは編み物をする。	Anonymous knits.
A さんは名無しさんをブライダルショップで見かけました。名無しさんがウェディングドレスを試着しているのが見えました。A さんはこのことを B さんに話しました。	A happened to see Anonymous at a bridal shop. Anonymous could be seen trying on a wedding dress. A told B this.	名無しさんは結婚する。	Anonymous is going to get married.
A さんは名無しさんとお見合いパーティーに行きました。パーティーの終盤、名無しさんが意中の相手を呼び出し、手を握りながら話しているのが見えました。A さんはこのことを B さんに話しました。	A went to a marriage meeting party with Anonymous. At the end of the party, Anonymous could be seen 'summoning' the person (PRO) was interested in and talking to (PRO) while holding (PRO) hand. A told B this.	名無しさんは意中の人に告白をする。	Anonymous is going to confess his love to someone (PRO) is interested in.
A さんは名無しさんの家に行きました。名無しさんの家が	A went to Anonymous's home. It could be seen	名無しさんは引っ越す	Anonymous is going to

売りに出されているのが見えました。A さんはこのことを B さんに話しました。	that Anonymous's house was on sale. A told B this.	。	move.

MEDIUM-CONJECTURE contexts with follow-up sentences

context	context_t	proposition	proposition_t
A さんは名無しさんをウィッグ専門店の近くで見かけました。A さんはこのことを B さんに話しました。	A happened to see Anonymous near a wig shop. A told B this.	名無しさんはハゲている。	Anonymous is bald.
A さんは四川料理屋さんに行きました。麻婆豆腐を食べている人が水を飲んでいるのが見えました。A さんはこのことを B さんに話しました。	A went to a Szechuan restaurant. It could be seen that a person eating the mabo tofu was drinking water. A told B this.	四川麻婆豆腐には赤唐辛子が入っている。	Szechuan mabo tofu has red chili pepper.
A さんは名無しさんのアパートを訪れました。窓のカーテンが閉めてあるのが見えました。A さんはこのことを B さんに話しました。	A visited Anonymous's apartment. It could be seen that the curtains were closed. A told B this.	名無しさんは出かけている。	Anonymous is out.
A さんが名無しさんとスキーをしていると、名無しさんがゲレンデを転び落ちました。名無しさんが泣いているのが見えました。A さんはこのことを B さんに話しました。	A was skiing with Anonymous, and Anonymous fell down the slope. Anonymous could be seen crying. A told B this.	名無しさんの足の骨は折れている。	Anonymous's leg is broken.
A さんは花壇に花を植えました。一ヶ月後、花びらが落ちているのが見えました。A さんはこのことを B さんに話しました。	A planted (a) flower(s) in the flower bed. One month later, it could be seen that the petals had fallen. A told B this.	庭の花は枯れている。	The flowers in the garden are dead.
A さんは名無しさんと女子会に行きました。名無しさんが普段よく飲むお酒を遠慮しているのが見えました。A さんはこのことを B さんに話しま	A went to a girls night with Anonymous. Anonymous could be seen refraining from alcohol, which she	名無しさんは妊娠している。	Anonymous is pregnant.

した。	normally drinks a lot of. A told B this.		
A さんはお昼休みにお弁当屋さんに行きました。お店の駐車場には車が見えませんでした。A さんはこのことを B さんに話しました。	A went to the bento store during lunch break. No cars could be seen in the store parking lot. A told B this.	お弁当屋さんは今日、閉まっている。	The bento store is closed today.
A さんは名無しさんを居酒屋の近くで見かけました。A さんはこのことを B さんに話しました。	A happened to see Anonymous at an izakaya (=Japanese bar). It could be seen that Anonymous's face was red and that (PRO) was staggering. A told B this.	名無しさんは飲んでいる。	Anonymous is drinking.
A さんは街に出かけました。水玉模様を着ている人が何人か見えました。A さんはこのことを B さんに話しました。	A went out to the city. Several people could be seen wearing polka dots. A told B this.	水玉模様が流行っている。	Polka dots are in.
A さんは名無しさんを図書館の近くで見かけました。A さんはこのことを B さんに話しました。	A happened to see Anonymous near the library. A told B this.	名無しさんは勉強している。	Anonymous is studying.
A さんはカフェで名無しさんを見かけました。テーブルの上に封筒があるのが見えました。A さんはこのことを B さんに話しました。	A happened to see Anonymous at a cafe. An envelope could be seen on (PRO) table. A told B this.	名無しさんは手紙を書いている。	Anonymous is writing a letter.
A さんはジムで名無しさんを見かけました。名無しさんがルームランナーで走っているのが見えました。A さんはこのことを B さんに話しました。	A happened to see Anonymous at the gym. Anonymous could be seen running 15km on the treadmill. A told B this.	名無しさんはマラソンのトレーニングをしている。	Anonymous is training for a marathon.
A さんは名無しさんを整骨院の近くで見かけました。A さんはこのことを B さんに話しました。	A happened to see Anonymous near an osteopathic clinic. A told B this.	名無しさんは整骨院に通っている。	Anonymous is regularly attending an osteopathic

			clinic.
A さんは教室へ向かいました。廊下に人がいるのが見えました。A さんはこのことを B さんに話しました。	A headed to the classroom. People could be seen in the hallway. A told B this.	教室に人がいる。	There is someone in the classroom.
A さんはひかり動物園に行きました。幼い子が虎のぬいぐるみを抱えているのが見えました。A さんはこのことを B さんに話しました。	A went to Hikari Zoo. A child could be seen holding a tiger stuffed animal. A told B this.	ひかり動物園には虎がいる。	Hikari Zoo has a tiger.
A さんは名無しさんのブログをチェックしました。名無しさんの子どもがプールで準備体操をしている写真が見えました。A さんはこのことを B さんに話しました。	A checked Anonymous's blog. A picture of Anonymous's child doing warm-up stretches at the pool could be seen. A told B this.	名無しさんの子どもは泳げる。	Anonymous's kid(s) can swim.
A さんは名無しさんのマンションに行きました。マンションにはベッドがある部屋が２つ見えました。A さんはこのことを B さんに話しました。	A went to Anonymous's condo. Two rooms could be seen with a bed. A told B this.	名無しさんには同居人がいる。	Anonymous has a housemate.
A さんは名無しさんの部屋に行きました。バイオリンの絵が飾られているのが見えました。A さんはこのことを B さんに話しました。	A went to Anonymous's room. A painting of a violin could be seen. A told B this.	名無しさんはバイオリンを弾く。	Anonymous plays the violin.
A さんは名無しさんの家に行きました。そこにワインの絵が飾ってあるのが見えました。A さんはこのことを B さんに話しました。	A went to Anonymous's home. A painting of wine could be seen there. A told B this.	名無しさんはワインを飲む。	Anonymous drinks wine.
A さんは名無しさんを佃煮屋さんで見かけました。名無しさんがイナゴの佃煮のセクションにいるのが見えました。A さんはこのことを B さんに話しました。	A happened to see Anonymous at a shop that sells soy-boiled products. Anonymous could be seen in the soy-boiled grasshoppers	名無しさんはイナゴの佃煮を食べる。	Anonymous eats soy-boiled grasshoppers.

	section. A told B this.		
A さんは名無しさんを毛糸屋さんの近くで見かけました。A さんはこのことを B さんに話しました。	A happened to see Anonymous near a yarn store. A told B this.	名無しさんは編み物をする。	Anonymous knits.
A さんは名無しさんをブライダルショップの近くで見かけました。A さんはこのことを B さんに話しました。	A happened to see Anonymous near a bridal shop. A told B this.	名無しさんは結婚する。	Anonymous is going to get married.
A さんは名無しさんとお見合いパーティーに行きました。パーティーの終盤、名無しさんが意中の相手を見つめているのが見えました。A さんはこのことを B さんに話しました。	A went to a marriage meeting party with Anonymous. At the end of the party, Anonymous could be seen gazing at the person (PRO) was interested in. A told B this.	名無しさんは意中の人に告白をする。	Anonymous is going to confess (PRO) love to someone (PRO) is interested in.
A さんは名無しさんの家に行きました。テーブルの上に新しいマンションのパンフレットが置いてあるのが見えました。A さんはこのことを B さんに話しました。	A went to Anonymous's home. On the table could be seen a pamphlet for a new condo. A told B this.	名無しさんは引っ越す。	Anonymous is going to move.

STRONG-REPORTATIVE contexts with follow-up sentences

context	context_t	proposition	proposition_t
A さんは名無しさんのヘアスタイリストです。B さんはこのことを知っています。A さんは名無しさんがハゲていると B さんに話しました。	A is Anonymous's hair stylist. B knows this. A told B that Anonymous is bald.	名無しさんはハゲている。	Anonymous is bald.
A さんは中国の四川省に住んでいました。B さんはこのことを知っています。四川麻婆豆腐には赤唐辛子が入っていると A さんは B さんに話しました。	A used to live in the Szechuan province. B knows this. A told B that Szechuan mabo tofu has red chili pepper.	四川麻婆豆腐には赤唐辛子が入っている。	Szechuan mabo tofu has red chili pepper.

A さんは名無しさんの同居人です。B さんはこのことを知っています。A さんは名無しさんが出かけていると B さんに話しました。	A is Anonymous's housemate. B knows this. A told B that Anonymous is out.	名無しさんは出かけている。	Anonymous is out.
A さんは医者です。B さんはこのことを知っています。A さんは名無しさんの足が折れていると B さんに話しました。	A is a doctor. B knows this. A told B that Anonymous's leg is broken.	名無しさんの足の骨は折れている。	Anonymous's leg is broken.
A さんは庭師です。B さんはこのことを知っています。A さんは庭の花が枯れていると B さんに話しました。	A is a gardener. B knows this. A told B that the flowers in the garden were dead.	庭の花は枯れている。	The flowers in the garden are dead.
A さんは名無しさんの親友です。B さんはこのことを知っています。A さんは名無しさんが妊娠していると B さんに話しました。	A and Anonymous are close friends. B knows this. A told B that Anonymous was pregnant.	名無しさんは妊娠している。	Anonymous is pregnant.
A さんはお弁当屋さんで働いています。B さんはこのことを知っています。A さんはお弁当屋さんが今日は閉まっていると B さんに話しました。	A works at the bento store. B knows this. A told B that the bento store is closed today.	お弁当屋さんは今日、閉まっている。	The bento store is closed today.
A さんは名無しさんと居酒屋にいます。B さんはこのことを知っています。名無しさんが飲んでいると A さんは B さんに話しました。	A is at an izakaya (=Japanese bar) with Anonymous. B knows this. A told B that Anonymous was drinking.	名無しさんは飲んでいる。	Anonymous is drinking.
A さんはファッションモデルです。B さんはこのことを知っています。A さんは水玉模様が流行っていると B さんに話しました。	A is a model. B knows this. A told B that polka dots were in.	水玉模様が流行っている。	Polka dots are in.
A さんは名無しさんと図書館にいます。B さんはこのことを知っています。A さんは名	A is at the library with Anonymous. B knows this. A told B that	名無しさんは勉強している。	Anonymous is studying.

無しさんが勉強しているとBさんに話しました。	Anonymous is studying.		
Aさんは名無しさんと仕事で机が隣同士です。Bさんはこのことを知っています。Aさんは名無しさんが手紙を書いているとBさんに話しました。	A has the desk next to Anonymous at their workplace. B knows this. A told B that Anonymous is writing a letter.	名無しさんは手紙を書いている。	Anonymous is writing a letter.
Aさんは名無しさんとランニング仲間です。Bさんはこのことを知っています。Aさんは名無しさんがマラソンのトレーニングをしているとBさんに話しました。	A is running buddies with Anonymous. B knows this. A told B that Anonymous is training for a marathon.	名無しさんはマラソンのトレーニングをしている。	Anonymous is training for a marathon.
Aさんはよく名無しさんの運転をしています。Bさんはこのことを知っています。Aさんは名無しさんが整骨院に通っているとBさんに話しました。	A often drives Anonymous around. B knows this. A told B that Anonymous is regularly attending an osteopathic clinic.	名無しさんは整骨院に通っている。	Anonymous is regularly attending an osteopathic clinic.
Aさんは教室のドアを開けて中を見ています。Bさんはこのことを知っています。Aさんは教室に人がいるとBさんに話しました。	A has opened the classroom door and is looking inside. B knows this. A told B that there was someone in the classroom.	教室に人がいる。	There is someone in the classroom.
Aさんはひかり動物園にいます。Bさんはこのことを知っています。Aさんはひかり動物園に虎がいるとBさんに話しました。	A is at Hikari Zoo now. B knows this. A told B that Hikari Zoo has (a) tiger(s).	ひかり動物園には虎がいる。	Hikari Zoo has a tiger.
Aさんは名無しさんの子どもをよく預かります。Bさんはこのことを知っています。Aさんは名無しさんの子どもが泳げるとBさんに話しました	A takes care of Anonymous's kid(s) often. B knows this. A told B that Anonymous's kid(s) can swim.	名無しさんの子どもは泳げる。	Anonymous's kid(s) can swim.

A さんは名無しさんの親友です。B さんはこのことを知っています。A さんは名無しさんに同居人がいると B さんに話しました。	A and Anonymous are close friends. B knows this. A told B that Anonymous has a housemate.	名無しさんには同居人がいる。	Anonymous has a housemate.
A さんは名無しさんと付き合っています。B さんはこのことを知っています。A さんは B さんに名無しさんがバイオリンを弾くと話しました。	A and Anonymous are a couple. B knows this. A told B that Anonymous plays the violin.	名無しさんはバイオリンを弾く。	Anonymous plays the violin.
A さんは名無しさんと飲み友達です。B さんはこのことを知っています。A さんは B さんに名無しさんがワインを飲むと話しました。	A is drinking buddies with Anonymous. B knows this. A told B that Anonymous drinks wine.	名無しさんはワインを飲む。	Anonymous drinks wine.
A さんは名無しさんとグルメ仲間です。B さんはこのことを知っています。A さんは B さんに名無しさんがイナゴの佃煮を食べると話しました。	A and Anonymous are foodie buddies. B knows this. A told B that Anonymous eats soy-boiled grasshopers.	名無しさんはイナゴの佃煮を食べる。	Anonymous eats soy-boiled grasshoppers.
A さんは名無しさんと住んでいます。B さんはこのことを知っています。A さんは B さんに名無しさんが編み物をすると話しました。	A and Anonymous live together. B knows this. A told B that Anonymous knits.	名無しさんは編み物をする。	Anonymous knits.
A さんは名無しさんの親友です。B さんはこのことを知っています。A さんは B さんに名無しさんが結婚すると話しました。	A and Anonymous are close friends. B knows this. A told B that Anonymous is going to get married.	名無しさんは結婚する。	Anonymous is going to get married.
A さんは名無しさんから恋愛の相談を受けています。B さんはこのことを知っています。A さんは B さんに名無しさんが意中の人に告白すると話しました。	Anonymous asks A for love advice. B knows this. A told B that Anonymous is going to confess (PRO) love to someone (PRO) is interested in.	名無しさんは意中の人に告白をする。	Anonymous is going to confess (PRO) love to someone (PRO) is interested in.

A さんは名無しさんの親友です。B さんはこのことを知っています。A さんは B さんに名無しさんが引っ越すと話しました。	A and Anonymous are close friends. B knows this. A told B that Anonymous is going to move.	名無しさんは引っ越す。	Anonymous is going to move.

MEDIUM-REPORTATIVE contexts with follow-up sentences

context	context_t	proposition	proposition_t
A さんは名無しさんと高校以来 会っていません。B さんはこのことを知っています。A さんは名無しさんがハゲていると B さんに話しました。	A hasn't seen Anonymous since high school. B knows this. A told B that Anonymous is bald.	名無しさんはハゲている。	Anonymous is bald.
A さんは主に洋食を食べます。B さんはこのことを知っています。四川麻婆豆腐には赤唐辛子が入っていると A さんは B さんに話しました。	A mainly eats Western food. B knows this. A told B that Szechuan mabo tofu has red chili pepper.	四川麻婆豆腐には赤唐辛子が入っている。	Szechuan mabo tofu has red chili pepper.
A さんは名無しさんの近所に住んでいます。B さんはこのことを知っています。A さんは名無しさんが出かけていると B さんに話しました。	A and Anonymous live in the same neighborhood. B knows this. A told B that Anonymous is out.	名無しさんは出かけている。	Anonymous is out.
A さんは高校生です。B さんはこのことを知っています。A さんは名無しさんの足が折れていると B さんに話しました。	A is a high school student. B knows this. A told B that Anonymous's leg is broken.	名無しさんの足の骨は折れている。	Anonymous's leg is broken.
A さんは植物に詳しくありません。B さんはこのことを知っています。A さんは庭の花が枯れていると B さんに話しました。	A is not very knowledgeable about plants. B knows this. A told B that the flowers in the garden were dead.	庭の花は枯れている。	The flowers in the garden are dead.
A さんは名無しさんと最近会っていません。B さんはこのことを知っています。A さんは名無しさんが妊娠している	A has not seen Anonymous recently. B knows this. A told B that Anonymous was	名無しさんは妊娠している。	Anonymous is pregnant.

とBさんに話しました。	pregnant.		
Aさんは今日お弁当屋さんに行っていません。Bさんはこのことを知っています。Aさんはお弁当屋さんが今日は閉まっているとBさんに話しました。	A has not been to the bento store today. B knows this. A told B that the bento store is closed today.	お弁当屋さんは今日、閉まっている。	The bento store is closed today.
Aさんは今日、名無しさんとしゃべっていません。Bさんはこのことを知っています。名無しさんが飲んでいるとAさんはBさんに話しました。	A has not talked to Anonymous today. B knows this. A told B that Anonymous was drinking.	名無しさんは飲んでいる。	Anonymous is drinking.
Aさんはファッションに詳しくありません。Bさんはこのことを知っています。Aさんは水玉模様が流行っているとBさんに話しました。	A doesn't know much about fasion. B knows this. A told B that polka dots were in.	水玉模様が流行っている。	Polka dots are in.
Aさんは名無しさんと一週間ほど会っていません。Bさんはこのことを知っています。Aさんは名無しさんが勉強しているとBさんに話しました。	A hasn't seen Anonymous in about a week. B knows this. A told B that Anonymous is studying.	名無しさんは勉強している。	Anonymous is studying.
Aさんは名無しさんと仕事で別々の部署です。Bさんはこのことを知っています。Aさんは名無しさんが手紙を書いているとBさんに話しました。	A and Anonymous work in different departments at work. B knows this. A told B that Anonymous is writing a letter.	名無しさんは手紙を書いている。	Anonymous is writing a letter.
Aさんは名無しさんと合コンで会いました。Bさんはこのことを知っています。Aさんは名無しさんがマラソンのトレーニングをしているとBさんに話しました。	A met Anonymous at a goukon (='dating party'). B knows this. A told B that Anonymous is training for a marathon.	名無しさんはマラソンのトレーニングをしている。	Anonymous is training for a marathon.
Aさんは最近名無しさんと連絡を取り合っていません。Bさんはこのことを知っていま	A hasn't been in contact with Anonymous lately. B knows this. A told B that	名無しさんは整骨院に通っている	Anonymous is regularly attending an

す。A さんは名無しさんが整骨院に通っていると B さんに話しました。	Anonymous is regularly attending an osteopathic clinic.	。	osteopathic clinic.
A さんは１０分前まで教室にいました。B さんはこのことを知っています。A さんは教室に人がいると B さんに話しました。	A was in the classroom until 10 min before. B knows this. A told B that there was someone in the classroom.	教室に人がいる。	There is someone in the classroom.
A さんは小さい頃にひかり動物園に行ったことがあります。B さんはこのことを知っています。A さんはひかり動物園に虎がいると B さんに話しました。	A went to Hikari Zoo when (PRO) was a child. B knows this. A told B that Hikari Zoo has a tiger.	ひかり動物園には虎がいる。	Hikari Zoo has a tiger.
A さんは名無しさんの子供に会ったことがありません。B さんはこのことを知っています。A さんは名無しさんの子どもが泳げると B さんに話しました。	A has never met Anonymous's kid(s). B knows this. A told B that Anonymous's kid(s) can swim.	名無しさんの子どもは泳げる。	Anonymous's kid(s) can swim.
A さんは名無しさんのアパートの前を通ったことがあります。B さんはこのことを知っています。A さんは名無しさんに同居人がいると B さんに話しました。	A happened to pass by Anonymous's apartment. B knows this. A told B that Anonymous has a housemate.	名無しさんには同居人がいる。	Anonymous has a housemate.
A さんは名無しさんとあまり親しくありません。B さんはこのことを知っています。A さんは B さんに名無しさんがバイオリンを弾くと話しました。	A is not very close with Anonymous. B knows this. A told B that Anonymous plays the violin.	名無しさんはバイオリンを弾く。	Anonymous plays the violin.
A さんは名無しさんとあまり親しくありません。B さんはこのことを知っています。A さんは B さんに名無しさんがワインを飲むと話しました。	A is not very close with Anonymous. B knows this. A told B that Anonymous drinks wine.	名無しさんはワインを飲む。	Anonymous drinks wine.

A さんは名無しさんとご飯を食べたことがありません。B さんはこのことを知っています。A さんは B さんに名無しさんがイナゴの佃煮を食べると話しました。	A has never eaten a meal with Anonymous. B knows this. A told B that Anonymous eats soy-boiled grasshoppers.	名無しさんはイナゴの佃煮を食べる。	Anonymous eats soy-boiled grasshoppers.
A さんは名無しさんとあまり話をしたことがありません。B さんはこのことを知っています。A さんは B さんに名無しさんが編み物をすると話しました。	A hasn't spoken much to Anonymous. B knows this. A told B that Anonymous knits.	名無しさんは編み物をする。	Anonymous knits.
A さんは名無しさんと中学の同級生です。B さんはこのことを知っています。A さんは B さんに名無しさんが結婚すると話しました。	A and Anonymous were in the same class in junior high school. B knows this. A told B that Anonymous is going to get married.	名無しさんは結婚する。	Anonymous is going to get married.
A さんは名無しさんとあまり話をしたことがありません。B さんはこのことを知っています。A さんは B さんに名無しさんが意中の人に告白すると話しました。	A hasn't spoken much to Anonymous. B knows this. A told B that Anonymous is going to confess his love to someone (PRO) is interested in.	名無しさんは意中の人に告白をする。	Anonymous is going to confess (PRO) love to someone (PRO) is interested in.
A さんは名無しさんと昔、一緒に住んでいました。B さんはこのことを知っています。A さんは B さんに名無しさんが引っ越すと話しました。	A and Anonymous used to live together. B knows this. A told B that Anonymous is going to move.	名無しさんは引っ越す。	Anonymous is going to move.

Fillers

context	context_t	proposition	proposition_t
先週、A さんの家の前に見慣れない人物が何人か現れました。その人達が何日も A さんの行動を記録しているのが見えました	Last week, several strangers appeared in front of A's house. They could be seen	A さんの家は見張られていた。	Someone was watching A's house.

。A さんはこのことを B さんに話しました。	recording A's activity for multiple days. A told B this.		
A さんは緑山町の昔の写真を見ました。ある建物の前に「洋食屋」の看板があるのが見えました。A さんはこのことを B さんに話しました。	A saw an old photo of Midoriyama Town. (PRO) could see a 'Western food' sign in front of a building. A told B this.	緑山町にはレストランがあった。	There was a restaurant in Midoriyama Town.
A さんは昨日、名無しさんのアパートに行きました。そこでゴキブリを一匹見ました。A さんはこのことを B さんに話しました。	A went to Anonymous's apartment yesterday. (PRO) saw a cockroach there. A told B this.	名無しさんのアパートにはゴキブリがはびこっていた。	Cockroaches were overrunning Anonymous's apartment.
A さんは今朝、ホテルのロビーで名無しさんと待ち合わせをしました。ロビーにテレビがあるのが見えました。A さんはこのことを B さんに話しました。	A met up with Anonymous in the lobby of a hotel this morning. (PRO) saw a TV in the lobby. A told B this.	名無しさんはテレビを見ていた。	Anonymous was watching TV.
A さんは昔、名無しさんの隣に住んでいました。名無しさんが毎朝公園の方に向かって散歩をしているのが見えました。A さんはこのことを B さんに話しました。	A used to live next to Anonymous. (PRO) saw Anonymous take a walk toward the park every morning. A told B this.	名無しさんは毎朝ラジオ体操をした。	Anonymous participated in 'radio exercise' every morning.
A さんは名無しさんを迎えに行くため空港に行きました。名無しさんからメールが届いたのが見えました。A さんはこのことを B さんに話しました。	A went to the airport to pick up Anonymous. (PRO) saw a text arrive from Anonymous. A told B this.	名無しさんの飛行機が着陸した。	Anonymous's plane landed.
A さんは名無しさんのウェディングドレスを直した裁縫師です。B さんはこのことを知っています。A さんは B さんに名無しさんのドレスがタフタで出来ていたと話しました。	A is a seamstress who altered Anonymous's wedding dress. B knows this. A told B that Anonymous' dress was made of taffeta.	名無しさんのウェディングドレスはタフタで出来ていた。	Anonymous' wedding dress was made of taffeta.

A さんは白鳥家の執事でした。B さんはこのことを知っています。A さんは B さんに名無しさんが白鳥家の運転手をしていたと話しました。	A used to be a butler for the Shiratori Family. B knows this. A told B that Anonymous used to be Shiratori Family's driver.	名無しさんは白鳥家の運転手をしていた。	Anonymous was the Shiratori Family driver.
A さんは昔、名無しさんと住んでいました。B さんはこのことを知っています。A さんは B さんに名無しさんが毎日炊事洗濯したと話しました。	A used to live with Anonymous. B knows this. A told B that Anonymous used to cook and do the wash every day.	名無しさんは毎日炊事洗濯した。	Anonymous cooked and did the wash everyday.
A さんは車の中から名無しさんを一瞬見かけました。B さんはこのことを知っています。A さんは B さんに名無しさんが酔っていたと話しました。	A saw Anonymous for a split second from the car. B knows this. A told B that Anonymous was drunk.	名無しさんは酔っていた。	Anonymous was drunk.
A さんは名無しさんと同じ高校に通っていました。B さんはこのことを知っています。A さんは B さんに名無しさんがスポーツも勉強も出来たと話しました。	A used to go to the same high school as Anonymous. B knows this. A told B that Anonymous could do sports and was smart.	名無しさんはスポーツも勉強も出来た。	Anonymous could do sports and was smart.
A さんは名無しさんの交通事故の後、まだ名無しさんに会っていませんでした。B さんはこのことを知っています。A さんは B さんに名無しさんが記憶喪失になったと話しました。	A hasn't seen Anonymous after Anonymous had gotten into a traffic accident. B knows this. A told B that Anonymous has lost (PRO) memory.	名無しさんは記憶喪失になった。	Anonymous lost (PRO) memory.
A さんはアイスクリームを冷凍庫から取り出しました。アイスクリームのパッケージにペンギンの絵が見えました。A さんはこのことを B さんに話しました。	A took out some ice cream from the freezer. (PRO) could see a picture of a penguin on the ice cream package. A told B this.	アイスクリームは溶けている。	The ice cream is melted.
A さんは駅に行きました。駅の	A went to the train	環状線の車	There's a

ホームに猫がいるのが見えました。A さんはこのことを B さんに話しました。	station. (PRO) could see a cat on the train platform. A told B this.	両にトラブルがある。	problem with one of the loop train carriages.
A さんは名無しさんとテレビを見ていました。名無しさんがスノボの CM で興奮するのが見えました。A さんはこのことを B さんに話しました。	A was watching TV with Anonymous. (PRO) saw get excited at a snowboarding commercial. A told B this.	名無しさんは車を購入する。	Anonymous will buy a car.
A さんは昨日、名無しさんをディズニーランドで見かけました。名無しさんがポップコーンを食べているのが見えました。A さんはこのことを B さんに話しました。	A saw Anonymous at Disneyland yesterday. (PRO) could see Anonymous eating popcorn. A told B this.	名無しさんは誕生日を祝っていた。	Anonymous was celebrating (PRO) birthday.
A さんは名無しさんの実家に行きました。名無しさんがかけっこで 1 位をとっている写真が見えました。A さんはこのことを B さんに話しました。	A went to Anonymous's parents' home. (PRO) could see a photo of Anonymous getting first place in a foot race. A told B this.	名無しさんは小さい頃、勉強ができた。	Anonymous excelled in school when (PRO) was small.
A さんは名無しさんの家の前を通りました。名無しさんの犬が寝ているのが見えました。A さんはこのことを B さんに話しました。	A walked by Anonymous's house. (PRO) could see Anonymous's dog sleeping. A told B this.	名無しさんは今朝髪を切った。	Anonymous cut (PRO) hair this morning.
A さんは石神山のことを聞いたことがありません。B さんはこのことを知っています。A さんは B さんに石神山で山火事が起きていると話しました。	A has never heard of Ishigami Mountain. B knows this. A told B that a mountain fire had started at Ishigami Mountain.	石神山で山火事が起きている。	There's a mountain fire going on in Ishigami Mountain.
A さんはデイリージムのことを聞いたことがありません。B さんはこのことを知っています。A さんは B さんにデイリージム	A has never heard of Daily Gym. B knows this. A told B that Daily Gym has a pool.	デイリージムにはプールがある。	Daily Gym has a pool.

にはプールがあると話しました。			
A さんはアメリカドラマの「グリー」を聞いたことがありません。B さんはこのことを知っています。A さんは B さんに「グリー」が終了すると話しました。	A has never seen the show "Glee". B knows this. A told B that the "Glee" series was ending.	『グリー』は終了する。	"Glee" is ending.
A さんは名無しさんとファンタジーランドの話をしたことがありません。B さんはこのことを知っています。A さんは B さんに名無しさんがファンタジーランドまでの道を知っていたと話しました。	A has never discussed Fantasyland with Anonymous. B knows this. A told B that Anonymous knew the way to Fantasyland.	名無しさんはファンタジーランドまでの道を知っていた。	Anonymous knows how to get to Fantasyland.
A さんは PTA ミーティングに出席しませんでした。B さんはこのことを知っています。A さんは B さんにミーティングで意見を主張した人がいたと話しました。	A did not attend the PTA meeting. B knows this. A told B that there was an individual who asserted their opinion at the meeting.	ミーティングで意見を主張した人がいた。	There was a person who asserted their opinion at the meeting.
A さんは南川町のことを聞いたことがありません。B さんはこのことを知っています。A さんは B さんに南川町では高齢の方が増えたと話しました。	A has never heard of Minamikawa Town. B knows this. A told B that the number of elderly had increased in Minamikawa Town.	南川町では高齢の方が増えた。	The number of elderly Minamikawa Town increased.

APPENDIX G

Consent form and translation for Chapter 3 experiment

研究題目: 日本語の証拠性表現についての意味論と語用論
(STU00201044)

主任研究員: グレゴリー・ワード

スポンサー: この研究はノースウェスタン大学の総合大学院と言語学部によってスポンサーされています。

研究参加者としての適格性

貴殿は日本語のネイティブ・スピーカーとしてこの研究への参加を要請されています。尚、日本語での標準読解力、そして漢字の知識が必要になります。

この研究について

- この研究についての説明は下記のとおりです。
- 参加するかしないかは貴殿の自由です。
- 参加を辞退することができます。
- 参加同意後に参加を取り消すこともできます。
- どちらでも貴殿の決断は尊重されます。
- 決断に際しての質問を受け付けております 。

問い合わせ

質問、懸念事項、苦情、もしくは研究参加によって害を受けたと思われる場合は、研究チームまでお問い合わせください :
jmatsubara@u.northwestern.edu.

この研究は研究倫理審査委員会(IRB)によって確認・承認されました。次のような場合、IRBまで (312) 503-9338 か irb@northwestern.edu にご連絡ください:

- 研究チームが質問、懸念事項、苦情などに応答しない場合。
- 研究チームと連絡がつかない場合。
- 研究チーム以外の者と話したい場合。
- 研究被験者としての権利について質問がある場合。

- 研究についての情報が知りたい、もしくは研究に対しての意見がある場合。

研究成果

この研究は人がどのように言語（特に日本語）を用いてコミュニケーションを取るかについてのより良い理解につながります。これは法律などの関連した分野にも貢献できる可能性があります。（例えば法律では、法定で話者が何を伝えようとしているのかを正確に理解することが重要となります。）

研究期間

この研究は４５−６０分で終了する見込みとなります。

研究被験者数

この研究は国内・外で約４００人の被験者を募る見込みとなります。

研究に参加する場合

この研究はインターネットが備わっているコンピュータからアクセスすることができるウェブ上での研究です。４５−６０分で終了する見込みとなっています。日本語の文章を読んだ後、それらの表現についての解釈や許容性の判断となります。年齢などの背景質問も幾つかある可能性があります。質問がある場合はいつでも研究チームに問い合わせることができます。

研究参加の拒否

研究はいつでも支障なく辞退することができます 。

研究参加同意後の参加取り消し

研究はいつでも支障なく辞退することができます 。

研究参加を辞退する場合、貴殿のデータは研究分析に含まれないこととなります。辞退するにはブラウザーを閉じるかコンピュータをシャットダウンしてください。

研究参加のリスク

この研究には、日常的に存在する身体的・感情的（心理的）リスクを上回るような実験上の危険性はありません。

研究参加のメリット

この研究に参加するにあたって、貴殿や他者への直接的なメリットは約束できません。しかし、可能性としては、 一時的な言語認識の向上が挙げられます。

研究で収集されたデータの行方

研究記録を含む個人情報は、極力この情報を解析する必要がある人物によってのみ使用・開示されます。完全な守秘は約束できません。貴殿の情報を調査・コピーする可能性がある組織・個人はIRB、他の弊機関代表、主任研究員やそのスタッフのメンバーなどです。

個人情報を含まない研究記録はノースウェスタン大学の研究情報セントラル貯蔵プラットフォーム、「ヴォルト」にて保存されます。データのコピーはクアルトリックスでも保存されます。クアルトリックスのデータは全て暗号化され、劣化したハードドライブのデータはU.S. DODの基準にそって処分された後、第三者処分処理センターに送られます。

必要事項

この実験に参加する場合は、被験者としての時間と努力を称えて＄７（もしくは８５０円）の報酬がAmazon e-ギフト券で支払われます。

このアンケートで得られた結果は教育や研究、そして論文や学会での発表などで使用される場合があります。貴殿個人の結果がハイライトされる場合、貴殿の個人情報は研究コードナンバーを使うことによって守られます。

任意事項

以下は任意であり、研究参加に必要な同意ではありません。適応する箇所にイニシャルを入力することで貴殿の意思を示してください。

Title of Research Study: The semantics and pragmatics of Japanese evidentials (STU00201044)

Investigator: Gregory Ward

Supported By: This research is supported by the Northwestern University Graduate School and Linguistics Department.

Why am I being asked to take part in this research study?

We are asking you to take part in this research study because you are a native speaker of Japanese who has demonstrated standard reading proficiency in Japanese including Chinese characters (kanji).

What should I know about a research study?

- The research study will be explained to you.
- Whether or not you take part is up to you.
- You can choose not to take part.
- You can agree to take part and later change your mind.
- Your decision will not be held against you.
- You can ask all the questions you want before you decide.

Who can I talk to?

If you have questions, concerns, or complaints, or think the research has hurt you, talk to the research team at jmatsubara@u.northwestern.edu.

This research has been reviewed and approved by an Institutional Review Board ("IRB"). You may talk to them at (312) 503-9338 or irb@northwestern.edu if:

- Your questions, concerns, or complaints are not being answered by the research team.
- You cannot reach the research team.
- You want to talk to someone besides the research team.
- You have questions about your rights as a research participant.
- You want to get information or provide input about this research.

Why is this research being done?

This research will lead to a better understanding of how people communicate with language, specifically Japanese. This could potentially benefit related fields such as the law, where it is crucial to know what exactly a speaker in the court is trying to convey.

How long will the research last?

We expect that you will be in this research study for 45-60 minutes.

How many people will be studied?

We expect at most 400 people will be in this research study internationally.

What happens if I say "Yes, I want to be in this research"?

This is a web-based study that you can access from any computer that has Internet. It is anticipated to take 45-60 minutes. You will be asked to read some Japanese sentences and then give judgments about the acceptability and/or interpretation of language expressions. You may also be asked some background questions like your age. If you have any questions during the study, you are free to contact the research team at any time.

What happens if I do not want to be in this research?

You can leave the research at any time and it will not be held against you.

What happens if I say "Yes", but I change my mind later?

You can leave the research at any time and it will not be held against you.

If you decide to leave the research, your data will not be included in the analysis. If you do decide to leave the research, you can simply close the browser or shut down your computer.

Is there any way being in this study could be bad for me?

Taking part in this research study does not involve any physical or psychological risk to you beyond that of everyday life.

Will being in this study help me in any way?

We cannot promise any benefits to you or others from your taking part in this research. However, possible benefits include a temporary increase in linguistic awareness.

What happens to the information collected for the research?

Efforts will be made to limit the use and disclosure of your personal information, including research study records, to people who have a need to review this information. We cannot promise complete secrecy. Organizations/individuals that may inspect and copy your information include the IRB, other representatives of this institution, the study investigator, and members of the investigator's staff.

The data, which will be void of any identifying information, will be stored on Vault, Northwestern University's central storage platform for research information. A copy of the data will also remain on Qualtrics. All data at rest on Qualtrics are encrypted, and data on deprecated hard drives are destroyed by U.S. DOD methods and delivered to a third-party data destruction service.

What else do I need to know?

If you agree to take part in this research study, we will pay you $7 (or 850 Japanese yen) through an Amazon e-gift card for your time and effort.

Results of this survey may be used for teaching, research, publications, or presentations at scientific meetings. If your individual results are discussed, your identity will be protected by using a study code number.

APPENDIX H

Linear regression modeling R code and output for Chapter 3 experiment

Block 1 key: 'Rating' - naturalness rating; 'CNJ' - Speaker Conjecture; 'Strength' -Strength of Evidence; 'EvA' - evidential contrast A (bare proposition vs. other follow-ups); 'EvB' - evidential contrast B (- textitkamoshirenai vs. other follow-ups excluding bare proposition); 'LC' - length of context; 'LF' - length of follow-up; 'Age' - age range of participant; 'Freq' - frequency of Japanese usage.

Model for naturalness encompassing all evidential follow-ups: lmerpmax = lmer(Rating ~ CNJ * Strength * (EvA + EvB) + LC + LF + Age + Freq + (1 + CNJ * Strength * (EvA + EvB) | Participant) + (1 + CNJ * Strength * (EvA + EvB) | Proposition), control = lmerControl(optimizer="bobyqa"), data=p, REML=F)

Block 2 key: 'Rating' - naturalness rating; 'CNJ' - Speaker Conjecture; 'Strength' -Strength of Evidence; 'EvA' - evidential contrast A (bare proposition vs. other follow-ups); 'EvB' - evidential contrast B (<matrix-clause hearsay, -*sooda*> vs. <-*kamoshirenai*, -*rashii*, -*yooda*); 'EvC' - evidential contrast C (<matrix-clause hearsay> vs. <-*sooda*, -*kamoshirenai*, -*rashii*, -*yooda*>); 'LC' - length of context; 'LF' - length of follow-up; 'Age' - age range of participant; 'Freq' - frequency of Japanese usage; 'Block1' - naturalness ratings from Block 1.

Fixed	Estimate	SE	t-value	*Random*	Effect	Variance	Std. Dev.
CNJ	1.4460	0.1321	10.943*	Participant	(Intercept)	0.2342	0.4839
Strength	1.1539	0.1074	10.740*		CNJ	0.3761	0.6132
EvA	0.2920	0.2003	1.458		Strength	0.1719	0.4146
EvB	0.8037	0.1844	4.359*		evA	0.4559	0.6752
LC	-0.0045	0.0060	-0.746	Proposition	(Intercept)	0.0552	0.2349
LF	-0.0043	0.0133	-0.323		CNJ	0.2262	0.4756
Age	0.0196	0.0517	0.378		Strength	0.1422	0.3771
Freq	0.0161	0.0784	0.205		evA	0.1821	0.4267
CNJ:Strength	-1.3392	0.1373	-9.757*		evB	0.2610	0.5109
CNJ:EvA	-0.6184	0.2581	-2.396*				
CNJ:EvB	2.9539	0.2621	11.270*				
Strength:EvA	-0.5540	0.2503	-2.213*				
Strength:EvB	2.2958	0.2519	9.115*				
CNJ:Str:EvA	-1.2060	0.4739	-2.545*				
CNJ:Str:EvB	-0.9892	0.4654	-2.125*				

Table H.1. Output for naturalness encompassing all evidential follow-ups

Model for contradictoriness encompassing all evidential follow-ups: lmernotpmax = lmer(Rating ~ CNJ ∗ Strength ∗ (EvA + EvB + EvC) + LC + LF + Age + Freq + Block1 + (1 + CNJ ∗ Strength ∗ (EvA + EvB + EvC) | Participant) + (1 + CNJ ∗ Strength ∗ (EvA + EvB + EvC) | Proposition), control = lmerControl(optimizer="bobyqa"), data=notp, REML=F)

?

Fixed	Estimate	SE	t-value	*Random*	Effect	Variance	Std. Dev.
CNJ	0.0794	0.0801	0.991	Participant	(Intercept)	0.6593	0.8120
Strength	0.0781	0.0664	1.176		CNJ	0.0135	0.1160
EvA	-1.8104	0.1647	-10.995*	Proposition	(Intercept)	0.0254	0.1594
EvB	0.0370	0.2402	0.154		CNJ	0.0403	0.2006
EvC	2.2018	0.1657	13.291*				
LC	0.0021	0.0052	0.413				
LF	0.0133	0.0076	1.751				
Age	0.0069	0.0859	0.081				
Freq	0.0820	0.1212	0.677				
Block1	0.0367	0.0221	1.664				
CNJ:Strength	0.4971	0.1425	3.488*				
CNJ:EvA	0.2229	0.2639	0.844				
CNJ:EvB	0.7419	0.4077	1.820				
CNJ:EvC	-0.1836	0.3299	-0.556				
Strength:EvA	0.3358	0.2635	1.275				
Strength:EvB	-0.3421	0.4057	-0.843				
Strength:EvC	0.1538	0.3299	0.466				
CNJ:Str:EvA	0.7487	0.5275	1.419				
CNJ:Str:EvB	-0.1131	0.8067	-0.140				
CNJ:Str:EvC	0.2175	0.6599	0.330				

Table H.2. Output for contradictoriness encompassing all evidential follow-ups