

Belief States and Evidence in Speech Acts:
The Japanese Sentence Final Particle *no*

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0.1 Acknowledgements

To keep it brief, I would like to thank the people that were most closely involved with this thesis, even though I certainly have many more to thank.

First of all, I thank Yukinori Takubo for taking me in at Kyoto University and introducing me to the linguistic community within and connected to Japan. He was my original advisor and had to retire before the write-up got serious, but taught me to take extant accounts, especially of the structure of Japanese, with a grain of salt, always encouraging me to pursue my own path in my research.

I also thank Syuntaro Tida, who has been my advisor for the past year, for taking over, bearing with my formalisms, and sharing his impressive overview of the relevant literature on (and in) Japanese, solidifying the empirical basis considerably. I have also benefited from discussion with and comments from my fellow students, as well as committee members Kazuhiko Yoshida and Yutaka Yoshida, when presenting aspects of this work at Kyoto University linguistics' weekly seminar for grad students.

I am greatly indebted to Eric McCready, who never quite became my official advisor, but was finally able to join the committee for the defense. As my "shadow advisor", he has been accompanying the development of the thesis from the beginning, inspired me to think outside the box, and, most importantly for the result, provided many extremely helpful comments and criticism in hours of discussion. He also at times reminded me that sometimes the order of the day must be to take it easy, which I am equally grateful for.

Out of the many people who have supported me during my time in Kyoto, Magda and Stefan Kaufmann, who were visiting in the fall semester of 2005, stand out for the invaluable advice they were always ready to provide on my research, and for showing me how to get from intuition to formalization.

Needless to say, this thesis is far from flawless, in spite of the support I've had, and all flaws are my own. I am hoping that it can contribute to the understanding of the Japanese particle *no* and utterance felicity nevertheless, and last, but not least, preemptively thank all of its future readers, who I hope will find the proposal to be of some interest.

0.2 Introductory remarks

The basic goal of this thesis is rather simple: to show that the effect of adding the Japanese particle *no* has on bias patterns of utterances can be explained on the premise that *no* adds a condition on the speech-act level requiring evidence supporting the prejacent accessible to all participants.

The idea that *no* is, in one way or another, an evidential particle is not new (*cf.* Aoki (1986), Tenny (2006) and references therein), and has been integrated into a formal analysis by Davis (2011), whose proposal I also build on. The novelty of my proposal is that *no* is treated as a lexical item directly modifying the evidence requirements within the utterance's felicity conditions, in that the kind of evidence that *no*-utterances require is the same kind of evidence Grice (1975) and Searle (1969) find is necessary for felicitous assertion — in short, *no* marks (sufficient) grounds for assertion.

To implement this perspective on *no* requires a formal framework which is able to capture felicity not only with regard to evidence, but also belief, as both are inseparably connected within utterance felicity conditions. This is not only because they are what Gricean Quality is built on, but also because on the view I defend, commitment arising from assertion is essentially (public) speaker belief backed up by evidence as grounds for assertion. Predicting the bias patterns and capturing the communicative effect of utterances with *no* from the apparently simple premise of evidence marking on the speech-act level within such a framework also requires taking into account a number of other factors, such as evidence in the utterance situation, communicative intentions, and implicatures arising from forgone active alternatives.

This thesis is an attempt to tackle this task, which requires a rather complex machinery incorporating the necessary concepts, the construction of which takes up the better part of the page count. The analysis of *no*-utterances proper, while relying on results of the discussion preceding it throughout, is found in section 3.4, and is a potential starting point for readers not too concerned with technical details, possibly in combination with the first chapter, in which the particle *no* is introduced.

0.3 Overview

This thesis offers an analysis of the Japanese particle *no* as an utterance modifier adding a preparatory evidence condition to basic utterance meaning. Crucially, this is not a condition requiring evidence in the sense of marking information sources as in extant analysis on (prejacent-level) evidential expressions, but evidence as required for the felicitous performance of speech acts. More concretely, *no* introduces a condition that the kind of evidence or grounds that a speaker needs to have for the felicitous assertion of a proposition be available to both speaker and addressee of the utterance it occurs in. This analysis accounts for the effect of *no* on bias patterns as a communicative effect arising from the contrast between *no*-utterances and their plain counterparts. The empirical focus of the analysis are salient cases of *no*-utterances which have been discussed as representative examples for the evidential contribution of *no* in the literature: polar-questions, *ka*-utterances with final falling intonation, and *daroo*-utterances expressing results of inference. The thesis is structured as follows.

Chapter 1

The first chapter discusses the scope of the thesis on the background of previous research on Japanese *no* as a complementizer and an evidential particle, showing that the sentence-final particle *no* is a distinct lexical item from the complementizer with distinct functions and a distinct structural position, and defining the empirical focus of the thesis as the interaction of the particle *no* and the bias patterns of the three aforementioned utterance types: polar questions, falling *ka*-interrogatives, and *daroo*-assertions. To differentiate between the complementizer and the particle *no*, both are located within models of Japanese sentence structure, showing that the sentence-final particle is “higher” or “outer”, *i.e.* more peripheral in the sentence. The functions of both are summarized based on previous descriptive research, focusing on the evidential properties of the particle *no*, and showing that the complementizer *no* does not function as an evidence marker. Bias patterns of utterances and their interaction with *no* as an evidential, sentence final particle are il-

illustrated with concrete examples forming the empirical basis of the thesis. Finally, the origins of *no* are discussed, underlining that while there are diachronic connections to the complementizer *no*, the sentence final particle *no* is synchronically an independent lexical item.

Chapter 2

Moving on to the formal analysis, the second chapter provides a framework for capturing utterance felicity conditions and, on the basis of this, the bias patterns observed in the first chapter. The framework proposed here models Gricean maxims of quality applied to four utterance types differentiated by illocutionary force (declarative and interrogative) and prosody (final rising and final falling intonation) based on the notions of belief, evidence, and commitment. Belief conditions are modeled in terms of belief propositions over the prejacent proposition, which require support by doxastic states of the participants for the utterance to be felicitous. Evidence conditions are modeled in terms of evidence propositions over the prejacent proposition, which require evidence supporting the prejacent proposition for the utterance to be felicitous. Commitments are defined as non-negated belief propositions, or belief states, representing speaker beliefs backed by the evidence an utterance requires to be felicitous.

Within this framework, felicity conditions for the four aforementioned utterance types are defined as preparatory belief conditions, evidence conditions, and commitments. The utterance modifier *daroo*, which needs to be integrated into the framework in order to account for the contribution of *no* in *daroo*-utterances, is analyzed as an operator lowering the quality threshold, reflecting the bias patterns of assertions (*i.e.* falling declaratives) with *daroo*. A final addition to the formal framework is the notion of forgone commitment arising from interrogative utterances, which is introduced in order to capture the communicative effect of questions and expressions of doubt.

Chapter 3

Chapter 3 constructs a dynamic context-change potential (CCP)-framework in which utterances are modeled as links between input and output contexts constrained in terms of the building blocks introduced in Chapter 2, where conditions on the input context correspond to preparatory belief and evidence conditions, those on the output context to (forgone) commitments. Contexts are defined as sets of propositions corresponding to worlds, the part of contexts that CCPs operate on being defined by the definition of input and output conditions in form of belief and evidence propositions only. Differences in felicity conditions are reflected in the conditions on input and output contexts linked by the CCPs corresponding to each utterance type.

In order to fully capture the communicative effects, and thus the bias patterns, of utterances with and without *no*, extralinguistic context sets and communicative intentions are introduced to the framework as a basis to account for utterance choice under given constellations of previous beliefs and evidence, as well as addressee reasoning over such choices. Output context conditions reflecting commitments in CCPs are shown to be enriched by implicatures in the form of negated output conditions of forgone active alternatives as determined by the communicative intention of the speaker, and the (satisfied) belief and evidence conditions of the input context. Assuming that *no* modifies the utterance by adding the aforementioned requirement for mutually accessible evidence supporting the prejacent to the input conditions, the dynamic framework thus predicts observed bias patterns of the *no*-utterances discussed in chapter one.

In conclusion, the analysis explains the communicative effects of adding *no* arising for each utterance type by the additional evidence condition that *no* introduces on top of the basic meaning of the respective utterance types (in form of their felicity conditions as defined in chapter 2), and, additionally, the implicatures which arise from forgoing alternative utterances, the presence of the fellow utterance modifier *daroo*, and compatibility of the utterance meanings thus derived with the speaker's communicative intentions and extralinguistic contextual constellations.

Chapter 1

Japanese *no* as a sentence final particle

This chapter defines *no* as a sentence final particle as the empirical scope of the analysis put forward in this thesis. The central claims are that *no* occurring sentence-finally as a particle is distinct from both the complementizer and the nominalizer *no* and is best understood as a sentence final particle, even if it differs from other members of this class of expressions in some points, and that only the sentence final particle, but not the complementizer or nominalizer *no* has (lexically) evidential properties. The grounds for this claim are as follows. First, *no* as a particle occurs higher, *i.e.* in a more peripheral position, in the structure of the Japanese clause than *no* as a complementizer, as defended in section 1.1. Second, the particle *no* and the complementizer *no* have different functions, as discussed in section 1.2, and by example of the bias patterns discussed in section 1.3 of three kinds of utterances where *no* occurs as a particle, polar questions, falling interrogatives, and *daroo*-assertions, which the analysis in the subsequent chapters aims to explain. The final argument for the independence of *no* as a particle is that it can be seen as a result of a pragmaticalization process which gave rise to its evidential meaning, as proposed in section 1.4. Section 1.5 closes the chapter with a summary of claims and findings.

1.1 *No* and Japanese sentence structure

The particle *no* has been classified as a nominalizer, a complementizer, and a (pragmatic) particle. There is also a homophonous genitive marker, which not only has a different function,¹ but diachronically different origins and is realized differently in dialects. Labels for *no* as a particle differ depending on the theoretical inclination of the author, and include stance marker, evidential particle, or mood particle.

In this section, I discuss some of the previous analyses in the literature with the goal of finding criteria and tests for and singling out unambiguous cases of *no* as a particle, rather than a complementizer (its use as a nominalizer is, I contend, easier to distinguish). I will furthermore motivate the label ‘sentence final particle’ applied to *no* in the title of this thesis as the best match from the inventory of extant terms for the Japanese lexicon of expressive markers in the sentential periphery, while maintaining that the function of *no*, the particle, is that of an utterance modifier, according to the analysis offered in this thesis.

1.1.1 *No* as a relativizer / complementizer

I suggest that morphosyntactic function is a good guide to roughly differentiate between *no* the nominalizer, the complementizer, and the particle. The basic function of a nominalizer in these terms is deriving nominal elements from verbal elements, for instance when deriving deverbal nominals in argument position. An example for this is (1.1).

- (1.1) *Kare-ga tsukutta no-o tabe-tai.*
 he-NOM made *no*-ACC eat-VOL
 ‘I want to eat { what / the one } he made.’

In this example, *no* is used pronominally. Note, however, that relativization and a *no*-pronominal in argument position can be realized with the same form

¹For a different perspective, attempting to unify genitive marking, nominalizer and complementizer function under the label of nominalization, see Shibatani (2013). Such an analysis is in principle also compatible with that provided in this thesis if the pragmatic, in particular evidential, function of *no* is treated as a distinct phenomenon from nominalization.

in Japanese, whereas in English these are distinct constructions, as shown in the English translation (historically, Japanese *no* has had a relativizing function as well, see section 1.4). That *no* is basically pronominal in this case can be easily verified by the substitution test in (1.2).

- (1.2) *Kare-ga tsukutta { ryoori / mono }-o tabe-tai.*
 he-NOM made dish thing -ACC eat-VOL
 “I want to eat { the dish (that) / the one (that) / what } he made.”

This test shows that *no* can be substituted by any plausible noun, such as *ryoori* ‘dish’ in the example, and by *mono* ‘thing’ which can refer to any concrete entity. Under the assumption that the particle *no* is not referential, cases where *no* can be substituted by nouns (limited only by plausibility of the referent) need to be excluded from the scope of this thesis, as well as cases in which *no* occurs in an argument position of a predicate.

No and koto Masuoka (1997) classifies clauses headed by *no* and the formal noun² *koto* as nominalized clauses (*meishietsu*, literally ‘noun clause’), which are “subordinate clauses serving as complements and topics followed by case or topic particles” — that is, they occur in argument positions and are hence to be excluded from the scope of the discussion.

The availability of substitution with *koto* is a diagnostic for such cases. Masuoka notes that *koto* occurs in what he labels endocentric as well as in what he labels exocentric constructions, citing the examples below, where (1.3) is endocentric as *koto* refers to the object of the verb “say”, whereas (1.4) is exocentric as *koto* refers to the state-of-affairs denoted by the negated predicate “stand”.

- (1.3) *Anata no it-te-ru koto-wa daitai wakat-ta.*
 you GEN say-PROG-NPST koto-TOP roughly understand-PST
 “I basically got what you are saying.”

²“Formal noun” is a translation of *keishiki meishi* a term for semantically bleached nouns like *koto* ‘thing’ (abstract), *mono* ‘thing’ (concrete), *tokoro* ‘place’ etc., which serve to subordinate the clause modifying them. There is an alternative term *juntai-joshi* for particles marking *jun-taigen* ‘quasi noun’s.

- (1.4) *Chak-koo no medo-ga tat-tei-nai*
 start-construction GEN aim-NOM stand-PROG-NEG.NPST
koto-ga hanmei_shi-ta.
koto-NOM confirm-PST
 “It is understood that there is no prospect for the start of
 construction.”

both examples from Masuoka (1997, 18)

In the endocentric subordinate clause in (1.3), *koto* is used to refer to an abstract entity that is in an argument with the verb of the relative clause, that is, *koto* serves as a relativizer. In the exocentric (1.4), on the other hand, the state-of-affairs denoted by the subordinate clause becomes the subject of the matrix verb, but *koto* is in no argument relation with the subordinate predicate, and serves as a complementizer. While in either example, *no* can substitute *koto* (barring issues of register and case-marking in the subordinate clause), these are clearly cases to be excluded for an analysis of *no* as a particle.

A caveat for the substitution diagnostic are cases in which only *no*, but not *koto* can occur, but are nevertheless “nominal clauses” in Masuoka’s sense. The examples he quotes are endocentric relative clauses where *no* corresponds an argument within the relative clause as in (1.5) and (1.6).³

- (1.5) *Boku-ga yon-da no-wa kono hon da.*
 I-NOM read-PST no-TOP this book COP
 “What I read is this book.” “The one I read is this book.”

- (1.6) [...] *Yasuko-ga rikon-shite hitori-de kurashi-tei-ru no-o*
 Yasuko-NOM divorce-do alone-by live-PROG-NPST no-ACC
nagusame-ru tame-ni tazune-ta.
 console-NPST purpose-for visit-PST
 “...*pro* came visit to console Yasuko, who lives by herself after having divorced.”

(both examples from Masuoka (1997, 22))

³Such constructions are also labeled head internal relative clauses (HIRCs), as opposed to head external relative clauses, especially in the productive diachronic and cross-linguistic literature on nominalized clauses in Japanese and neighboring languages.

(1.5) can be easily excluded by the first substitution test, as *no* is used pronominally, and can thus be substituted by a number of nouns which are compatible in meaning with “book”, and with the underspecified *mono* making reference to a concrete entity. (1.6), on the other hand, cannot be excluded by substitution tests, as only *no* is available. However, the example, a literal paraphrase of which would be on the lines of “...consoling Yasuko’s living alone”, is all but indistinguishable in meaning from a version corresponding to “...consoling Yasuko, who is living alone”, where the subject of the relative clause is extracted to replace *no*.

Finally, Masuoka shows examples in which he takes the *no*-headed clause to describe the speaker’s experience at the time of utterance, in which *koto* cannot replace *no* due to their status as “subjective-descriptive sentences” (*shukanteki byoosha bun*). This is by no means a primary feature of *no* as a complementizer (it rather seems that *koto* requires some degree of objectivity), but a potentially interesting connection to the function of the particle *no* marking perceptual evidence. Such a connection is a diachronic one, however: synchronically, the complementizer heading a clause in argument position and the particle *no* can co-occur and are clearly distinct, and the particle is not limited to descriptions of immediate experiences.

The referentiality criterion Summing up, I conclude that the primary test for *no* as a referential element, possible labels for which include nominalizer, pronominalizer, relativizer and complementizer, is occurrence in argument position, usually accompanied by case- or topic marking. Substitution tests can serve as additional diagnostics, that is *no* as a particle cannot be substituted by lexical noun phrases, the formal nouns *koto* and *mono*.⁴ The first diagnostic for the particle *no* is thus that it is non-referential.

This leaves only instances of *no* which are sentence final within the main clause, as opposed to heading a subordinate clause or being used pronominally in argument position. In the following section, I review previous re-

⁴There is a caveat to this in form of the homophonous particle *mono*, which in contrast to the formal noun can be reduced to *mon*, occurs sentence-finally, can replace some instances of the particle *no*.

search on where *no* occurs within the Japanese sentence, showing that as a particle, *no* is more peripheral than as a complementizer.

1.1.2 Layered models of sentence structure and *no*

Japanese is a strictly right-headed language, which in principle means that the further right in linear order a functional head is found, the higher it is in the syntactic hierarchy. In more general terms of sentence meaning, the Japanese clause can be seen as a layered structure around the propositional core. This holds for both elements occurring in the clause as free morphemes and for verbal inflections in form of agglutinating suffixes, which follow the sequence tense - aspect - mood. The purpose of this section is to locate the particle, as well as the complementizer, *no* within the structure of the Japanese clause, both in terms of morphosyntactic structure and in terms of meaning.

The layer model One particularly influential approach cited in much of the previous research on elements with expressive, non-propositional meaning such as sentence final particles such as *yo* and *ne*, the utterance modifier *daroo*, but also *no* as a particle, is the layered structure of the Japanese clause proposed by Minami (1974). Of particular interest for the present thesis focusing on expressive elements on utterance level are the observations on Minami's analysis in Takubo (1987), who proposes the following correspondence of Minami's layers to syntactic categories and meaning types.

(1.7) Layers of the Japanese sentence:

(Takubo 1987 based on Minami 1974)

layer	structure	meaning	expression
A	verb phrase	action	predicate
B	clause	state of affairs	negation and tense
C	main clause ⁵	judgment	modals
D	utterance	transmission	sentence final particles

In this classification, sentence final particles like *yo* and *ne* fall squarely into category D, as embedding tests show: according to Takubo, elements in category D are only embeddable as (direct) quotations with the quotation marker *to* or *to-iu* ‘to-say’. As for status of sentence final expressions with expressive meaning *daroo* and the particle *no*, which I take to be utterance modifiers, Takubo classifies *daroo* as type C on the grounds that it conveys the speaker’s judgment and can, for instance, be embedded under *kara* ‘because’, when the “latter conveys grounds for judgment”⁶ The status of the particle *no*, on the other hand, is not immediately clear.

The complementizer *no* in the layered structure

Regarding the complementizer *no*, Takubo shows that it serves as a scope-adjuster, allowing question formation and modals to target constituents within the clause rather than the entire state-of-affairs denoted by the predicate.⁷ While he is not concerned with the status of *no* as a particle, the following examples Takubo (1987, 45) gives to illustrate the type (within the layered structure) of subordinate clauses are interesting in this respect.⁸

- (1.8) *Tanaka-san-ga iru kara, Hokkaido-ni iku no*
 Tanaka-HON-NOM be.NPST because Hokkaido-to go.NPST *no*
daroo.
daroo

This example is ambiguous between two readings, paraphraseable as follows:

- (1.9) a. “I bet it’s because Tanaka is there that she’s going to Hokkaido.”
 b. “Since Tanaka is there, I bet she’s going to Hokkaido.”

⁵Japanese: *shusetsu*, in the sense of matrix clause as opposed to *juusokushetsu* ‘subordinate clause’ or *kankeishetsu* ‘relative clause’.

⁶Japanese original: *handan no konkyo*, translation my own.

⁷The constituents thus targeted need to be of type B or smaller, *i.e.* must be clauses that can be used for restrictive modification.

⁸Takubo uses this example to show that the subordinating connective *kara* ‘because’ is ambiguous between a reading or structural position of type C and of type B, where the former gives rise to the reading in (1.9b) as elements of type C are not the type of constituent that can be targeted by modals.

The English paraphrase for the first reading in (1.9a) makes transparent that this is essentially a cleft-like reading (a corresponding cleft is available and faithful to the paraphrase in Japanese as well), and that *no* is thus, indeed, a complementizer in this case. However, this is not the case on the reading in (1.9b) — as a cleft-like reading is unavailable for this paraphrase, as indicated in the English paraphrase by inversion and changing of *because* to *since*. To underline the observation, consider the following example provided by Takubo in which *no* is unambiguously not scope adjusting.

- (1.10) *Tanaka-san-ga iru keredo, Hokkaido-ni iku no*
 Tanaka-HON-NOM be.NPST but Hokkaido-to go.NPST *no*
daroo.
daroo
 “Tanaka-san is there, but I bet [she] is going to Hokkaido.”

This raises the question what the status of *no* is in examples like (1.8) on reading (1.9b) and in (1.10). My answer is that *no* is a particle and utterance modifier, rather than a complementizer and scope-adjuster in this case.

The particle *no* in the layered structure

Noda (1997, 209-210) proposes based the restrictions with regard to embedding and modification with modals that scope-adjusting *no(da)* (which I take to be unambiguously a complementizer) is located within Minami’s and Takubo’s layer B. As for *no(da)* of mood (which I roughly take to be either a complementizer or ambiguous in what Noda labels its connective functions, unambiguously a particle in what Noda its non-connective functions), Noda (1997, 229-230) maintains based on functional considerations that “factual *no(da)*” is part of Minami’s and Takubo’s layer C along with modal and evidential expressions, but also *daroo*, all of which are “forms expressing the mental attitude towards whether or not to acknowledge the truth of a state-of-affairs”.⁹ She also notes that *no* is further to the “inside”, *i.e.* lower in the structure than the other expressions in this group, as it can precede them

⁹Translation mine, Japanese original: *jitai no seiritsu-o mitomeru ka doo ka ni tsuite no shintekitaido-o arawasu keishiki.*

while they are in a paradigmatic relation with each other. I note at this point that this syntagmatic rather than paradigmatic relation supports my view that *no* as a particle is an utterance modifier. Next, regarding “personal *no*”, Noda takes it to be functionally on the fence between layers C and D, as it, like sentence final particles, conveys information regarding the transmission of information, especially cases like “*no(da)* with bleached meaning that is used lightly”¹⁰ Note that if this goes for *no*, or, as Noda puts it, *no(da)*, as her main focus is on *no* in assertions, it also likely goes for *daroo*. This observation on a sentence final particle-like use of *no* can be connected to my analysis of *no* as cases such as that of using the particle *no* to present an asserted state-of-affairs as obviously true, or based on what I label verifiable evidence. It also potentially connects to similar uses of *daroo*, such as its use in rising declaratives, which in terms of the functional classification of layers is much closer to type D, *i.e.* encoding information about transmission, than to type C, *i.e.* encoding information about the epistemic status of the proposition.

Summing up, the role of *no*, and its fellow utterance modifier *daroo*, within the outer layers of the Japanese clause has aspects of those ascribed to type C and D, the layers of “judgment” and “transmission”, respectively. The next question to address is whether or not this can be framed in terms of a difference in syntactic status.

1.1.3 The syntactic status of *no*

The status of *no* within a generative model of syntactic structure depends on its function, the most straightforward assumption being that nominalizer and complementizer *no* are NP- and CP-heads respectively. However, if the complementizer is less peripheral, *i.e.* lower in the structure than the complementizer *no* as argued above, the question of whether or not this is reflected in the syntax is raised. Here, I first discuss previous research taking *no* to be a complementizer, based on its selective properties and its scope-adjusting function (see also the next section), then moving on to possible higher posi-

¹⁰Translation mine, Japanese original: *imi-ga kihakuka shi karuku mochiirareru* ‘*no(da)*’.

tions within an articulated CP, which makes a connection to the evidential properties of *no*.

No as a CP-head

Recent support for the assumption that *no* is a CP-head, *i.e.* syntactically a complementizer comes from Saito (2012), who takes *no*, *ka*, and *to*, three elements occurring in the Japanese right periphery, to be specialized complementizers. The outermost *to* is analyzed as a complementizer for “paraphrases of direct discourse”, which can embed “question CPs” in turn headed by the complementizer *ka* thus specialized. Finally, the complementizer *no* is specialized for propositions. Within a split CP as proposed by Rizzi (1997), Saito proposes the following structural positions for *no*, *ka*, and *to*, following Hiraiwa and Ishihara’s (2002) proposal that *no* is a FIN-head.

(1.11) **No in the split CP (Saito and Haraguchi 2012):**

$$[_{CP} \dots [_{CP} \dots [_{CP} \dots \text{Finite}(no)] \text{Force}(ka)] \text{Report}(to)]$$

Saito furthermore argues that as *no*, as a FIN-head, specifically selects for TPs, it does not allow embedding of *daroo*, which he in turn takes to be a MODALP-head. This is reminiscent of the following structure proposed in Ono (2006, 14) for *no-daroo* in exclamatives (more on Ono’s analysis below), where *daroo* is taken to be a complex expression formed from a Focus particle *da* and a mood head *roo*.

(1.12) **No in the split CP (Ono 2006):**

$$[_{\text{MOODP}} \dots [_{\text{FOCUSP}} \dots [_{\text{FINITEP}} \dots \text{Finite}(no)] \text{Focus}(da)] \text{Mood}(roo)]$$

The analysis that both Saito and Haraguchi and Ono build upon is that of Hiraiwa and Ishihara (2002) and Hiraiwa and Ishihara (2012), who propose the following structure.

(1.13) **No in the split CP (Hiraiwa and Ishihara 2002):**

$$[_{\text{TOPP}} \dots [_{\text{FORCEP}} \dots [_{\text{FOCP}} \dots [_{\text{FINP}} \dots \text{Fin}(no)] \text{Foc}(da)] \text{Force}(ka)] \text{Top}]$$

Hiraiwa and Ishihara also propose a derivational link between clefts and what they call the “in-situ focus construction”, as in their example below.

- (1.14) *Naoya-ga ringo-o mittsu tabeta no da.*
 Naoya-NOM apple-ACC three ate no COP
 “Naoya ate **three apples**.”

- (1.15) *Naoya-ga tabeta no-wa ringo-o mittsu da.*
 Naoya-NOM ate no-TOP apple-ACC three COP
 “It’s three apples that Naoya ate.”

They argue that (1.15) is derived from (1.14) by focus movement and remnant topicalization. Without going into details, this means for the syntactic status of *no* that in its structuring function, which is essentially the function of the focus construction, the structure in (1.13) should be assumed.

With regard to the observations on complementizer and particle *no* within the layered Japanese sentence that the complementizer is less peripheral than the particle, the question arises of whether the particle *no* has its own place in the split CP, and if so, where in structure it fits, or is but another instance of the complementizer used in another function, which would mean that the CP-structure is applied recursively. In a footnote, Hiraiwa and Ishihara (2012, 155) provide the following example from an anonymous reviewer.

- (1.16) **Naoya-ga ringo-o mittsu tabeta no na n da.*
 Naoya-NOM apple-ACC three ate no COP.ADN no da

- (1.17) *Naoya-ga tabeta no-wa ringo-o mittsu na n da.*
 Naoya-NOM ate no-TOP apple-ACC three COP no COP

The issue raised by the reviewer is that the badness of (1.16) is unexpected considering that (1.17) is licit. Hiraiwa and Ishihara explain this by a putative morphological restriction that the *na* (=adnominal) form of the copula can “not appear when it is sandwiched between two *no*-complementizers”. This is interesting for two reasons.

First, it opens up the possibility that (1.14) is actually ambiguous between the reading that (1.16) stands for, but which is morphologically not possible, and a “plain” focus reading (Noda (1997) suggests that an instance of *no(da)* can have both functions at the same time). Second, Hiraiwa and

Ishihara (2012)’s reply shows that they assume that the particle *no*, which is what I take the second instance of *no* in (1.17) to be, is another instance of a complementizer, *i.e.* the example shows a cleft, derived from an in-situ focus construction, wrapped in an in-situ focus construction (where focus presumably takes widest possible scope). While there are no obvious problems with such a view in syntactic terms (after all, CPs can be embedded recursively), it is not at all clear how to derive the meaning of such a double-focus construction if both CPs receive in principle the same interpretation.

The alternative assumption would be that *no* in its use as a particle occupies a higher structural position than *no* as a complementizer. I take the fact that after the particle *no*, *da* and *ka* are in a paradigmatic relation, as shown in (1.18), to support the assumption that *da* is not only a focus particle, but can also be an assertion morpheme, that is a FORCE-head.¹¹

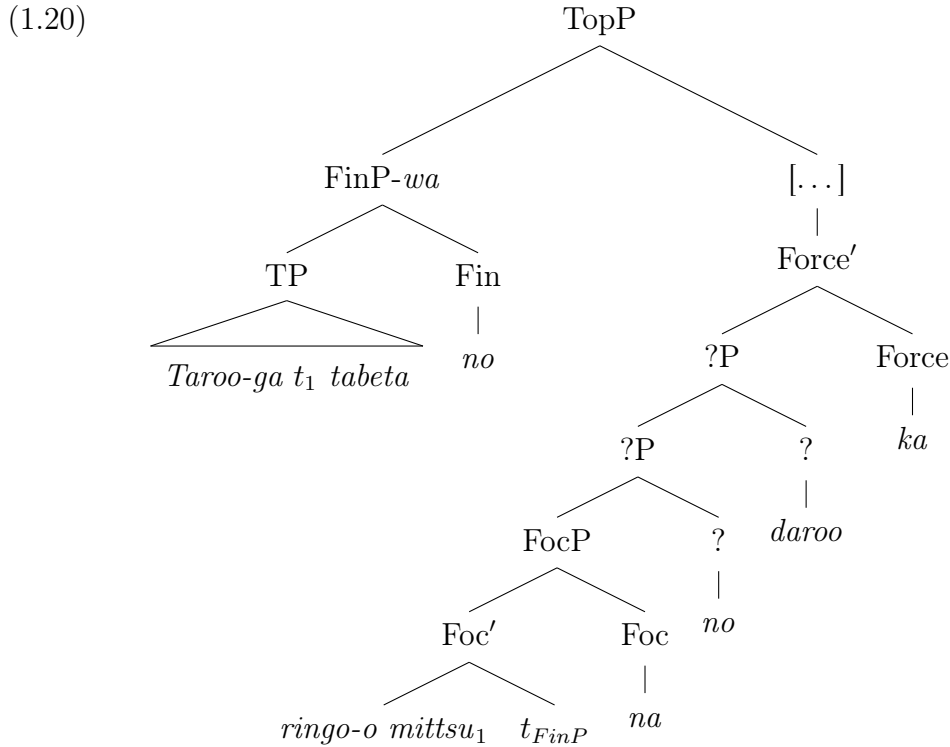
- (1.18) *Taroo-ga tabeta no-wa ringo-o mittsu na no*
 Taroo-NOM ate no-TOP apple-ACC three COP.ADN *no*
{da/ka}.
 Q COP
 “So it’s **three apples** that Taroo ate!”

If this, and the analysis of *no* as an utterance modifier, are on the right track, then *no* can be assumed to modify force. This is not without problems, however, as the availability of connective readings of *no-da* assertions, which is also available for (1.17) and which I do not take to be a reading of the particle, can be taken as support for a double-CP analysis. Furthermore, there is the issue that *no-daroo-ka* can be added to a cleft, as shown below.

- (1.19) *Taroo-ga tabeta no-wa ringo-o mittsu na no*
 Taroo-NOM ate no-TOP apple-ACC three COP.ADN *no*
daroo ka.
daroo Q
 “Is it **three apples** that Taroo ate?”

¹¹The sequence *da-ka* is good in *wh*-sluicing constructions, which Hiraiwa and Ishihara (2012) argue can be derived from *wh*-clefts deletion of the topicalized remnant, as in this example of sluicing with *nani* ‘what’: *Taroo-ga tabeta no-wa nani-o da ka wakaranai*.

I remain agnostic with regard to the preferable syntactic analysis, maintaining that the particle *no*, and possibly sentence final instances of the complementizer, are located in the area of syntactic structure indicated with question marks in the tree below, representing a structure in accordance with the observations above.



While the syntactic status of *no* as a complementizer and *no* as a particle thus appears to differ, even though it is not clear how exactly this can be implemented, modification has to occur lower in the structure than where other sentence final particles are added, underlining the different status of them and *no*. On my analysis, this difference reflects the distinction between discourse markers and utterance modifiers, like *daroo* and *no*. In summary, the considerations so far are compatible with the observation that *no* is on the fence between layers C (modals) and D (sentence final particles) of the Japanese clause. As additional diagnostics for the particle *no*, the unavailability of a corresponding cleft when sentence final *no* is a particle, and the possibility of adding the particle *no*, but not the complementizer *no* (at least its scope-adjusting function), to a cleft have emerged.

1.2 Functions of complementizer and particle *no*

The contrast between the scope-adjusting complementizer and the pragmatic particle *no* is described in detail in Noda (1997), who differentiates (as already mentioned at some points) between “scope *no*(da)” and “mood *no*(da)”. After some additional observations on scope-adjusting *no*(da), I will return to the sub-classification of “mood *no*(da)” and contrast Noda’s classification with the complementizer / particle split I propose.

1.2.1 The scope-widening function of *no*

In this section, I show, illustrated by data discussed in Ijima (2011), that *no* as a sentence-structuring complementizer does not always necessarily have a cleft-equivalent, and can be generalized to be a scope-widener rather than simply an operator allowing for negation etc. to target a single constituent within the clause.

Ijima (2011) makes observations on “non-final” instances of *no*(*da*), among others *no* with negation, *no* in *ka*-interrogatives, and *no* in expressions of inference. He notes that there is a dearth of research on these occurrences of *no*(*da*), at about 30 works, far outnumbered by the works on what he calls “final *noda*” (which he claims to number more than 200). Apart from providing instructive data, Ijima attempts to explain scope-adjusting and particle uses of *no* in a unified manner, in contrast to the assumptions made in the present thesis. To illustrate how the data is accounted for in different ways depending on the viewpoint, I discuss some of his data below.

The solution Ijima proposes is taking *no* to be a nominalizer in the sense of expressing an expectation of the speaker or addressee (that is, the nominalized clause is essentially a presupposed clause). To illustrate the role of context, Ijima gives this example:

- (1.21) A: ... *kono shashin-wa Pari-de tot-ta n desho?*
 this photo-TOP Paris-in take-PST *no daroo*

You took this picture in Paris, I guess?

- (1.22) *S: Pari-de kono shashin-o tot-ta n janai yo.*
 Paris-in this photo-ACC take-pst no COP.NEG SFP
 I didn't take this picture in PARIS.

On Ijima's view, S's utterance is felicitous by virtue of the "presupposition" (*zentei*, also "premise") that S has taken pictures in Paris, on the basis of which A utters an "expectation" (*kitai*) which S then revokes. This is compatible with what has been discussed above, as corresponding clefts have basically the same interpretation. Ijima notes that all sorts of constituents can be targeted by negation, as in the following example.

- (1.23) *S: Pari-de shashin-o tot-ta no dewanai.*
 Paris-in photo-ACC take-PST no COP.NEG
 "I didn't **take pictures** in Paris".

On the interpretation Ijima points out, there is a "presupposition" that the speaker did *something* in Paris, and the "expectation" that this activity was taking pictures is negated. A cleft cannot be directly derived from this, as the presupposed clause "I did something in Paris" is not an overt part of the clause. I add the observation to this that there is another interpretation of this clause, on which multiple constituents are negated, *e.g.* the speaker could be negating the "expectation" that she took pictures in Paris not since she did something else in Paris, but as she, for instance, went shopping in London. While this is a caveat for the test of cleft-derivation as a test for *no* in its sentence-structuring function, it makes clear that the function of *no* in these cases is to widen the scope of whichever function the sentence final morpheme has, be it negation, focus, or conjecture.

Making a connection between scope-adjusting and expressive *no*, Ijima gives the following example of a negated *no(da)*-clause expressing prohibition.

- (1.24) *Sugu ori-ru n da. [...]* *Tani-gawa-e*
 immediately descend-NPST no COP valley-side-to
iku n janai.
 go-NPST no COP.NEG
 "You have to go down immediately. You can't go to the valley side."

As Ijima observes, this cannot easily be explained in terms of constituent negation or negation of some expectation, but is closely connected to “modality” in a broad sense. I take this to also be covered by scope-widening, as there is contrastive focus on both constituents.

I conclude that the function of sentence-structuring *no* can be subsumed under scope-widening, making it possible for focus, negation, and marking of uncertainty with *daroo* to target not only the event or state-of-affairs denoted by the predicate, but other constituents in the utterance as well. I do, however, not assume that this is the only function of the complementizer *no*, which I take to have a discourse-oriented, connective or elaborating function as well. This function is discussed below.

1.2.2 Classification of non-structuring *no*

Apart from its clause-structuring function, there are two central topics in the functional description of the *no* in the sentential periphery, particularly of *no* in assertions also labeled “*noda*-sentences” (*noda-bun*), in the Japanese literature. I subsume the first under the label “givenness”¹², the second under “explanation”. On the view I propose, the first thing to exclude in order to restrict the scope of the discussion to the particle *no* rather than the complementizer is to exclude cases of “explanation”, which I take to be a discourse-oriented function of the complementizer *no*. Note that this function of the complementizer can also be observed in other languages, in particular in copular clauses corresponding to English “It’s that...”, but this does not mean that the complementizer also can be used as a particle. I contend, however, that the different versions of a notion of “givenness” cannot account for cases where *no* clearly adds evidential meaning to the utterance, however suitable they may be to explain more discourse-oriented uses, for instance such where the speaker seeks to present the prejacent as being previously known, in some way obvious, or “given”. Focusing on the evidential cases, where contrasts between plain utterances and those with *no* are comparably

¹²Alternatively “settledness”, from the Japanese *kiteisei*, lit. “the quality of being already decided” from *ki* ‘already’, *tei* ‘decided’, *sei* suffix denoting a quality.

sharp (as can be confirmed by the bias patterns in the second part of this chapter), I analyze *no* as an evidence marker on the speech-act level, and defend that this analysis also covers the “givenness” uses of *no*.

Connective uses of the complementizer *no*

Coming back to the classification of *no(da)* proposed by Noda (1997), she differentiates between four classes of “mood *no(da)*” as shown in the table translated from Noda (1997, 67), which shows the classification she proposes for “mood *no(da)*” in declarative sentences, *i.e.* assertions of a proposition Q.

(1.25) Noda’s classification of *no(da)* in assertions:

	factual (<i>taijiteki</i>)	personal (<i>taijinteki</i>)
connective (<i>kankeizuke</i>)	grasp Q as the meaning or background of P	present Q as the meaning or background of P
non-connective (<i>hi-kankeizuke</i>)	grasp Q (as a settled state of affairs)	present Q as (as a settled state of affairs)

The difference between personal and factual is orthogonal to that between complementizer and particle, but plays a role in the analysis of examples which are saliently interpreted as soliloquous utterances. Such utterances can convey information about the speaker’s beliefs with regard to the pre-jacent and their relation to (typically perceptual) evidence available in the utterance context, for instance indicating that the speaker is in a process of belief revision. The distinguishing feature of the factual varieties of “mood *no(da)*” is that they do not require an addressee to be felicitously uttered.

The difference between connective and non-connective uses, on the other hand, is basically that between complementizer and nominalizer, and most clearly so in the personal case. Examples of personal, connective “mood *no(da)*” are mostly examples of elaboration, as this one (Noda 1997, 64):

- (1.26) *Boku, ashita-wa ko-nai yo. Yooji-ga aru*
 I tomorrow-TOP come-NEG.NPST SFP errand-NOM have
n da.
no COP
 “I won’t come tomorrow. (It’s that) I got a thing.”

In this example, the speaker provides a reason for not coming after announcing this. This is clearly not a case of scope-adjusting, as a cleft with the same meaning in terms of information structure is unavailable and there is no contrastive focus. Substitution tests also fail. Thus, one might conclude that *no* in this case is a particle, rather than a complementizer. However, there is no additional expressive meaning arising from the addition of *no* here, and the entire clause is backgrounded, which is parallel to the structuring function of *no* in clefts, where the topicalized remnant constitutes the background to the focused constituent. The difference is that here, the backgrounded part is not necessarily known or presupposed — rather, the preceding assertion and the *no*-assertion are in a topic-comment relation, or, in terms of discourse structure, the second assertion is an elaboration on the first.

I take such instances of *no*-assertion used for elaboration, or backgrounding to indicate a connection on the discourse level, not as cases of the particle, but of the complementizer *no*. This is backed up by a parallel function of complementizer-copula phrases in other, for instance European languages (note that even the English paraphrase in the example above can approximate this effect¹³). Noda (1997, 230pp) also makes mention of such connections, finding at least some overlap between “mood *no(da)*” and French “*est-ce que*” in translations of Japanese novels.¹⁴

The instances of *no* interesting for the study of *no* as a particle are thus primarily the non-connective ones, the core of which in Noda’s descriptions of uses in assertions above is the notion of “givenness” (as mentioned above), especially in the factual / soliloquous case. I will argue that this is due to the evidence requirement that *no* adds to assertions (and other utterance types) as a speech-act modifier. In assertions, this comes out most clearly in soliloquous, *i.e.* in Noda’s terms “factual” assertions with mirative overtones linking the contribution of *no* to evidentiality. Before discussing previous re-

¹³If not as closely as it would in the case of the speaker explaining a third party’s reasons, the reasons for which are not clear to me and go beyond the scope of this thesis.

¹⁴While this is not the main focus of this thesis, I assume that the elaboration use of the complementizer is what for instance French and Japanese presumably have in common in this point. If, as I claim, the particle *no* has evolved from the complementizer in Japanese (see also below), then such parallels would be expected to occur even if there are no parallels in the particle use.

search in terms of evidentiality in such cases, I briefly discuss the connections of *no* to another element with similar uses, *wake*.

Comparing *no* and *wake*

Noda (2002) compares *no* and *wake* in their function as discourse-structuring markers for relations of “explanation”. I take what I have labeled “elaboration” above, *i.e.* connective, personal *no(da)*, to be a core case of this. Noda (2002) does note that the two expressions are not fully paradigmatic, as a combination *wake-na-no-da* is available, but not the other way around. This is interesting as it provides support for an assumption that *no* has further grammaticalized to particle than *wake*, and in such examples functions as an utterance modifier and evidence marker, whereas *wake* only marks elaboration.

The result of Noda’s comparison between *wake* and *no* on the background of her own classification shown in the table above is that *wake* can replace *no* in all but the case of factual, non-connective *no(da)*. This strengthens the assumption that such cases are, at least for assertions, at the core of what the particle *no* contributes. However, it is interesting that *wake* can substituted *no* in the personal, non-connective case, as this indicates that it is not only an elaboration marker.

Obviousness and *wake* Noda (2002) gives the following examples for fringe cases, which “do not follow the general meaning of the word ‘explanation’”, some of which I contend are plausibly, if not unambiguously cases of the particle *no*. Such an overlap between particle and complementizer function are not unexpected, assuming a diachronic link between the two forms, and are also supported by the possibility of one instance of *no* functioning both as a scope-adjuster and as a pragmatic particle.

As for connective, uses, Noda (2002) notes that *wake* is limited to examples in which a proposition is presented as the meaning of some other proposition, rather than as background information. To illustrate, she provides the following examples.

- (1.27) [...] *asa, hayaku me_ga_same-ta. Denwa-ga nat-ta*
 morning early wake_up-PST phone-NOM sound-PST
{no / #wake} dearu.
no wake COP.NPST
 “In the morning, [I] awoke early. (It’s that) the phone rang.”

[She has a husband, he is a teacher, too, they taught at the fourth elementary school at the same time. ...]

- (1.28) ... *Tsumari, futari-wa mukashi, yon shoo de*
 that_is, two_people-TOP long_ago four elementary at
shokuba kekkon-o shi-ta {no / wake} da.
 workplace wedding-ACC do-PST *no wake COP.NPST*
 “...that is, the two got married as coworkers at Fourth Elementary back then.”

These examples illustrate that *as* a marker of elaboration, *no* does not contribute to the expressive meaning, while *wake* appears to require that the proposition it attaches to be an explanation *of* the proposition it relates to rather than an explanation *for* it or its reasons. I tentatively propose presenting the proposition as “obvious” as a characterization of the meaning of *wake* in connective, as well as non-connective uses.

This can explain why *wake* can replace *no* in non-connective, addressee-directed cases where the latter conveys that there is verifiable evidence for the prejacent proposition in a sense which will be defined in the course of the analysis. Noda (2002) notes that *wake* originally expresses “logical necessity” (*ronriteki hitsuzensei*, but can also be used for “lending objectivity” (*kyakkansei no fuyo*) to the assertion on the personal, non-connective use.

In summary, the comparison of *wake* and *no* in assertions shows that in its connective function, *no* does not add any expressive meaning, which in turn supports its status as a complementizer. In its non-connective use, on the other hand, the expressive meaning contributed by *wake* overlaps with the function of *no* as an evidence marker when the assertion is used to present a proposition as “obvious”, *i.e.* as something that the addressee should believe given the available information or evidence. When *no* is used in its pure evidence-marking function, as in factual, non-connective declaratives,

such as the mirative assertions in the next section, *wake* is infelicitous as its expressive meaning does not match the communicative intention of the utterance.

Before moving on to mirative utterances, consider the following examples from Noda (2002) of cases in which only *no*, but not *wake* is licit, all of them non-connective, factual / soliloquous. They show that such utterances are not necessarily mirative, as the first example.

- (1.29) *E, sonna-ni ippai iru n da.*
 What, such_extent-to a_lot exist *no* COP
 “What, there are that many!”

The second example is set in a context where the speaker is regaining consciousness and is asserting something on the basis of memory, rather than immediate experience.

[“Thus, his memory came back.”]

- (1.30) *Soo, sas-are-ta n da.*
 right stab-PASS-PST *no* COP
 “Right, I’ve been stabbed.”

In the third example, there is immediate experience, but the speaker is confirming something they believed before, and there is not necessarily a mirative nuance.

[Drinking beer after work.]

- (1.31) *Soo, kore-ga umai n da.*
 right this-NOM delicious *no* COP
 “Yeah, this is delicious.”

This concludes the discussion of disambiguation of *no* as a particle. Next, I move on to discuss the connection between *no* and evidentiality before presenting the core data of *no* as a particle and its interaction with bias patterns in the second half of this chapter.

1.2.3 No as an evidential marker

An early study of Japanese *no* in terms of the Japanese evidential system is Aoki (1986), who takes *no* to be a “marker of fact”. He gives the following example for this function of *no*.

- (1.32) *Kare-wa atsui *(no da).*
 he-TOP hot *no* COP
 “He is hot.” (Aoki 1986, 228)

Japanese *-i* adjectives are a class of perspective sensitive predicates which, as bare predicates, can only be used to denote the state the speaker is in, but not to attribute the state they describe to someone other than the speaker. For Aoki, who centers his account of Japanese evidentiality around such examples, *no* “removes the statement from the realm of a particular experience and makes it into a timeless object” (Aoki 1986, 229). On a similar vein, Tenny (2006, 249–250) labels *noda* as occurs in examples like (1.32) “clausal evidentiality”, proposing that there is a syntactic locus of evidentiality which, when filled, lifts person restrictions. However, these claims do not only hold for *no*, but for a number of other elements such as modals like *hazu*, *nichigainai*, and *kamoshirenai*, and may thus not be a suitable way of accounting for the properties of the particle *no* in all of the relevant uses.

Evidence-marking on the speech-act level, as proposed in this thesis, can also explain the goodness of examples like (1.32) with *no*: on this view, *no* marks that the speaker is asserting the proposition on the basis of evidence which all participants have access too (such as, for instance, the person in question looking or acting like they feel hot, or having said something to suggest this). Interestingly, both Aoki and Tenny also discuss the suffix *-gar(u)*, which, when attaching to *-i* adjectives marks that there is (perceptual) evidence from which it can be inferred the agent of the *-i* adjective is in the state denoted by it. As *-gar(u)* thus is specialized to the function that *no* is predicted to have in (1.32) according to the present analysis, the observation that both have the same effect in the example at hand is compatible with what I propose *no* contributes to utterance meaning.

The view from typology

Based on Aoki's (1986) description of *no* as an evidential particle, Aikhenvald (2004) concludes in her typological survey of evidential systems that:

[The] "maker of fact" (*no* or *n*) . . . can be interpreted as referring to validation of information rather than the way it was obtained.

Notwithstanding the limited nature of Aoki's observations, this is a point well taken, as *no* does not appear to impose any restriction as to the source of evidence (but does, on my view, restrict the accessibility of evidence). Regarding the Japanese evidential system in general, Aikhenvald concludes, mainly based on the observations that evidential marking in Japanese is not mandatory and that the evidential expressions are not in a perfect paradigmatic relation with one another, which in particular goes for *no*, that: "systems [as the Japanese one] are somewhat problematic and thus only marginally relevant for the present study."

Clearly, Japanese does not have an evidential marking system as articulated and productive as those of the languages that Aikhenvald is primarily concerned with. Also, the particle *no* does not appear to fit within the rest of the evidential system of Japanese. While I do not have much to say about evidential expressions which operate on the propositional level of meaning (see 2 for a definition of the two levels of meaning I assume within utterance meaning), the analysis I propose for *no* straightforwardly derives how it is different from other Japanese evidential expressions: it operates on the speech-act level of meaning, directly modifying utterance preparatory condition, and it is underspecified with regard to the type of evidence it marks, as long as the evidence is accessible to all (or both in the case of discourse involving speaker and addressee only) participants, which in many cases means extralinguistic, perceptual evidence. The analysis also explains how *no*, together with the felicity conditions and implicatures on the speech-act level, conveys information about evidence-based revision processes the speaker's beliefs are undergoing.

1.3 Bias patterns and *no*

Among the most clear examples of the apparent evidential properties of *no* are polar questions, interrogatives with final falling intonation, and *daroo*-utterances conveying results of speaker inference, which this next section discusses.

1.3.1 Bias patterns of polar questions and *no*

Based on the observations of bias patterns of positive polar questions (PPQs) and negative polar questions (NPQs) that Buring and Gunlogson (2000) report, Sudo (2013) provides data testing the bias patterns of Japanese PPQs, and NPQs with both inner and outer negation, all with and without the “question particles” *no* and *desho*, which is a semi-polite variant of *daroo*.¹⁵ He differentiates between *evidential bias*, which is determined by the felicity of the questions in different types of contexts by the evidence available in them, and *epistemic bias*, which is determined by the speaker expectations or previous beliefs regarding the proposition which are conveyed by the question.

Excluding OPNQs

Below, his examples and findings are summarized, without the data on polar questions with outer negation (ONPQs) which I do not discuss in this thesis. This is because OPNQs are a contentious topic in the literature, and attempting an analysis of them along with *no* would likely require a parallel framework to model non-propositional negation: analyses of polar questions with outer negation typically differ markedly from those of “standard” questions or other speech-acts. For instance, Krifka (2015) provides an analysis of outer negation constraining future continuations of the discourse to those where the addressee does *not* commit to the prejacent, Romero and Han (2004) an analysis by which the question partition scopes over VERUM-focus, and Asher and Reese (2005) for an analysis of polar questions with outer

¹⁵On my analysis, both *no* and *daroo* are utterance modifiers, and the *desho*-utterances Sudo provides as data are rising interrogatives rather than rising declaratives. Here, I present Sudo’s findings as is, and add my analysis in section 3.4.

negation as complex speech acts from assertions and questions. While it is an interesting prospect to integrate the present proposal with any of these analyses, this is left for further research.

Findings from Sudo (2013)

The most basic case to consider are positive polar questions and their versions with final particles in a neutral context, that is, a context in which there is neither evidence supporting the proposition the question is based on, nor evidence supporting the negation of this proposition.

Scenario: We're looking for a left-handed person. [The speaker is] wondering about John, who is not around. [Neutral context]

(1.33) *John-wa hidarikiki?*
John-TOP left_handed

(1.34) #*John-wa hidarikiki na no?*
John-TOP left_handed COP.ADN no

(1.35) *John-wa hidarikiki desho?*
John-TOP left_handed daroo
“Is John left-handed?”

The result is relatively straightforward: while both the plain and the *desho*-question are felicitous in this context, the *no*-PPQ is out. The difference between the plain and the *desho*-PPQ is that the latter conveys a strong bias on part of the speaker that “John is left-handed” is true. When adding evidence supporting this proposition to the context, thus making it a positively biased context, the felicity of the plain and the *no*-PPQ is reversed. Sudo demonstrates this with the following examples.

Scenario: My friend has just entered our windowless office wearing a dripping wet raincoat. [positive context w.r.t “It is raining”.]

(1.36) #*ima ame fut-teru?*
now rain fall-PROG.NPST
“Is it raining now?”

- (1.37) *ima ame fut-teru no?*
 now rain fall-PROG.NPST *no*
 “Is it raining now?”

Same context as above. [negative context w.r.t. “It is sunny”.]

- (1.38) *#ima hare-teru (no)?*
 now be_sunny-PROG.NPST *no*
 “Is it sunny now?”

- (1.39) *ima hare-teru desho?*
 now be_sunny-PROG.NPST *daroo*
 “Is it sunny now?”

The final two examples shows that both plain and negative PPQs are out when there is evidence for the negation of the prejacent. The PPQ with *desho*, on the other hand, is fine, and conveys strong bias on part of the speaker towards the prejacent, *i.e.* bias towards it being sunny. From the examples so far, it seems reasonable to assume that *no* is actually a marker of contextually available evidence. However, there are some issues with these assumptions as they do not make the right predictions with regard to the observations Sudo makes on negative polar questions (NPQs) in negatively biased contexts, as illustrated by the following examples.

Scenario: At a student meeting. A is the student representative and knows who will be present today. S is another student.

A: We are all here now. Shall we begin the meeting?

- (1.40) *S: Daremo hokani konai?*
 nobody else come.NEG

- (1.41) *S: Daremo hokani konai no?*
 nobody else come.NEG *no*

- (1.42) *S: Daremo hokani konai desho?*
 nobody else come.NEG *daroo*
 “Is nobody else coming?”

The observations on these questions is rather interesting, as in the negative context, all NPQs, regardless of whether particles are added or not, are felicitous. There is also a difference with regard to bias of *no*-NPQs here, as the *no*-NPQ in (1.41) conveys *positive* speaker bias towards the proposition “Somebody else is coming”, *i.e.* bias towards the positive version of the proposition. The version with *desho*, on the other hand, conveys strong *negative* epistemic bias. The findings so far are summarized in the table below, where “speaker bias” means an expectation of the speaker of the truth or falsity of the base proposition (or epistemic bias).

(1.43) Sudo’s findings on felicity of (*no*-)PQs by context:

	neutral	positive	negative	speaker bias
PPQ	✓	#	#	none
PPQ- <i>no</i>	#	✓	#	none
PPQ- <i>desho</i>	✓	✓	✓	positive
NPQ	#	#	✓	none
NPQ- <i>no</i>	#	#	✓	positive
NPQ- <i>desho</i>	✓	✓	✓	negative

From this table, it becomes immediately apparent that there is a divide between negative and positive polar questions, an asymmetry that has drawn much attention in the literature since its original observation by Ladd (1981). I argue in the analysis of bias patterns and their interaction with *no* in chapter 3 that the bias patterns of NPQs are best analyzed in terms of relative polarity, that is as a result of the interaction of utterance situation and utterance meaning. Below, I discuss some data related to this view.

Bias from (*no*-)NPQs

As for the contribution of *no*, Sudo’s findings regarding PPQs support the assumption that *no* marks contextual evidence. He also finds plain NPQs to be felicitous in negative contexts, and epistemic bias in the form of positive speaker bias to arise from *no*-NPQs. Similar observations have been made with regard to epistemic bias arising from English NPQs, in contexts where

the positive proposition is more salient than the negative one. However, Romero and Han (2004, 613) point out that when the negative proposition is made more salient, this is not necessarily the case, as the following example shows.

Scenario: S hates both Pat and Jane. The prospect of an excursion without them pleases S. S does not have any previous belief about whether either of them is coming or not.

A: Pat is not coming.

(1.44) S: Great! Is Jane not coming (either)? That would be the best!!!

(1.45) S: #Great! Isn't Jane coming (either)? That would be the best!!!

In this scenario, in which the speaker has no previous expectation with regard to the truth or falsity of the proposition “Jane is coming”, (1.45) is bad as it obligatorily conveys (positive) epistemic speaker bias, but (1.44) is felicitous, as it does not convey epistemic bias when the scenario primes the context into the direction of the negative proposition.

Ito and Oshima (2014) make a similar observation with regard to Japanese with the following example.

Scenario: A and S are organizing a Japanese Sake party. Having been asked to bring some bottles of sweet Sake to the party venue, S comes to the liquor storage room. She does not know which bottles are sweet and which are not, so asks A for help.

A: This one and this one are not sweet.

(1.46) S: *Kore-wa? Amaku-nai?*
 this-TOP sweet-NEG

“How about this one? Is it not sweet?” (Ito and Oshima 2014)

With this example, Ito and Oshima replicate Romero and Han’s observation for Japanese, showing that negative polar questions are not necessarily epistemically biased, and label NPQ-negation the “negative / neutral” type as opposed to the “positive” type of OPNQ-negation. An additional observation

can be made with regard to this example: there is no evidence supporting the negated proposition, *i.e.* this is a neutral context. In such a case, a *no*-NPQ is infelicitous, the same way that a *no*-PPQ is infelicitous in a neutral context. If there were evidence, on the other hand, the *no*-NPQ would be felicitous, even if the speaker is not biased towards the positive proposition. This means that parallel to English, NPQs are the mirror image of PPQs in that they do not exhibit any bias in contexts where the more salient polarity matches that of the question, and that in the case of Japanese, the assumption that *no* marks evidence is supported. Evidential bias from NPQs and epistemic bias from *no*-NPQs, on the other hand, arises from interaction with utterance context, which any analysis of bias patterns should account for.

In this thesis, I focus on positive polar questions and thus with inner negation, but do not discuss polar questions with outer negation in the analysis, for the reasons discussed above. Thus putting outer negation aside, I suggest that in light of the observations by Romero and Han (2004), reproduced for Japanese by Ito and Oshima (2014), the bias patterns that Sudo observes in positive *vs.* negative polar questions can be explained as the bias patterns of polar questions used in contexts matching the polarity of the question *vs.* polar questions used in contexts not matching the polarity of the question.

1.3.2 Bias from falling (*no*)*ka*-interrogatives

Similar observations with regard to the interaction of *no* with contextual evidence can be made with regard to falling *ka*-interrogatives with *no*. These are polar interrogative utterances, but differ from questions in that they do not have final rising intonation, and in that they are obligatorily marked with the question particle *ka*.¹⁶ Falling *ka*-interrogatives are basically rhetorical questions in that the speaker does not necessarily expect an answer or request information from the addressee when uttering them. The following

¹⁶This can easily be explained as otherwise they would be indistinguishable from assertions, as in Japanese declarative sentences do not differ from interrogatives syntactically. Why, on the other hand, *ka* is usually dropped in non-polite polar questions is an issue that goes beyond the scope of this thesis.

examples are taken from Davis (2011), who proposes that *no* introduces an evidence proposition with regard to the context the utterance is made in. First, consider two scenarios bringing out two readings of the interrogatives.

- (1.47) a. Scenario 1: The speaker is biased towards it being the case that birds cannot live here, but looking out the window is surprised to discover that in fact they do. He utters [the falling *ka*-interrogative] to indicate his surprise.
 b. Scenario 2: The speaker believes that birds cannot live here. His friend says something that suggests they do. He utters [the falling *ka*-interrogative], thereby indicating that his friend is mistaken, and that it should be obvious birds cannot live here.

The following are the two versions of the falling *ka*-declarative, one plain and one with *no*, for which Davis gives rather different paraphrases.

- (1.48) *Tori-ga konna tokoro-ni sum-eru ka.*
 bird-NOM such_a place-in live-POT.NPST *ka*
 “Can birds live in a place like this?” (Davis 2011, 198)
- (1.49) *Tori-ga konna tokoro-ni sum-eru no ka.*
 bird-NOM such_a place-in live-POT.NPST *no ka*
 “Ah, so birds can live here after all.” (Davis 2011, 208)

The observation Davis makes is that (1.48) is only felicitous in Scenario 2 (or at least clearly degraded in Scenario 1), that is as an utterance casting doubt on what the addressee said, or more generally doubting the truth of the base proposition. (1.49), on the other hand, is felicitous in Scenario 1, and is also somewhat degraded in Scenario 2. In terms of bias patterns, the observations are the same as those on PPQs with regard to contextual evidence, but epistemic bias is negative in both cases. This is a rather clear case of evidence marking with *no*, supporting the evidential assumption.

1.3.3 Additional observations on *no*-interrogatives

Without making a distinction between interrogatives with final rising and final falling intonation, Ijima (2011) gives a number of examples for the contrast between *ka*-interrogatives with and without *no*. His claim is essentially

that *ka* questions are used to ask for a decision, *no-ka* questions to confirm a previously made decision, claiming that what is “enclosed” by *no* is “informational content” as a rule, thus it is difficult to use *noka*-questions in speech acts other than those used for information transmission. He quotes Tanomura (1990), who has it that questions with *no* “ask for something the addressee knows or something the addressee has internally decided”, and cannot be used in the case of “questions requiring an answer by the addressee based on thinking about some yet undecided matter”, giving these examples.

- (1.50) *Tetsudatte {mora-emasu/ ?mora-eru n desu} ka?*
 help get-POT.POL.NPST get-POT.NPST *no* COP Q
 “Could you help me?”

- (1.51) *Atsui kara, mado-o akete-mo ii (?n) desu ka?*
 hot because window-ACC open-ADD good *no* COP Q
 “It’s hot, so may I open the window?”

[Trying on clothes:]

- (1.52) *Doo? Kono fuku, niau (?no)?*
 how this clothes fit *no*
 “What do you think — do these fit me?”

I propose a simple explanation in terms of evidential bias, *i.e.* the availability of contextual evidence. In the example in (1.50), the speaker is asking the addressee for help, the predicate being paraphraseable as “is it possible to get help from you” — if there were evidence for the truth of this, the speaker would arguably not need to ask. Note that similar evidential bias arises from English rising declaratives, and “You’ll help me?” would be equally bad.

The example in (1.51) is similar in that the speaker is asking for permission from the addressee. Note that when the register of the question is changed to non-polite, the example with *no* becomes much better, which points to a connection with politeness (but can be explained with the decided / undecided split). This example is rather difficult to account for in terms of evidentiality as it is not immediately clear what constitutes evidence for permission. Assuming, however, that when the speaker and addressee are of

equal social standing, the permission should be usually granted, unless the addressee has a cold etc., then such an account appears feasible.

Finally, accounting for the example in (1.52) in terms of evidence is relatively straightforward and similar to the first example: if it were evident that the dress fits the speaker, the question would not be motivated. It should be noted that all three of the examples are good with *no* in a situation where the prejacent proposition is under discussion and evidence supporting it arises, such as the addressee (possibly unexpectedly) indicating willingness to help in (1.50), someone opening the window when the expectation was that this is not allowed in (1.51), and in a situation where there is some indication that the addressee finds that the clothes suit the speaker.

All three examples are ambiguous between a question and a rising declarative in the non-polite, final-rising form, as it does not allow for the addition of *ka*. Falling interrogative versions, on the other hand, always convey that the speaker does not believe the prejacent to be true, in the case where *no* is added in spite of the evidence. In (1.51), this would give rise to a reading on which the speaker doubts that the addressee will actually help, in (1.51) the salient nuance would be one of doubt whether it is really permitted to open the window, and in (1.52) the falling *ka*-interrogative would saliently convey doubt over either the honesty or quality of the addressee's regarding the clothes the speaker is trying on.

1.3.4 Bias from *no* in *daroo*-assertions

The following example is originally due to Minami (1974), as quoted by Takubo (2009). As with the falling interrogative above, consider first the two scenarios for testing utterance felicity.

(1.53) Scenarios for *daroo*-assertion:

- a. Scenario 1: The speaker is wondering about the marital states of an ex-girlfriend from his time in college.
- b. Scenario 2: The speaker sees that the surname of an ex-girlfriend from his time in college has changed and wonders about her marital status.

These two scenarios again differ in the presence or absence of evidence, but there is a crucial difference to the scenarios for the falling *ka*-interrogative: the evidence supporting the base proposition in this case is weaker, as it is indirect evidence on the basis of which the inference that the prejacent holds can be made rather than practically irrefutable perceptual evidence. This is because *daroo* is a marker of inference, a property which I will also seek to explain in the analysis.

The examples to demonstrate the felicity contrast are shown below.

- (1.54) *Kanojo-wa moo kekkon_shi-ta daroo.*
 she-TOP already marry-PST *daroo*
 ‘‘She is married already I guess.’’

- (1.55) *Kanojo-wa moo kekkon_shi-ta no daroo.*
 she-TOP already marry-PST *no daroo*
 ‘‘She is married already I guess.’’

The plain version of a *daroo*-assertion in (1.54) is not felicitous when there is evidence supporting an inference that the prejacent proposition holds, as in Scenario 2, but is fine in Scenario 1 as long as the speaker has an expectation that ‘‘she is married’’. Adding *no*, to yield the version in (1.55) makes the utterance felicitous in Scenario 2, which means further support for the evidential assumption. Again, (1.54) would be preferred in Scenario 1, all things being equal, while there can be other reasons for the version with *no* in (1.55) to be felicitous in this scenario, for instance when *no* is taken to be an instance of the complementizer in its use as an elaboration marker.

To explain the badness of examples like (1.54) in scenarios like Scenario 2, Hara (2006) proposes that *daroo* conveys that the speaker has an ‘‘epistemic bias’’ that the prejacent holds ‘‘derived from reasoning and not from observable evidence’’. On her analysis, *daroo* is a modal, but also an evidential marker in that ‘‘it makes reference to the speaker’s lack of evidence’’, *i.e.* the modal base is restricted to the speaker’s predictions *not* inferable from evidence. This view is revised in Hara and Davis (2013), in which *daroo* is proposed to lower the quality threshold, which I assume as well but implement in a different way, namely modification of utterance felicity conditions.

As I implement the contribution of *no* in the same way, my proposal can straightforwardly account for cases like this.

An alternative analysis: *no* marking reverse inference

An alternative analysis is proposed by Takubo (2009), who argues that *daroo* is an epistemic, rather than evidential element in that it always involves speaker inference, which differentiates it from other evidentials in Japanese. He proposes that in the case of (1.55), *no* allows for scope widening (as described as a function of the complementizer *no* above), so that not only the predicate denoting the event “she got married”, but also the premise “her name changed” is in the scope of *daroo*. From this, Takubo proposes an interpretation on the lines of “I assume that her name having changed means that she got married”, that is the utterance is no longer one where the assumption is presented as independent of the evidence. On this basis, he argues that *daroo*-assertions convey results of deductive inference (that is essentially *modus ponens*), while *no-daroo* assertions convey results of abductive inference, *i.e.* (defeasible) inference of the type $[p \rightarrow q] \wedge q \rightsquigarrow p$, where p corresponds to the prejacent “she got married”, and q to the observation from evidence that “her name changed”. Ijima (2011) comes to a similar conclusion, noting that the addition of *no* marks “reverse inference”.

***Wh*-exclamatives: mirativity and evidentiality**

Another class of *daroo*-utterances are *wh*-exclamatives, which are not well-formed without *no*. As exclamatives are mirative utterances in that they convey surprise originating from a mismatch of expected and observed degree, and mirative utterances naturally require some kind of (perceptual) contextual evidence as a trigger, this can be explained rather straightforwardly as evidential marking. In Ono’s example below, the speaker expresses surprise over the size of the pizza John ate.

- (1.56) *John wa nante ookina pizza-o tabeta *(no) daroo*
 John TOP nante big pizza-ACC ate no daroo
 “What a big pizza John ate!”

Ono (2006) proposes that *-roo* in *wh*-exclamatives is an evidential morpheme occurring in MoodP (see structure in 1.12), sharing a syntactic slot with other evidential expressions such as *yoo* and *-rashii*, but not epistemic or deontic modals like *hazu* and *beki*, which explains that the evidential expressions, but not the modals, can occur in exclamatives. On Ono’s analysis, *no* in exclamatives is the FIN-head proposed by Hiraiwa and Ishihara (2002), and serves as a presupposition marker in both clefts and exclamatives, contributing “factivity” to the latter. This analysis can be adapted to be compatible with the present proposal by assuming that *nante... daroo* is the *wh*-exclamative proper, the addition of *no* being required for evidence marking.

The link to mirative assertions other than *wh*-exclamatives is also rather straightforward. Consider the following example repeated from (1.29).

- (1.57) *E, sonna-ni ippai iru n da.*
 What, such_extent-to a_lot exist *no* COP
 “What, there are that many!”

This utterance conveys the same kind of mirativity, that is surprise over the amount of people, originating in the mismatch of the expected number and the actual number. While there is no *wh*-construction, *no* appears to have the same function as above, and the mirative reading arises. This is compatible with the assumption that *wh*-exclamatives with *nante* are constructions specialized in singling out a degree expression within the clause as a target for the conveyed mirativity, but that *no*, as a marker of evidence, can give rise to the same type of meaning.

1.4 The origins of the particle *no*

A number of grammaticalization paths have been proposed for Japanese *no*. Following recent studies such as Serafim and Shinzato (2009) and Shibatani (2013), both drawing on data from dialects other than Standard Japanese, and studies of similar elements in Ryukyuan such as Shibasaki (2011) and Shibatani and Shigeno (2013), I assume that the genitive particle *no*, while being a possible lexical source for the nominalizer/complementizer *no* in (Standard)

Japanese, is not directly relevant to the origins of the stance marker, and that the ultimate lexical origins of *no* are unknown.

1.4.1 Origins of the nominalizer / complementizer *no*

Diachronically, the referential, relativizing, and subordinating functions of *no* as a nominalizer and complementizer were borne by an adnominal inflected form occurring before nouns, which used to be distinct from the conclusive form occurring sentence-finally. This is not necessarily to say that *no* has filled a gap due to functional pressure, since as Shibatani (2013) points out, there is a long gap between the adnominal/conclusive-merger and the emergence of *no* as a fully productive subordinating operator.

Subject marking and adnominal use

According to Frellesvig (2010, 127pp), the earliest records of *no* go back to Old Japanese. In Old Japanese, *no* had two functions: connecting nominal elements as a genitive particle and marking subjects mainly in subordinate clauses non-declarative main clauses. In the former function, it alternates with *tu* in earliest varieties and with *ga* up to Late Modern Japanese, and continues in use in contemporary Japanese. In the latter function it also alternates with *ga*, which prevails in contemporary Japanese as the subject marker, while *no* still functions as the subject marker in contemporary Japanese adnominal clauses.

These functions of *no* are historically distinct from its uses as a complementizer and nominalizer, as demonstrated with data from Japanese and Ryukuan dialects in Shibatani (2013) and Shibatani and Shigeno (2013), and thus not directly relevant for this thesis.

Relativizing use

Another function of *no* in which it alternates with *ga* which was present in Old Japanese is adjoining clauses to both nominal and verbal heads. This is the first function of interest for the development of the complementizer *no*. While both *no* and *ga* optionally occur between nominals and relative

clauses (with adnominal verb morphology) in Old Japanese, only *ga* can occur between verbal predicates¹⁷ and adnominal clauses, as in the example below, where *ga* connects the adnominal form *miru* to the predicate *tomosi-sa*.

- (1.58) *kogu punabito wo miru ga tomosi-sa*
 row.ADN boatsman ACC see.ADN *ga* enviable-EXCL
 “How enviable it is to see the rowing boatsmen!”
 (*Man’yōshū*, 8c, Frellesvig 2010, 129)

This function of *ga* (which later was taken over by *no*) plays a crucial role in the story I propose for the development of the complementizer *no*. While *ga* (and, only when adjoining the clause to nominal elements, *no*) are optional in most cases, in the exclamatives like (1.58), it “seems to have been obligatory” Frellesvig (2010, 128-9). Up to Late Modern Japanese, *i.e.* in Old Japanese and Early Middle Japanese, the adnominal and conclusive forms were differentiated.

From Late Modern Japanese onwards, the use of *no* and *ga* in relative clauses increases, and the frequency of *no* increases. This coincides with the conclusion of a major process of change in Japanese morphology: the merger of the adnominal and the conclusive (infinitive) verb forms.

- (1.59) *kuru o tanomu no kari-no-tamadusa*
 come ACC ask no letter
 “The letter asking me to come.”
 (*Shingoshū wakashū*, 14c, Frellesvig 2010, 357)

Note that in this example, *no* has replaced *ga* as a relativizer. Also, the adnominal form has been replaced by the new final form resulting from the merger of adnominal and conclusive forms in both the verb *kuru* ‘come’ in argument position, and the verb *tanomu* ‘ask’ which heads the relative clause modifying the noun phrase and is marked with *no*. With the grammaticalization of *no* into a complementizer in modern Japanese, this relativizing function disappeared.¹⁸

¹⁷Verbal predicates in the sense of verbal elements, which includes adjectives like *tomosi* in (1.58), which do not require a copula for use as a predicate, in contrast to nominal predicates which are generally formed with the copula.

¹⁸This holds for adult relative clauses, while *no* still occurs in children’s relative clauses in this function, as Murasugi (1991) shows.

Referential / pronominal use

The second function of interest for the rise of the complementizer *no* is its referential use referential elements, which developed from Early Modern Japanese, as demonstrated by Frellesvig (2010, 355pp).

Pronominal *no* The second instance of *no* in (1.60) below shows its pronominal use, which can either be taken as a case of genitive *no* (as the first instance of *no*) and ellipsis of *aruzi* ‘governor’ resulting in noun-deletion, or as an early instance of the referential use of *no*.

- (1.60) *ima no aruzi mo saki no mo te tori-kapasite*
 now *no* governor too before *no* too hand take-join
 “The current governor and the previous one joined hands”
 (*Tosa Nikki*, 10c, Frellesvig 2010, 244)

Frellesvig argues that this is a case of noun-deletion and notes that “*ga* was used in this function *for as long as it was a genitive, i.e.* into [Late Modern Japanese]” (Frellesvig 2010, 244, emphasis mine). This means that the clause above contains a null nominal form, as in “... *saki no* $\emptyset_N$ *mo*...”. Shibatani (2013), on the other hand, argues that *no* itself is referential in such examples, citing data from dialects, and historical data in which two instances of *no* co-occur. This use of *no* is only shown for completeness, as it is thus possibly diachronically connected to the referential use of *no*.

Referential use The referential use of the adnominal form has been taken over by *no* as a complementizer or nominalizer in the course of the history of Japanese. The adnominal form marking clauses in argument position of verbs became frequent in Early Modern Japanese (in Old Japanese, a nominal verb form existed for this purpose), and is later replaced by *no* as a nominalizer and a complementizer. Frellesvig (2010, 362–365) discusses possible analyses for various such examples. First, an example of a relative clause which can be analyzed as a head-internal relative clause (HIRC, see also footnote on p. 4), a construction possible with *no* in contemporary Japanese. Note that *no* and *ga* occur in similar examples as relativizers.

- (1.61) *kiku no pana no uturop-eru wo worite*
 chrysanthemum no flower no fade-ADN ACC break.GER
 “picking some faded chrysanthemum”
 (*Ise Monogatari*, 10c, Frellesvig 2010, 362)

This can be construed as a construction in which the object of “pick” is the noun “chrysanthemum flower”, which in turn is specified as “faded” by the predicate of the subordinate clause.

In other examples, which can be analyzed as “true” headless nominalizations, the subordinate clause denotes a state of affairs, but not an individual.

- (1.62) *imizi-u naku pito aru wo kikitukete*
 terrible-inf cry.ADN person exist.ADN ACC hear.GER
 “hearing that there was a person who was crying terribly”
 (*Ise Monogatari*, 10c, Frellesvig (2010, 363))

In this example, the subordinate clause denotes an event, which becomes an argument for the main clause verb “hear”.

In the course of the merger of the conclusive and adnominal verbal inflections that takes place during Late Modern Japanese, the new inflected verb forms initially take over these functions of the adnominal form, but *no* starts appearing in the same positions from later Late Modern Japanese. Frellesvig cites the following two early examples of this developing use of *no*.

- (1.63) *soregasi ga suite yomu no wa seisuki o suite yomu*
 I NOM like read no TOP Seisuki ACC like read
 “What I like reading is I like reading the Seisuki.”
 (*Kyogen-ki*, ca.1660, Frellesvig 2010, 364)

- (1.64) *fara no tatu no wa warui*
 stomach no rise no TOP bad
 “It’s bad that he’s angry.”
 (*Kabukijihachibanshii*, ca.1700, Frellesvig 2010, 364)

These examples are to illustrate how *no* gradually took over functions of the adnominal form to develop into a complementizer without referential, but with connective meaning in sentence final use and finally into a pragmatic

particle. These functions have been subsumed under “stance-marking” in the diachronically oriented typological literature.¹⁹

1.4.2 Development of the sentence final particle *no*

Diachronic processes from nominalizer to complementizer have received relatively wide attention in the literature on grammaticalization in Japanese and other, in particular Asian, languages, with considerable variation in the classification of functions and in labels for stages in the process. For instance, Simpson and Wu (2001) offer an early comparative study of the development of Japanese, Korean, and Chinese “formal nouns and nominalizers”. As for diachronic processes going beyond sentence-structuring functions, Yap et al. (2004), building on the analysis of Japanese *no* in Horie (1998), propose grammaticalization paths for *no*, Mandarin Chinese *de*, and Malay (*em*)*punya*, all of which have pronominal uses and function as genitive and cleft-markers, but have also developed what the authors label “stance-marking” functions.

As for *no*, Yap et al. (2004) show that sentence final uses in assertions occur from as early as the 16th century, when *no* started to take over the functions of the adnominal form. Iwasaki (2000) reports that the attributive²⁰ from when used sentence-finally marks “background information” in prose contexts and conveys “exclamation” and “weak conjecture” in poetry contexts. These literary uses of the final attributive form foreshadow discourse-structuring, *i.e.* connective, sentence final uses of the complementizer *no* labeled “elaboration” above, as well as, in the case of exclamations, mirative uses of the particle *no*. However, it is difficult to find examples of *no* as a particle in older literature, as the particle is essentially used in discourse. The judgments regarding its stance marking properties in general and evidential

¹⁹The sentence-structuring functions of *no* are also connected to the demise of *kakari-musubi*, the focus-marking system of earlier stages of Japanese. I assume that this has contributed to the proliferation of *no* as a complementizer, leading to its high productivity and thus indirectly promoting the development to a pragmatic particle. As a full account of the history of *no* is beyond the scope of this paper, however, I focus on the non-structuring uses of *no*.

²⁰Iwasaki uses “attributive” for the form labeled “adnominal” here and throughout.

properties in particular come mostly from spoken Japanese, and the bulk of examples of *no* as a particle to be found in the literature are from direct speech, *i.e.* representations of discourse. As it is thus difficult to empirically grasp the last stage in the process giving rise to the particle *no*, namely the step from complementizer to particle with evidential meaning, I propose an approach from the theoretical side, proposing a possible pragmaticalization process to give rise to the utterance modifier *no*.

Form complementizer to particle via pragmaticalization.

In this section, I discuss how a process $no_1 > no_2$ by which the sentence final particle *no*, henceforth no_2 , has emerged from the complementizer *no*, henceforth no_1 can (or cannot) be captured by extant theories of grammaticalization and pragmaticalization. The following issues arise for extant theories of grammaticalization with regard to this process.

- (i) Many of the criteria traditionally proposed for grammaticalization do not apply to $no_1 > no_2$. For instance:
 - There is no change from lexical to grammatical item as proposed as a criterion for grammaticalization by Heine (2002), *i.e.* no shift from lexical to functional category: no_1 is already of the functional category C (complementizer), thus semantically vacuous.
 - There is no shift towards less referential meaning, a grammaticalization criterion proposed by Hopper and Traugott (2003), as the complementizer no_1 in its sentence-structuring function is not referential at all.
 - There is no apparent loss in autonomy, which is one of Himmelmann' (2004) grammaticalization criteria: as a syntactic operator, no_1 is entirely dependent on the construction it occurs in. On the other hand, no_2 , while occurring in a fixed position, can be considered *more* autonomous — as a pragmatic particle it is optionally added to convey its expressive meaning.

- (ii) While grammaticalization as left- and upward reanalysis as proposed in Roberts and Roussou (2003) appears a promising alternative for the development from nominalizer to complementizer, no_2 has lost all syntactic function. While no_2 is clearly more peripheral than no_1 , it is not clear where in the syntax, *e.g.* within a Split-CP framework (Rizzi 1997) it would occur, and whether it would be a projecting head.
- (iii) Within the processes Lehmann (2004) distinguishes from grammaticalization, $no_1 > no_2$ is not a case of “lateral conversion” to a sentence final particle (SFP). Rather, *no* underwent “recategorization”: the position of no_2 , preceding force morphemes (assertive *da*, interrogative *ka*) is distinct from that of SFPs. Thus, while extant criteria for grammaticalization apparently do not apply, see (i) and (ii), we are looking at an innovative process of language change.
- (iv) While the emergence of expressive meaning makes it plausible that $no_1 > no_2$ is a process of pragmaticalization, extant definitions can also not fully capture it:
 - It is not a typical case of pragmaticalization as defined by Diewald (2011), *i.e.* there is no shift from propositional towards more discourse-oriented meaning, since the pragmatical meaning of no_2 arises from the semantically vacuous no_1 .
 - On a similar vein, the concept of pragmaticalization as a diachronic shift from at-issue to expressive meaning, as proposed by Davis and Gutzmann (2015), does not apply as there is no descriptive meaning in no_1 that could undergo such a process.

I propose that $no_1 > no_2$ is a process of pragmaticalization, in which new lexical meaning arises in the vacuum left by the loss of syntactic function accompanying the process from sentence-structuring element to stance-marking element with functions such as “explanation”. While I take this new meaning to be expressive in the sense of Davis and Gutzmann (2015), it does not originate in descriptive lexical meaning, but is innovated in a process of expressive enrichment.

In order to account for $no_1 > no_2$ on these lines while sidestepping the issues enumerated above, in the following section I propose an idealized model in which pragmaticalization comes with a parallel process of “functional bleaching” by which grammatical function is lost, giving rise to enrichment with new, expressive meaning. The notion of “functional bleaching” is the mirror image of semantic bleaching: semantic bleaching means loss of meaning, making room for functional enrichment in a grammaticalization process, while functional bleaching means loss of function, making room for (expressive) meaning enrichment in a pragmaticalization process.

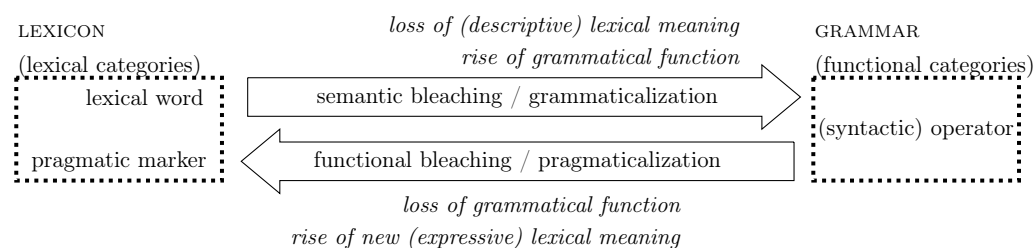
Pragmaticalization: out of the grammar, into the lexicon

In order to ground the model within a concept of lexicon and grammar, the two poles which many analyses place at the core of grammaticalization (I ignore how lexicalization fits into the picture for space), I define lexicon and grammar by the simple criterion of whether an element has any kind of lexical meaning, be it descriptive or expressive, or is only a syntactic operator which relates or stands for lexical elements. Using labeling familiar from generative approaches in formal linguistics, for instance, I take N and V to be prototypically lexical (with the possible exceptions of semantically vacuous formal nouns and nominalizers as mere category shifters from V to N, see ‘open issues’ below); D, T, and C to be functional categories. This only covers independent words in the descriptive meaning dimension, however — it is not a trivial question how to integrate particles with only expressive meaning. Taking any kind of lexical meaning into consideration, however, the distinction should be fairly intuitive, especially in the case of no_1 and no_2 : the former is “(syntactic) function only”, and is thus part of the grammar, the latter “(expressive) meaning only” and thus part of the lexicon.

The model I propose to thus account for $no_1 > no_2$ is illustrated below: grammaticalization is a process from lexical to functional category accompanied by semantic bleaching in which new function emerges, pragmaticalization a process in the opposite direction accompanied by functional bleaching in which new meaning emerges. Both “lexical words” with descriptive mean-

ing and “pragmatic markers” with expressive meaning are part of the lexicon.

(1.65) **Proposed model of grammaticalization and
pragmaticalization to account for $no_1 > no_2$:**



In this model, $no_1 > no_2$ is a case of pragmaticalization in which the syntactic (scope-adjusting and cleft-marking) functions of the complementizer erode, and new (stance-marking, evidential) expressive meaning arises as *no* moves out of the grammar and (back) into the lexicon.

This concludes the excursus on the origins of *no* as a pragmatic particle. I hope that it can make the assumption that the particle and utterance modifier *no*, with its evidential meaning, is indeed distinct from the complementizer *no*, and that while there are gray zones, which is expected as both diachronic stages are synchronically available and can overlap in meaning, applying the criteria proposed in this chapter can identify cases in which *no* is unambiguously a (special kind of) sentence final particle.

1.5 Empirical focus: *no* as a particle

The gist of the discussion in this chapter is that there are cases where it is unambiguous that *no* is neither a complementizer with a sentence-structuring function, nor a complementizer used sentence-finally for instance as an elaboration marker, but a particle conveying information about the epistemic state of the speaker with regard to evidence available in the context. It has been shown that the particle *no* has unique structural properties, unique uses and functions, and interacts in a unique way with the bias patterns of utterances. Furthermore, it can be analyzed as diachronically distinct from the complementizer *no*.

Explaining the properties of the particle *no* discussed so far is the empirical focus of this thesis. I aim to accomplish this by first capturing the notions that form the part of meaning that *no* interacts with, namely belief, evidence, and commitment, and next model the interaction of *no* with utterance type, extralinguistic context, and speaker belief and communicative intentions to derive the bias patterns of *no* from its role as an utterance modifier.

Chapter 2

Utterance felicity conditions: Belief, Evidence, Commitment

Overview

This chapter proposes a framework aimed at capturing the felicity conditions of utterances imposed on the speaker's beliefs and the available evidence, and the speaker commitments that arise from utterances, all relative to an utterance's prejacent proposition. The framework provides the necessary background for the analysis of the communicative effect utterances, plain and modified by addition of *no* as an evidence marker, have within their context in the next chapter. The chapter is structured as follows.

First, section 2.1 defines belief propositions as tools to capture permitted doxastic states of the participants within an utterance's felicity conditions. Based on a model of doxastic states as sets of accessible worlds which support belief propositions, negation of belief propositions, higher-order belief propositions (*i.e.* beliefs over beliefs), first-level and second-level doxastic states will be classified according to the belief propositions they support.

Next, section 2.2 introduces evidence into the model as the foundation of belief states a participant commits to, linking evidence and commitment by the evidence rule. This rule covers evidence-based belief-state formation, reasoning on the addressee's part about evidence available to the speaker, and evidence-based belief revision, concluding the introduction of the basic

framework.

With this in place, preparatory conditions of assertions are the focus of section 2.3. Discussing Searle's (1969) and Grice's (1975) prominent accounts of the felicity of assertions in the context of the framework introduced in sections 2.1 and 2.2, basic preparatory conditions of assertions are provided as belief conditions, evidence conditions, and commitment arising from assertion. A final modification of the model will be made next, accounting for some properties of Japanese *daroo*-assertions. The proposed function of *daroo* is lowering of the quality threshold, which means that the belief state the assertion commits the speaker to is supported by a doxastic state which is biased towards the prejacent proposition. Consequently, the evidence required to support the commitment is weaker than in the case of a plain assertion.

After this final modification to the basic framework, section 2.4 applies it to utterance types other than assertion. The two factors by which utterance types are classified are prosody, in the form of sentence final rising and falling intonation, and assertive and interrogative illocutionary force. Starting with falling interrogatives, the belief conditions on interrogatives are defined as complementary to those of declaratives on the level of prejacent propositions, followed by a discussion of forgone commitment as the complement of commitment on the level of belief propositions. Next, in the discussion of rising declaratives, prosodically underspecified belief conditions and commitments of declaratives are introduced, which in rising declaratives are resolved to (speaker) commitment to addressee beliefs. Finally, the felicity conditions of rising interrogatives are defined as forgone commitment complementary to rising declaratives, and their property of seeking commitment from the addressee is briefly discussed.

To conclude the discussion of preparatory conditions, section 2.5 applies the framework to rising declaratives and interrogatives with *daroo*, bringing together the analyses of *daroo* and the quality threshold and of forgone commitments in interrogatives in chapters 2.3.4 and 2.4, concluding that the effects of *daroo* on different utterance types can be derived from this.

Section 2.6 closes with a chapter summary.

Definitions of terms

There is a number of terms which are used in a specific sense throughout this and the following chapter. Descriptions of these terms are given below, also in order to make explicit some of the premises the analysis builds on.

Speech act A *speech act* is linguistic behavior performed when an utterance is made. Speech acts have illocutionary force, which in the data in the scope of this thesis is declarative or interrogative. The felicity conditions arising from illocutionary force can be modified by addition of utterance modifiers, and come with a set of preparatory conditions and commitments determined by force, and determine utterance felicity relative to the prejacent proposition.

Utterance An *utterance* is a modified or unmodified instance of a speech act performed with a prejacent proposition. Utterance meaning consists of *utterance-level meaning* (or speech-act meaning) and *prejacent-level meaning* (or propositional meaning). Prejacent-level meaning is entirely dependent on the prejacent proposition, while utterance-level meaning is dependent on factors such as sentence final intonation and the addition of utterance modifiers, such as the Japanese particle *no* and the speech-act operator *daroo*.

Utterance modifiers Utterance modifiers like *no* and *daroo* influence the felicity conditions of an utterance by marking the availability of evidence (*no*) and lowering the quality threshold, leading to weaker commitments (*daroo*). They do not change the propositional or prejacent-level meaning of the utterance, in contrast with propositional modals.

Felicity Utterance-level meaning can be captured in terms of *utterance felicity conditions*. These are the conditions under which the speech act the utterance constitutes can be performed felicitously, depending on illocutionary force and other factors influencing meaning on the utterance level. Within utterance felicity conditions, I differentiate between (i) preparatory conditions, (ii) commitments, and (iii) implicatures.

Preparatory conditions *Preparatory conditions* are the part of felicity conditions that is constant for a given utterance type determined by prosody and illocutionary force of the speech act. They can be modified by utterance modifiers, and have to be distinguished from commitments arising from the speech act proper, and implicatures arising from the choice of utterance among active alternatives. Preparatory conditions come as evidence conditions and belief conditions.

Commitments Commitment of an agent to a proposition means that the agent makes public a belief state according to which the proposition is true. This makes it necessary for the agent to have sufficient evidence to support this belief. Utterances with declarative force commit the speaker to belief states, utterances with interrogative force forgo such commitment.

Implicatures Implicatures relevant for the purposes of this thesis arise from interaction of the utterance with contextual factors and from the assumed communicative intention of the speaker via addressee reasoning on speaker beliefs. The concrete implementation in the next chapter will be labeled Q-implicatures, where context and communicative intention determine which alternatives are active, and Q-implicatures arise as the complements of the beliefs the forgone alternatives convey.

The concepts of belief and evidence which are basic to the framework to capture utterance felicity conditions will be defined in the first section below.

2.1 Belief propositions and doxastic states

The three ingredients of utterance meaning on the speech-act level, as far as the phenomena in the scope of this thesis go, are beliefs, evidence, and commitment. The most basic of this concept is belief, defined in terms of belief propositions. This section introduces belief propositions as the basic building blocks for the framework within which utterance preparatory conditions are modeled in the remainder of the chapter. Belief, evidence, and commit-

ment are connected as follows. Belief propositions are defined in terms of the doxastic states that support them, and doxastic states are in turn backed by evidence. In this way, evidence is indirectly defined in terms of the belief states it provides grounds for. Commitment, then, is defined as a belief proposition made public by a speech act, which will be discussed mainly in the next chapter where the dynamic part of the framework is introduced.

The first building block to be introduced, however, is belief. Belief propositions are defined in a framework modeling possible worlds as sets of (true) propositions, and the extension of propositions as the set of those possible worlds at which they are true. Belief propositions within this framework are defined in terms of doxastic states, that is sets of worlds doxastically accessible to an agent (a participant, *i.e.* speaker or addressee) at a world (the utterance world). Expanding from basic belief propositions, higher-order belief propositions representing one agent's beliefs over another agent's beliefs, and negated belief propositions on both first- and higher-order levels are defined in order to subsequently capture the preparatory belief conditions of different utterance types.

2.1.1 Believing: doxastic states supporting belief states

Belief propositions are the formal implementation of sentences like “ x believes φ to be true” (where x stands for an agent, and φ for a proposition), of their strongest negated counterparts of the form “ x believes φ to be false”, versions involving negation over beliefs rather than negation of the proposition targeted by belief (or the prejacent proposition), of the form “ x doesn't believe φ to be true”, and sentences describing beliefs over other agent's beliefs, *i.e.* higher-order beliefs, of the form “ x believes that y believes φ to be true” (where y stands for an agent other than x), as well as negated varieties of higher-order beliefs parallel to those of first-order beliefs, of the form “ x believes that y believes φ to be false”, “ x believes that y does not believe φ to be true”, etc. While such sentences are somewhat difficult to interpret with increasing complexity, they can be readily captured in a modal logic formal framework based on possible worlds and accessibility relations.

This section defines belief propositions in terms of the doxastic states which support them. Doxastic states are defined by doxastic accessibility relations as sets of worlds accessible from a given world, *i.e.* as sets of worlds compatible with the beliefs of an agent at a given world. As the extension of a proposition is defined as the set of worlds at which it is true, belief propositions like the sentences listed above are defined as sets of (accessible) worlds. In the definitions below, I follow the discussion in Kaufmann et al. (2006), based on the possible-world frameworks of Hintikka (1962) and Kripke (1963). For a detailed technical discussion of epistemic logic see Fagin et al. (1995), chapters two and three.

Possible worlds and propositions The first, basic step necessary for modeling belief propositions is the definition of the relation between propositions and possible worlds, *i.e.* the definition of propositions within a possible-world framework. I define a possible world w as the set of propositions which are true at w , as in (2.1) below, via the valuation function V which assigns a truth-value (0 for false, 1 for true) to any proposition φ at any world w .

(2.1) **Definition of possible worlds**

$$w = \{\varphi \mid V(\varphi, w) = 1\}$$

The extension of a proposition φ is in turn defined as the set of worlds at which it is true, as shown in (2.2) below.

(2.2) **Definition of proposition**

$$\llbracket \varphi \rrbracket = \{w \mid V(\varphi, w) = 1\}$$

The following two equivalent definitions for “ φ -worlds”, or the worlds at which φ is true, written as W^φ , are available.

(2.3) **Definition of φ -worlds**

- a. $W^\varphi = \{w \mid w \in \llbracket \varphi \rrbracket\}$
- b. $W^\varphi = \{w \mid \varphi \in w\}$

The first definition in (2.3a) presupposes the definition of the extension of φ in (2.2) as the set of worlds which make φ true, *i.e.* the set of worlds at which

the validation function V is such that it assigns the truth value 1 to φ . Note that on this view, W^φ is essentially a notational variant of $\llbracket \varphi \rrbracket$. The definition in (2.3b) is solely based on (2.1), where possible worlds are defined as the sets of true propositions, and does not require the definition of the extension of propositions. As long as no reference needs to be made to any propositions other than φ and its negation, worlds do not necessarily need to be considered sets of propositions — it suffices for the valuation of φ to be defined at any given world, and it becomes irrelevant which other propositions are true at a world where φ is. For ease of exposition, I will henceforth use the notation in (2.3a) to define φ -worlds, as there is no necessity to consider alternatives other than a proposition and its negation for the data in the empirical scope of this thesis (for *wh*-questions, for instance, the internal structure of a world would matter).

Prejacent negation In a model treating worlds as sets of propositions and the extensions of propositions as sets of possible worlds, propositional negation can be defined based on the definitions of the complements of W^φ -worlds as in (2.4) below, where $\mathcal{W}$ is the universe of worlds, *i.e.* the set of all possible worlds.

(2.4) **Definition of world-complements**

- a. $\overline{W^\varphi} = \mathcal{W} \setminus W^\varphi$
- b. $\overline{W^\varphi} = \{w \mid w \notin W^\varphi\}$

The complement of W^φ is equivalent to $W^{\neg\varphi}$, *i.e.* the worlds in which φ is false and $\neg\varphi$ is true, as long as no negation of belief propositions, defined as higher-order propositions over prejacent propositions below, are involved. The extension of $\neg\varphi$ ($W^{\neg\varphi}$) is shown in (2.5) below.

(2.5) **Definition of negated proposition**

$$\llbracket \neg\varphi \rrbracket = \{w \mid V_w(\varphi) = 0\}$$

In parallel to the definition of φ -worlds as W^φ in (2.3) above, (2.6) below defines $\neg\varphi$ -worlds in terms of their relation to the extension of $\neg\varphi$ in (a), and in terms of the inclusion of φ in worlds as sets of propositions in (b).

(2.6) **Definition of $\neg\varphi$ -worlds**

- a. $W^{\neg\varphi} = \{w \mid w \in \llbracket \neg\varphi \rrbracket\}$
- b. $W^{\neg\varphi} = \{w \mid \varphi w\}$

Again, the definition in (2.6a) is sufficient when the only alternatives to be considered are a proposition and its negation. As mentioned above, there is an additional complication when belief propositions, which are defined via the worlds compatible with an agent's beliefs: the complement of “ x believes φ to be true” is *not* “ x believes φ to be false” when negation occurs on the level of belief. When “ x does not believe φ to be true” holds, this means that the set of worlds w compatible with x 's beliefs can be defined as in (2.6a) but not as in (2.6b) on the prejacent level. Below, belief propositions and their negations are defined in terms of sets of worlds compatible with agent belief (doxastic states) to capture this complexity.

Belief propositions I use the following notation for belief propositions:

(2.7) **Notation, paraphrases for first-order belief propositions**

- a. “Agent x believes φ to be true.” $B_x\varphi$
- b. “Agent x believes φ to be false.” $B_x\neg\varphi$
- c. “Agent x does not believe φ to be true.” $\neg B_x\varphi$
- d. “Agent x does not believe φ to be false.” $\neg B_x\neg\varphi$

Belief propositions are essentially like their prejacent propositions in that the valuation function assigns a truth value 0 or 1 to them at each world. Their truth depends, however, on the compatibility of their prejacent propositions with the beliefs of their agent at a given world rather than the truth of the prejacent at that world. In order to model this, I introduce a framework of doxastic accessibility relations, which are functions mapping worlds to doxastic states, or sets of worlds compatible with an agent's beliefs. Given an agent's doxastic states at a world w , I will write that the doxastic state *supports* a belief proposition if the belief proposition is true at w , and define belief propositions by properties of the doxastic states supporting them (concretely, by the relation of these doxastic states to the prejacent proposition, thus modeling the agent's beliefs about the prejacent).

Furthermore, I will also refer to the non-negated belief propositions in (2.7a) and (2.7b) (regardless of whether or not the prejacent proposition φ is negated) as *belief states*. The reason for differentiating between non-negated and negated belief propositions in terminology is that only non-negated belief propositions (*i.e.* belief states) are only supported by *committed* doxastic states, *i.e.* such only containing worlds at which the prejacent proposition is true. Negated belief propositions, on the other hand, are negatively defined in that they are *not supported* by doxastic states committed to the prejacent proposition, but do not require a doxastic state committed to the prejacent's negation to be supported. This means that when "Agent x does not believe φ to be true" holds, this does not settle whether or not "Agent x believes φ to be false" holds. When, for instance, all an observer knows about the beliefs of agent x is a negated belief proposition, the observer has no certainty on whether the agent is in a committed, or a non-committed doxastic state. Belief *states* are thus those belief propositions that, when known (or believed) by an observer with regard to an agent's beliefs on the prejacent proposition, allow for certainty and resolve the issue of whether or not the agent believes the prejacent. As reasoning about the other discourse participant's beliefs is central to the present analysis, the differentiation of belief states and other belief propositions is thus crucial, as the goal of such reasoning must be to find out which belief *state* the other participant is in.

Doxastic states and accessibility relations Doxastic states are defined via accessibility relations. A doxastic accessibility relation gives a set of doxastically accessible worlds for each world, *i.e.* models which worlds are compatible with an agent's beliefs at a given world. For instance, if an agent believes that it is raining, this means that all doxastically accessible worlds are rain-worlds, *i.e.* the proposition "It is raining" is true at all accessible worlds. If, on the other hand, an agent deems it possible that it is raining, this means that *some* doxastically accessible worlds are rain-worlds.¹ I use

¹When all doxastically accessible worlds are φ worlds, this is equivalent to doxastic necessity, when some doxastically accessible worlds are φ worlds to doxastic possibility. In order to avoid confusion, however, I will henceforth not use the terms "epistemic / doxastic necessity" and "epistemic / doxastic possibility", which are generally used for modals on the

the following notation for accessibility relations.

(2.8) **Doxastic accessibility relations**

$wR_x^{dox}w'$ indicates that w' is doxastically accessible to agent x at w , or compatible with x 's beliefs at w .

The doxastic state DOX_x^w of an agent x at world w is defined as below, as the set of all worlds w' which are accessible from w via x 's doxastic accessibility relation R_x^{DOX} .

(2.9) **Definition of doxastic state**

$$\text{DOX}_x^w = \{w' \mid wR_x^{\text{DOX}}w'\}$$

By this definition, the set DOX_x^w contains all worlds compatible with the beliefs of agent x at world w . Thus, when DOX_x^w is, for instance, a subset of W^φ as defined above, this is to say that according to x 's beliefs, φ necessarily holds. A belief of x in φ expressed by the belief proposition $B_x\varphi$ can then be defined by this property required for supporting doxastic states in the following two ways.

(2.10) **Belief proposition in terms of doxastic state**

- a. $B_x\varphi$ is supported by DOX_x^w iff $\text{DOX}_x^w \subseteq W^\varphi$
- b. $B_x\varphi$ is supported by DOX_x^w iff $\forall w' \in \text{DOX}_x^w : w' \in W^\varphi$

The definition in (2.10a) defines $B_x\varphi$ by requiring doxastic states to be subsets of the worlds at which φ is true. The equivalent (2.10b) expresses the same requirement in quantificational terms, requiring all member worlds of x 's doxastic state to be φ -worlds. For completeness, another equivalent quantificational version in terms of accessibility relations rather than doxastic states is given in (2.11).

(2.11) **Belief proposition in terms of accessibility relations**

$$B_x\varphi \text{ is supported by } \text{DOX}_x^w \text{ iff } \forall w'. wR_x^{\text{DOX}}w' : w' \in W^\varphi$$

Thus, belief propositions can be defined in terms of the doxastic states that support them, which are in turn characterized by their relation with the propositional level.

worlds which make the prejacent proposition true. The quantificational notation with accessibility relations will also be used in the definitions of higher-order belief states below.

Finally, the extension of a belief proposition $B_x\varphi$ as the set of possible worlds at which it is true can thus be defined in the following two ways, where (2.12a) shows a definition based on doxastic states and their relation to φ -worlds, (2.12b) a definition based on quantification over accessible worlds and their relation to φ -worlds.

(2.12) **Extensions of belief propositions**

- a. $\llbracket B_x\varphi \rrbracket = \{w \mid \text{Dox}_x^w \subseteq W^\varphi\}$
- b. $\llbracket B_x\varphi \rrbracket = \{w \mid \forall w'. wR_x^{\text{Dox}} w' : w' \in W^\varphi\}$

In order to unify the notation with that for prejacent propositions, I henceforth also write $W^{B_x\varphi}$ and $W^{B_x\neg\varphi}$ for the extensions of the belief states $B_x\varphi$ and $B_x\neg\varphi$, respectively.

Epistemic privilege and introspection

Before moving on to negated belief propositions, I assume two additional rules that will be necessary for derivation of equivalent belief propositions throughout the thesis: epistemic privilege and positive and negative introspection for belief propositions.

First, epistemic privilege means that beliefs of an agent over the same agent's beliefs are realistic. This is illustrated by the two examples below.

(2.13) **Epistemic privilege for belief:**

- a. $B_x B_x\varphi \rightarrow B_x\varphi$
- b. $B_x \neg B_x\varphi \rightarrow \neg B_x\varphi$

The intuition behind this rule is that an agent is the best judge of their own beliefs, thus we can assume that beliefs over their own beliefs are realistic. Crucially, this does not mean that beliefs over propositions other than own beliefs are realistic.²

²Note that this is akin to the Truth axiom in modal logic, with the difference that it only goes for higher-order beliefs.

Second, positive and negative introspection, which are also axioms of modal logic, are defined as follows.

(2.14) **Positive and negative introspection for belief:**

- a. $B_x\varphi \rightarrow B_xB_x\varphi$
- b. $\neg B_x\varphi \rightarrow B_x\neg B_x\varphi$

Note that this is the mirror image of epistemic privilege. The two rules can thus be expressed in the following compact form:

(2.15) **Epistemic privilege and introspection for belief:**

- a. $B_x\varphi \leftrightarrow B_xB_x\varphi$
- b. $\neg B_x\varphi \leftrightarrow B_x\neg B_x\varphi$

These rules only go for higher-order beliefs of an agent over beliefs of the same agent.

2.1.2 Not believing: negation of belief propositions

The next step for implementing the framework is defining negated belief propositions by the doxastic states which support them, or, more precisely, by the properties supporting doxastic states can *not* have, as negated belief propositions *exclude* the doxastic states which support their non-negated counterparts.

Belief conditions and negation Negated belief conditions will play a role within the present analysis in two ways. First, they will be used to reflect cases in which there are requirements on the belief state of an agent that one of the possibilities with regard to a prejacent proposition and its negation is excluded. These include preparatory belief conditions, which permit both committed and non-committed speaker doxastic states except for such supporting one of the possible belief states, and cases where an observer is unsure about an agents belief state, but based on observed linguistic behavior excludes one of the committed doxastic states and thus one of the possible first-order belief states. Second, negated belief propositions will be used to

implement the notion of *forgone commitment* in the analysis of interrogative speech-acts, defined as the complement of commitment (which is in turn defined in terms of — non-negated — belief states) arising from declarative speech-acts.

Negated belief propositions

Negation of a belief proposition can be defined parallel to negation of a first-order proposition, namely as the complement of worlds where the belief proposition holds, *i.e.* $B_x\varphi$ -worlds written as $W^{B_x\varphi}$ in (2.16), in the universe $\mathcal{W}$ of possible worlds. On this definition, the difference between negation on the level of belief propositions and negation on the level of prejacent propositions is not yet apparent.

(2.16) World-complements of belief propositions

- a. $\overline{W^{B_x\varphi}} = \mathcal{W} \setminus W^{B_x\varphi}$
- b. $\overline{W^{B_x\varphi}} = \{w \mid w \notin W^{B_x\varphi}\}$

Note, however, that the complement of worlds in $W^{B_x\varphi}$, that is the extension of $\neg B_x\varphi$, is distinct from the extension of $B_x\neg\varphi$, the negation of $B_x\varphi$ on the prejacent level. In terms of support by doxastic states and their relation to the φ -worlds, *i.e.* their relation to the extension of the prejacent proposition, the negated belief proposition $\neg B_x\varphi$ can be defined as in (2.17a) in terms of subset relations of doxastic states and φ -worlds, and as in (2.17b) in terms of quantification over accessible worlds.

(2.17) Negation of belief proposition in terms of doxastic states³

- a. $\neg B_x\varphi$ is supported by DOX_x^x at w iff $\text{DOX}_x^w \not\subseteq W^\varphi$
- b. $\neg B_x\varphi$ is supported by DOX_x at w iff $\neg\forall w' \in \text{DOX}_x^w : w' \in W^\varphi$
- c. $\neg B_x\varphi$ is supported by DOX_x at w iff $\exists w' \in \text{DOX}_x^w : w' \notin W^\varphi$

In terms of accessibility relations, negated belief propositions can be defined as in (2.18), where negated universal quantification over φ -worlds is substituted with the equivalent existential quantification over not- φ worlds, that is $\neg\varphi$ worlds as shown above.

³“ $B_x\varphi$ is *not* supported at $w \dots$ ”, on an exhaustive construal, is an equivalent paraphrase.

(2.18) **Belief proposition in terms of accessibility relations**

- a. $\neg B_x \varphi$ is supported by DOX_x^w iff $\exists w'. wR_x^{\text{DOX}} w' : w' \notin W^\varphi$
- b. $\neg B_x \varphi$ is supported by DOX_x^w iff $\exists w'. wR_x^{\text{DOX}} w' : w' \in W^{\neg\varphi}$

The crucial difference of belief-proposition and prejacent negation with regard to the truth of the prejacent proposition is as follows. While the set of worlds which are not included in W^φ is identical to the set of worlds which *are* included in $W^{\neg\varphi}$ (as $\mathcal{W} = W^\varphi \cup W^{\neg\varphi}$ — the universe of worlds is the union of φ -worlds and $\neg\varphi$ -worlds), possible doxastic states which are not a subset of W^φ (and thus do not support a committed belief state $B_x \varphi$) are not necessarily a subset of $W^{\neg\varphi}$.

Possible doxastic states Another way to frame this difference is as follows. Belief states are intuitively about their prejacent propositions, but negation does not occur on the prejacent level. The universe of all possible doxastic states is the powerset $\mathfrak{PW}$ of the universe of worlds, that is all possible combinations of possible worlds. The doxastic states supporting $B_x \varphi$ are those members of this powerset which contain only φ -worlds. However, the complement of these doxastic states in $\mathfrak{PW}$ contains not only sets of worlds at which φ is false, but also sets of worlds containing both φ - and $\neg\varphi$ -worlds, *i.e.* doxastic states in which the agent considers both φ and $\neg\varphi$ to be possible. Thus, $\neg B_x \varphi$ as the complement of $B_x \varphi$, or the complement of all doxastic states supporting the latter in the universe of possible doxastic states, does not determine whether $B_x \neg\varphi$ is true or false and is thus less informative with regard to agent x 's doxastic state.

2.1.3 Higher-order beliefs and doxastic states

The last step to complete the framework of belief propositions necessary to capture the belief conditions of various utterance types in the following section is defining higher-order belief propositions, and the higher-order doxastic states supporting them. I define second-order belief states as beliefs of one agent over beliefs of another, distinct agent, which are supported by second-order doxastic states.

Higher-order belief propositions

Notation and paraphrases for some second-order belief propositions are given in (2.19) below.

(2.19) Notation, paraphrases for higher-order belief propositions

- | | | |
|----|--|-----------------------------|
| a. | “Agent y believes agent $x \dots$
... to believe φ to be true.” | $B_y B_x \varphi$ |
| b. | “Agent y does not believe agent $x \dots$
... to believe φ to be true.” | $B_y \neg B_x \varphi$ |
| c. | “Agent y does not believe agent $x \dots$
... to believe φ to be true.” | $\neg B_y B_x \varphi$ |
| d. | “Agent y does not believe agent $x \dots$
... to not believe φ to be true.” | $\neg B_y \neg B_x \varphi$ |

Note that negation can occur on any level (prejacent preposition, first-order belief, second-order belief) resulting in eight possible versions of belief propositions derived from a belief state $B_y B_x \varphi$. As the paraphrases become rather chunky and less intuitive on higher levels (note that there is no limit to recursion in belief propositions), I will use the formal notation introduced here when referring to higher order beliefs throughout the analysis.

Second-order belief states The definition of the basic second-order belief state $B_y B_x \varphi$ in this notation by the kind of doxastic state supporting it is shown in (2.20) below.

(2.20) Doxastic states supporting second-order belief states

$B_y B_x \varphi$ is supported by DOX_y at w iff $\text{DOX}_y \subseteq W^{B_x \varphi}$

This definition presupposes the definition of first-order beliefs as y 's doxastic state is characterized in terms of worlds at which the first-order belief proposition $B_x \varphi$ holds. The extension of the basic second-order belief state $B_x B_y \varphi$ in terms of doxastic states and accessibility relations is given in (2.21a) in terms of doxastic state membership, and in (2.21b) in terms of doxastic accessibility relations.

(2.21) **Extensions of higher order belief propositions**

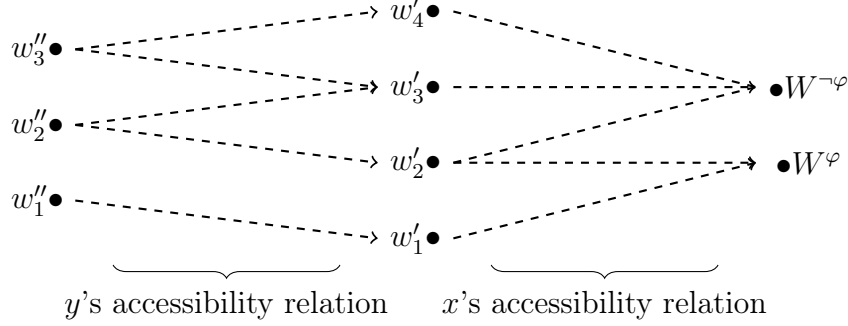
- a. $\llbracket B_y B_x \varphi \rrbracket = \{w \mid \forall w' \in \text{DOX}_y^w : \forall w'' \in \text{DOX}_x^{w'} : w'' \in W^\varphi\}$
- b. $\llbracket B_y B_x \varphi \rrbracket = \{w \mid \forall w'. w R_y^{\text{DOX}} w' : \forall w''. w' R_x^{\text{DOX}} w'' : w'' \in W^\varphi\}$

These definitions say that “ y believes x to believe φ to be true” holds at all worlds at which in all worlds compatible with y ’s beliefs, only φ -worlds are compatible with x ’s beliefs. Before moving on to negation, I discuss and illustrate the sets of worlds represented by the doxastic states, and quantified over, in the definition above in some more detail.

Belief propositions and quantification over accessible worlds

The definitions in (2.21) presuppose the same basic definition of second-order doxastic states as that of first-order doxastic states based on accessibility relations. This yields a set of accessible worlds (which differ in whether or not they are φ -worlds) for each first-order doxastic state. On the secondary level, things are slightly more complicated, as the accessibility relation yields a *set of first-order accessible doxastic states* for each second-order doxastic state. Sets of first-order doxastic states can also be considered sets of worlds, each world with its own first-order accessibility relation yielding its own set of worlds, or first-order doxastic state. That is, while first- and second-order doxastic states are functions from worlds to sets of possible worlds all the same, the property of these worlds which is of interest is different in the two cases. For first-order beliefs, it matters which prejaent propositions of belief propositions the accessible worlds make true. For second-order beliefs, however, it matters which *belief propositions* the accessible worlds make true, or, from a different perspective, it matters with *which accessibility relations* the accessible worlds come. The diagram of an accessibility relation with two levels, representing second-order beliefs over first-order beliefs over a prejaent proposition shown in (2.22) illustrates the latter perspective. This view will be crucial for the definition of negation in higher-order belief propositions, which in turn is crucial for capturing utterance felicity conditions.

(2.22) Levels of accessibility relations



The illustration in (2.22) shows the level of second-order doxastic states (w''), where each world is associated with an accessibility relation of worlds on the level of first-order doxastic states (w'), where each world is associated with an accessibility relation over worlds on the propositional level (w), where each world makes φ true or false (only according sets of worlds indicated for ease of exposition). $B_y B_x \varphi$, for instance, requires all worlds accessible from the second-order level to be worlds in which only φ -worlds are accessible, so only in w''_1 does y 's doxastic state support $B_y B_x \varphi$.

This view on doxastic states makes it possible to define belief propositions in terms of quantification over sets of sets of possible worlds, which in turn enables representation of negation over second-order belief propositions such as those paraphrased above.

Negation in higher-order belief propositions

The second order belief state $B_y B_x \varphi$ can be paraphrased as follows in terms of the framework developed so far:

“ $B_y B_x \varphi$ is supported by y 's doxastic state at w iff all worlds w' compatible with y 's beliefs at w are such that all worlds w'' compatible with y 's beliefs at w' are φ -worlds.”

The introduction of negation on the level of x 's beliefs yielding the second-order belief proposition $B_y \neg B_x \varphi$ changes the paraphrase to “*not* all worlds $w'' \dots$ are φ worlds”, which is equivalent to “*some* worlds $w'' \dots$ are *not* φ worlds”. Formally, this can be represented as follows.

(2.23) **Doxastic states supporting negated second-order beliefs**

- a. $B_y \neg B_x \varphi$ is supported at w iff $\text{DOX}_x^w \not\subseteq W^{B_x \varphi}$.
- b. $\llbracket B_y \neg B_x \varphi \rrbracket = \{w \mid \forall w'. wR_y^{\text{DOX}} w' : \exists w''. w'R_x^{\text{DOX}} w'' : w'' \in W^{\neg \varphi}\}$

The two definitions above differ from that of the doxastic state supporting $B_y B_x \varphi$ shown in (2.20) as follows. First, in (2.23a), negation on the first-order level is implemented as a condition on the doxastic states of x compatible with y 's beliefs is that it not be contained in W^φ , thus excluding cases in which x is certain that φ is true, but not cases in which x deems φ possible. Crucially, this condition is equivalent to a condition that *not all* doxastic states of x compatible with y 's beliefs are included in W^φ .

This is precisely what (2.23b) shows, where negation scopes over the second-order belief, which is represented as negation over universal quantification over y 's doxastic states. This notation is, however, not very intuitive in terms of making the connection with doxastic states (in terms of which belief propositions are defined) and makes it somewhat difficult to confirm the relative scope of quantifiers. I thus suggest the notation in (2.24) through (2.27) below, which preserve the quantificational view and highlight quantifier scope while making the connection to doxastic states transparent.

$$(2.24) \llbracket B_y B_x \varphi \rrbracket = \{w \mid \forall w' \forall w'' (w' \in \text{DOX}_y^w \wedge w'' \in \text{DOX}_x^{w'} \rightarrow w'' \in W^\varphi)\}$$

$$(2.25) \llbracket \neg B_y B_x \varphi \rrbracket = \{w \mid \exists w' \exists w'' (w' \in \text{DOX}_y^w \wedge w'' \in \text{DOX}_x^{w'} \rightarrow w'' \in W^{\neg \varphi})\}$$

$$(2.26) \llbracket B_y \neg B_x \varphi \rrbracket = \{w \mid \forall w' \exists w'' (w' \in \text{DOX}_y^w \wedge w'' \in \text{DOX}_x^{w'} \rightarrow w'' \in W^{\neg \varphi})\}$$

$$(2.27) \llbracket \neg B_y \neg B_x \varphi \rrbracket = \{w \mid \exists w' \forall w'' (w' \in \text{DOX}_y^w \wedge w'' \in \text{DOX}_x^{w'} \rightarrow w'' \in W^\varphi)\}$$

The advantage of this notation is that it makes it easy to implement negation by the rules of first-order predicate logic while making the connection to doxastic states belief propositions are defined by. It also makes transparent that higher-order negation is in principle no different from negation on the first-order or any other level. However, it does not help much with the simplicity of paraphrases. By example of (2.27), the natural language paraphrase of which as a belief propositions is rather difficult to process, a

paraphrase of the quantificational notation could go “in some worlds compatible with y ’s beliefs, all worlds compatible with x ’s beliefs are φ -worlds”, which is not necessarily a simple way of putting it.

As inclusion of doxastic states in sets of worlds denoted by propositions is the way in which support for belief propositions is defined throughout the thesis, I suggest another modification, which is formally potentially less elegant but, I believe, makes the right connection to the basic definitions of belief propositions. In this notation, first-order doxastic states are defined by inclusion in φ - and $\neg\varphi$ - worlds as shown in the alternative definitions in (2.28) through (2.31), and connected to higher-order doxastic states by quantification. This notation that is also more intuitive in connection with the schematic representations of the sandbox-model.

$$(2.28) \llbracket B_y B_x \varphi \rrbracket = \{w \mid \forall w' \in \text{Dox}_y^w : \text{Dox}_x^{w'} \subseteq W^\varphi\}$$

$$(2.29) \llbracket B_y \neg B_x \varphi \rrbracket = \{w \mid \forall w' \in \text{Dox}_y^w : \text{Dox}_x^{w'} \not\subseteq W^\varphi\}$$

$$(2.30) \llbracket \neg B_y B_x \varphi \rrbracket = \{w \mid \exists w' \in \text{Dox}_y^w : \text{Dox}_x^{w'} \not\subseteq W^\varphi\}$$

$$(2.31) \llbracket \neg B_y \neg B_x \varphi \rrbracket = \{w \mid \exists w' \in \text{Dox}_y^w : \text{Dox}_x^{w'} \subseteq W^\varphi\}$$

The paraphrase for (2.31) that describes this notation is on the lines of “Agent x considers it possible that agent y believes φ to be true”. This is arguably a serviceable paraphrase, which becomes possible due to the trick of a mixed notation from quantification, which naturally corresponds to possibility and necessity statements, and the inclusion notation of doxastic states, which readily translates to belief propositions.

The quantificational perspective on accessible worlds also makes transparent which doxastic states support a given belief proposition and allows to compare different belief propositions, which will be used to differentiate speech acts in the analysis. For instance, the denotation of $B_y B_x \varphi$ includes two instances of universal quantification, that of $\neg B_y B_x \varphi$ two instances of existential quantification (along with propositional negation). This means that the condition on doxastic states supporting $B_y B_x \varphi$ is maximally strict: *all* worlds in the set given by y ’ accessibility set need to be such that *all* worlds

accessible from them via x 's accessibility relations are φ -worlds. $\neg B_y B_x \varphi$, on the other hand, is as weak as it gets, as it is supported as long as there is only a *single* $\neg\varphi$ -world compatible with x 's beliefs which is also compatible with y 's beliefs at the utterance world.⁴ Adding additional levels is trivial on this representation, as is negation,⁵ and the relative logical strength of the belief propositions as well as their entailment relations are transparent, which will become important in the discussion of alternative utterances. For other aspects of the discussion, such as which doxastic states are felicitous when a negated belief proposition is a preparatory condition of an utterance, a classification of belief by the doxastic states that represent them which I will introduce in the following section can be instructive.

2.1.4 Types of doxastic states by supported beliefs

To facilitate subsequent discussion, I introduce some labels classifying first- and second-order doxastic states and the belief propositions they support. Furthermore, in order to illustrate the framework developed thus far and the aforementioned types of doxastic states, I introduce an illustrative sandbox model of doxastic states to be used throughout the chapter.

First-order doxastic states

First-order doxastic states can be classified as follows:

Committed states of an agent x with regard to a partition into φ and $\neg\varphi$ worlds are those doxastic states which are included in (*i.e.* are subsets of) either W^φ or $W^{\neg\varphi}$ and hence support either of the belief states $B_x \varphi$ or $B_x \neg\varphi$.

Non-committed states are all states which are not committed, *i.e.* included in neither W^φ nor $W^{\neg\varphi}$ in the case of a partition into φ and $\neg\varphi$ -worlds, and can be further classified into biased and neutral states.

⁴The figure of accessibility layers in (2.22) also illustrates this.

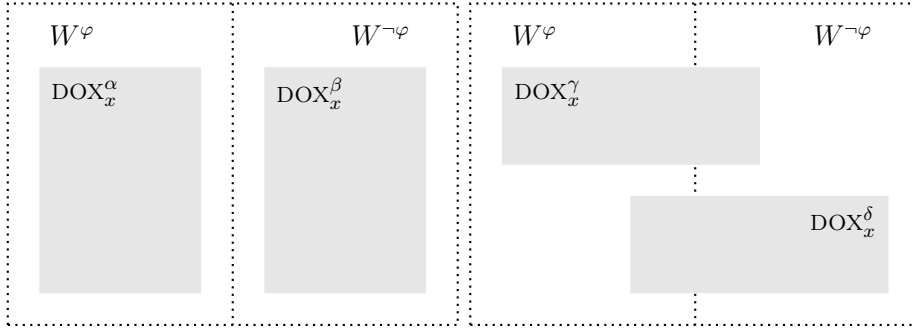
⁵Which follows the following equivalence rules, assuming that $\mathcal{W} = \{W^\varphi | W^{\neg\varphi}\}$:
 $\neg \exists w, w \in W^\varphi = \forall w : w \in W^{\neg\varphi}$ and $\neg \forall w, w \in W^\varphi = \exists w : w \in W^{\neg\varphi}$

Biased states are non-committed states which have a larger intersection with either W^φ or $W^{\neg\varphi}$, which on the present analysis means that the agent deems one of the alternatives more likely than the other. This type of doxastic state will become important in the discussion of *daroo*-utterances in sections 2.3.4 and 2.5 and will be formally defined there.

Neutral states are non-committed states which have equally large intersections with both of the sets of worlds that make up the partition. Neutral can be further classified into ignorant and agnostic states on the second-order level.

(2.32) below shows a simplified “sandbox model” of a universe of possible worlds, which is used for illustration purposes henceforth and exemplifies above types of doxastic states. Note that in the geometrical representation, the height of the gray boxes representing doxastic states is irrelevant and determined purely for reasons of space, the relevant dimension illustrating the worlds they include being their horizontal extension, and their intersection with the cells of the partition indicated by the dashed line. The same universe with the same partition is shown twice for ease of exposition.

(2.32) **Sandbox model of doxastic states of agent x**



The illustration in (2.32) shows a partition of worlds into worlds W^φ at which φ is true, denoted by $\llbracket \varphi \rrbracket$ and worlds $W^{\neg\varphi}$ at which φ is false, denoted by $\llbracket \neg\varphi \rrbracket$. Out of the four doxastic states of agent x shown in the illustration, α and β are committed states as they are subsets of W^φ and $W^{\neg\varphi}$, respectively, while γ and δ are both non-committed states with regard to the partition

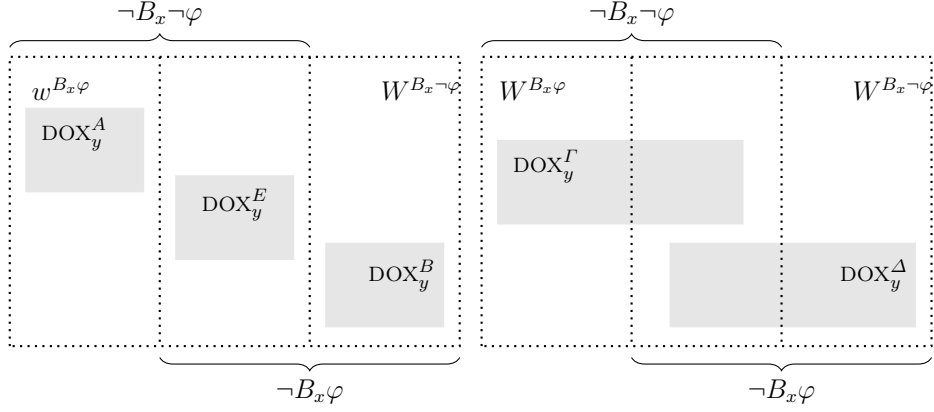
$\{\varphi|\neg\varphi\}$, as both of them have nonempty intersections with either cell. Out of these non-committed states, γ is biased towards φ and δ is biased towards $\neg\varphi$, as the former has a larger intersection with W^φ than with $W^{\neg\varphi}$, the latter *v.v.* The intersection and union of γ and δ would both be neutral doxastic states.

Second-order doxastic states

First-order doxastic states are sets of worlds which are doxastically accessible to an agent, second-order doxastic states sets of first-order doxastic states accessible to another agent.⁶ In order to describe the kinds of such doxastic states which will be relevant for the discussion of utterance felicity conditions, a partition into three cells (see the illustration below) is necessary on the level of second-order doxastic states. This is because it is necessary to differentiate cases where the higher-order agent is certain about the belief state of the first-order agent, *i.e.* is certain that the first-order doxastic state is committed, from cases in which the higher-order agent can merely exclude one of the committed states of the first-order agent, but entertains the possibility that the first-order agent is in a non-committed states.

The illustration below shows examples of second-order doxastic states, the partition indicating which first-order belief states are supported by the first-order doxastic states in the respective cell. As in the illustration above, the height of the boxes is irrelevant, their width, and overlap with cells of the partition, indicating which worlds they include.

⁶If it were the same agent, the two levels could be collapsed to one and all worlds on the primary level which are accessible to the agent in the second-order accessibility relation via the intermediary step of the first-order accessibility relation would become accessible in the agent's primary doxastic state.

(2.33) **Sandbox model of second-order doxastic states of agent y** 

Note that the partition of worlds in (2.33) is tripartite, into worlds at which $B_x \varphi$ holds, worlds at which $B_x \neg \varphi$ holds, and worlds at which neither holds. Braces indicate worlds at which negated first-order belief propositions hold. This is due to the aforementioned complication with regard to negation of belief states — from the higher-order agent's perspective, this means that the question of whether the first-order agent believes φ to be true or to be false (rather than whether or not the first-order agent believes φ to be true/false) cannot be resolved by negation of the belief proposition (rather than the prejacent). All doxastic states shown here support non-negated belief propositions (*i.e.* belief states) on the second-order level.

I introduce the classifying labels paraphrased below for second-order doxastic-states. The paraphrases are formulated on the view that doxastic states can *include* other doxastic states. This is because second-order belief propositions reflect reasoning of the second-order agent over the first-order agents beliefs. Thus, the doxastic state of the second-order agent contains only those worlds at which the doxastic state of the first-order agent is compatible with what the second-order agent believes. These first-order doxastic states are *included* in the second-order agents doxastic state.

Committed states on the second-order level are doxastic states which include only committed first-order states, *i.e.* the second order agent believes the first-order agent to be committed to either the truth or the falsity of the prejacent and either $B_y B_x \varphi$ or $B_y B_x \neg \varphi$ is supported.

Non-committed states are states other than committed states, *i.e.* all doxastic states which only support belief states involving negation on the belief level, and can be further classified into the three categories below.

Biased states are those which exclude all committed first-order states within one cell of the first-order partition into W^φ and $W^{\neg\varphi}$, but include non-committed (biased and/or neutral) first-order doxastic states. The belief propositions supported by such states are those without negation on the second-order level, but with negation on the first order level. For instance, $B_y \neg B_x \varphi$ is supported by a biased doxastic state if agent y does not exclude that agent x believe φ to be false — in this case, agent y is biased towards agent x believing φ to be false.

Agnostic states are those which exclude all committed first-order states in both cells of the primary partition, but include non-committed (biased and/or neutral) first-order states. If for instance, both $B_y \neg B_x \varphi$ and $B_y \neg B_x \neg \varphi$ are supported, agent y ascribes a non-committed state to agent x .

Ignorant states are those which do not exclude any first-order states, that is only negated second-order belief propositions are supported.

In the illustrative sandbox model, A and B are the committed states, as they only contain worlds at which the first-order agent is committed to the truth or falsity of φ . The biased states Γ and Δ , on the other hand, first-order doxastic states committed to $\neg\varphi$ and φ , respectively. E (the intersection of Γ and Δ) is the agnostic state, which excludes committed first-order doxastic states of either polarity, but includes non-committed (biased and/or neutral) first-order doxastic states. Finally, the union of Γ and Δ would be an ignorant state, as it does not rule out any first-order states.

On a final note, negation on the second-order level, *i.e.* negation of second-order belief propositions cannot be directly represented by single doxastic states in this illustration. A negated belief proposition $\neg B_y B_x \varphi$, for instance, is supported if there is one $\neg\varphi$ -world in DOX_x at one of the worlds in DOX_y . All doxastic states except for DOX^A satisfy this requirement, illustrating how

relatively weak second-order negation is. Notice, however, that belief negation on both the first- and the second-order level is stronger, as $\neg B_y \neg B_x \varphi$ excludes more first-order doxastic states, namely DOX^B , DOX^E , and DOX^F .

Belief, evidence, and commitment

The account of preparatory conditions that will be given in this chapter relies on belief propositions as its basic building block. However, belief conditions alone are not enough to reflect either the preparatory conditions of utterance types or the conveyed meaning of instances of utterances, including their bias patterns, which are the main empirical focus of this thesis as the background on which the particle *no* alters utterance meaning.

In order to account for bias, it is necessary to introduce a notion of evidence into the framework, chiefly in order to account for the effect of adding *no*, but also to account for evidential bias as part of the preparatory conditions of certain utterance types. The first notion of evidence will be introduced in the following section, in connection with the notion of commitment.

2.2 Evidence and Commitment

Evidence and commitment are two closely linked phenomena shaping the preparatory conditions of utterances. There are two possible perspectives on this link. First, a condition on an assertion that evidence be available could be the basis of a conjecture that the speaker of the utterance, if it constitutes a felicitously performed speech act, is committed to the truth of the prejacent by virtue of being committed to the presence of evidence. Second and conversely, commitment to a proposition by assertion can support the conjecture that the speaker has evidence for the truth of φ , assuming there is a more general rule that commitment should be backed by evidence. I remain agnostic with regard to which of these views is on the right track, attempting to make the connection between evidence and commitment by some basic inference rules as discussed in the remainder of this section. In the following introduction of the inference rules, I will not introduce a formal

notion of commitment, defining commitment and forgone commitment in terms of (negated) belief states when discussing other utterance types in section 2.4.

2.2.1 Evidence as grounds for commitment by assertion

The term *evidence* has various uses both in linguistic and non-linguistic contexts, and is used here only in the specific context of utterance felicity conditions. I will on occasion use the term *grounds* interchangeably in the same sense, for instance when discussing the effects that perceptual evidence in the utterance situation has on choice of utterance and utterance felicity. Perceptual evidence is one instance of what can serve as evidence in the sense of grounds for assertion, but is a special case of evidence in the sense used here, which is available to all participants (I will use the term “mutually accessible” for this), and, insofar as it is relevant for the empirical observations on utterance felicity in the first chapter, has just become available in the utterance situation. Buring and Gunlogson’s (2000) definition of “compelling contextual evidence”,⁷ for instance, characterizes this kind of evidence. The inferential part of their definition, namely that “compelling” evidence “in isolation, [...] would allow the participants to assume $[\varphi]$ ”, and that it “could reasonably be considered to justify the inference that $[\varphi]$ ”, on the other hand, points to the possibility of defining evidence as grounds for belief formation, regardless of its status as perceptual or mutually accessible.

The view I take on evidence is similar but restricted to its role within the felicity conditions of utterances. Evidence in this sense used here can be private (that is, accessible only to the speaker), and does not need to be perceptual. The definition of the preparatory conditions for assertion in Searle (1969), which will be discussed further below, hints at what I take to be a similar view of evidence, as the first preparatory condition for assertions is formulated as “[the speaker] has evidence (*reasons etc.*) for the truth of the φ ” (emphasis mine), where “reasons etc.” seems to indicate that the evidence

⁷This notion and its relation to the current proposal is discussed in more detail in section 3.4.1 where the meaning of *no* I propose is defined in terms of the dynamic framework.

does not need to be mutually accessible perceptual evidence, and that the speaker is, in the first place, the judge of whether or not the evidence is “adequate”, in Grice’s (1975) sense, to warrant assertion of φ . The definition of evidence to follow below is thus based on the relation between the evidence required for felicitous assertion and the commitment in form of belief made public that arises from assertion of φ .

The evidence rule connecting belief and evidence

A definition of what constitutes evidence is a complex matter and is far from uncontroversial in the literature. The notion of evidence I introduce here, on the other hand, is defined solely in terms of conjecture on behalf of the observer of an assertion based on the premise that the assertion has been performed felicitously. While this could possibly be framed in more general terms, namely that the availability to an agent of (sufficiently strong) evidence supporting a proposition φ allows the conjecture that, all things being equal, this agent believes φ to be true, discussion of such general questions with regard to belief and evidence are beyond the scope of this thesis. Instead, I introduce a rule encoding the conjecture of belief from the premise of the presence of evidence, this premise being a result of observer reasoning based on observed linguistic behavior, and label this rule the *evidence rule*.

Introducing the evidence rule The rule I propose essentially states that based on the premise that there be evidence supporting a proposition φ available to an agent x (which is adequate to back up felicitous assertion of and thus commitment to φ), the inference can (normally) be made that this agent x has a belief that φ .⁸ If, however, it is known to the observer that agent x believes φ to be false, this inference should be blocked (this is motivated both in terms of belief revision and by the observations on *no*-utterances which are the empirical focus of this thesis). For this reason, the evidence

⁸Alternatively and more generally as it does not involve the notion of assertion, the rule could read that based on the premise that there be sufficient grounds for agent x to believe φ the inference can be made that this agent believes φ . Making such a claim is, however, not necessary for the present definition of evidence restricted to its role within utterance felicity.

rule is defined as a *defeasible* entailment relation, where the inference can be blocked in other than “normal” cases.

I will use the notations given below for evidence propositions which in the current framework reflect utterance felicity conditions of declarative speech acts requiring the availability of evidence supporting a belief that a proposition φ , or its negation $\neg\varphi$, be true.

(2.34) **Notation and paraphrases for availability of evidence**

- $EV_x\varphi$: Agent x has evidence adequately backing up a doxastic state $DOX_x \subseteq W^\varphi$ supporting a belief $B_x\varphi$
(i.e. x has sufficient grounds to felicitously assert φ).
- $EV_x\neg\varphi$: Agent x has evidence adequately backing up a doxastic state $DOX_x \subseteq W^{\neg\varphi}$ supporting a belief $B_x\neg\varphi$
(i.e. x has sufficient grounds to felicitously assert $\neg\varphi$).

Crucially, these paraphrases are meant to define evidence *within utterance felicity conditions* of declaratives, which means that “believing” means sufficient to back up a doxastic state of the agent committed to φ or $\neg\varphi$, which in turn supports a respective belief state. Thus, the notion of evidence on this view is intended to support belief states, but not negated belief propositions. That is to say that there is no such thing as negative evidence supporting the exclusion of belief states in terms of the felicity conditions of utterances, only the presence or absence of evidence.

Preview: the evidence threshold

So far, no mention has been made of the strength of evidence in the formal system, which will be necessary to expand the framework to *daroo*-utterances, which I claim lower the threshold for evidence to be considered sufficient. This evidence threshold will be linked to a global *quality threshold*, which could be reflected in the paraphrases above by replacing doxastic states which support a belief that φ with biased doxastic states, a notion which is necessary to account for *daroo*-belief states as well, see sections 2.3.4 and 2.5.

Also note that the strength of evidence required for felicitous assertion can be influenced by any operators on the prejacent level, one example for which

are modal predicates such as the epistemic modal *kamoshirenai* in Japanese. When φ is modified in this way it is only commitment to the *possibility* that φ is true which needs to be backed up by evidence, thus indirectly requiring weaker evidence. As can be seen from the empirical observations in chapter 1, however, the addition of *daroo* has a distinct evidential effect, which I explain as an effect of lowering the quality threshold on utterance level. While this effect also differs from that of other evidential expressions in Japanese, a full survey of the Japanese modal and evidential system in this respect is beyond the scope of this thesis.

The interpretive evidence rule

The evidence threshold aside, for now evidence supporting φ means evidence sufficient to back up a belief state fully committing an agent to φ *by assertion of φ* , as reflected in the evidence rule given below.

(2.35) Evidence rule

$$EV_x\varphi > B_x\varphi$$

This rule states that given the premise that there is evidence which is sufficient to support a belief that φ be true available to an agent x , which the observer derives, for instance, from felicitous assertion of φ by the agent, the same agent x usually believes φ to be true, or is in a doxastic state supporting a belief state $B_x\varphi$. This rule can potentially govern both reasoning over the beliefs of an agent and belief formation, but is here only intended as an interpretive rule for observed linguistic behavior.

Formally, the inferential relation between evidence and belief is implemented as defeasible entailment, in (2.35) above represented by the symbol “>”, following Asher and Lascarides’ (2003, 185) notation for what they label a “default axiom”. Defeasible entailment reflects that the availability of evidence to an agent does not automatically lead to a doxastic state in which only φ -worlds are accessible to the agent. In the following section, I will discuss the possible construals of the evidence rule with regard to the conditions under which defeasible inference is blocked, also discussing a possible weaker alternative to the evidence rule.

On a side note regarding the notion of commitment to be discussed in more detail in section 2.3.2, evidence is necessary to back up commitment, in the sense that commitment to a belief state and thus a corresponding doxastic state is only felicitous when there is evidence sufficient to support this doxastic state. The converse, and also conceivable, view is that when there is evidence supporting φ , it causes the agent to whom the evidence is available to be in a belief state supported by a doxastic state from which only φ -worlds are accessible. Both views are compatible with the evidence rule as stated above, the former view interpreting it from the perspective of the observer of a speech act committing the agent to φ by conveying a belief state $B_x\varphi$, the latter view interpreting it from the perspective of an agent who has access to evidence supporting φ , or the perspective of an observer of a speech act conveying that the speaker has access to evidence supporting φ (which I will argue to be the function of the particle *no*).

2.2.2 Two construals of the evidence rule

The central question to be discussed in this section is that of the blocking condition for the evidence rule, which “defeats” the defeasible inference. According to Asher and Lascarides (2003, 190), the inference that the consequent of a defeasible entailment relation holds from the truth of the prejacent is blocked when the negation of the consequent holds.

There are two apparent possibilities for implementing such a blocking condition for the evidence rule as stated in (2.35). The two possible conditions are both derived from negation of the consequent of the defeasible entailment rule, with the difference that negation scopes over the prejacent proposition in $B_S\neg\varphi$, and scopes over the belief state in $\neg B_S\varphi$. As the former version is logically stronger (support of $B_S\neg\varphi$ entails support of $\neg B_S\varphi$), I label the construal of the evidence rule under which $B_S\neg\varphi$ is the blocking condition the strong construal, as shown in (2.36), and the construal under which $\neg B_S\varphi$ defeats inference the weak construal of the evidence rule, as shown in (2.37). Evidence rule and blocking condition are defined in a., successful inferences are shown in b., blocked inferences in c. for each construal.

(2.36) **Blocked inference on the strong construal:**

- a. $EV_x\varphi > B_x\varphi$ unless $B_x\neg\varphi$:
- b. $(EV_x\varphi > B_x\varphi) \wedge EV_x\varphi \vdash B_x\varphi$
- c. $[(EV_x\varphi > B_x\varphi) \wedge EV_x\varphi] \wedge B_x\neg\varphi \not\vdash B_x\varphi$

(2.37) **Blocked inference on the weak construal:**

- a. $EV_x\varphi > B_x\varphi$ unless $\neg B_x\varphi$
- b. $(EV_x\varphi > B_x\varphi) \wedge EV_x\varphi \vdash B_x\varphi$
- c. $[(EV_x\varphi > B_x\varphi) \wedge EV_x\varphi] \wedge \neg B_x\varphi \not\vdash B_x\varphi$

As the labels indicate, the two different blocking conditions effectively differentiate two construals of the evidence rule, which are strong and weak in the sense that inference is less easily defeated on the strong construal, as the blocking condition is logically stronger than on the weak construal.

The weak construal The weak construal is straightforwardly derived from the standard recipe for deriving the blocking condition for defeasible inference: if the inference $[A > B \wedge A] \vdash A$ is blocked by $\neg B$, then $EV_x\varphi > B_x\varphi$ would be blocked by $\neg B_x\varphi$. The weak construal of the evidence rule also has some intuitive appeal: it makes it possible to retain doxastic states in which the agent still entertains the possibility that $\neg\varphi$ holds in spite of evidence supporting φ , for instance when the agent is not ready to let go of a previously entertained possibility, or when the evidence is not strong enough to warrant full belief revision.

There is a potentially fatal problem for the weak construal, however: in order for evidence supporting φ not to fall under the table in cases where the agent preserves the possibility that $\neg\varphi$ holds, we would need to introduce doxastic states “leaning” towards one alternative or the other, which are unavailable in the model as it stands (a similar notion will be necessary to account for the effects of *daroo*), and additional rules governing how evidence makes doxastic states more or less biased. In the model at this point, only doxastic states already supporting $B_x\varphi$ do not block the inference from $EV_x\varphi$ to $B_x\varphi$, rendering the evidence rule powerless. While there is the prospect of revising the model to include biased doxastic states and more complex

belief revision rules, this is not necessary when construing the evidence rule strongly.

The strong construal On the strong construal, only an additional premise $B_x \neg \varphi$, *i.e.* that agent x believe φ to be false, blocks the inference of $B_x \varphi$ from the premise $EV_x \varphi$, but not the weaker additional premise $\neg B_x \varphi$. That is, as long as the agent does not rule out φ completely, it can be assumed that the agent will believe it when supporting evidence is available. From the perspective of evidence-based belief formation, this means that when the speaker has a previous belief that φ is false, evidence supporting φ does not lead to a belief that φ is true. In the analysis of different utterance types in section 2.4 and of communicative intentions they can convey in the next chapter, such a blocking condition is crucial in order to account for combined mirative / incredulity readings, on which the speaker conveys that the evidence supporting φ makes *belief revision* necessary.

2.2.3 Evidence and belief revision

Recall that the Evidence rule on its strong construal states that when an agent believes a proposition to be false, the availability of evidence supporting this proposition to the agent does not allow the conjecture that the agent believes the proposition to be true, due to blocked defeasible inference. The relevant formula is repeated below.

(2.38) **Blocked defeasible inference (strong construal)**

$$[(EV_x \varphi > B_x \varphi) \wedge EV_x \varphi] \wedge B_x \neg \varphi \not\vdash B_x \varphi$$

From the perspective of belief formation this means that, at first, nothing changes when there is evidence in contradiction to a previously held belief of agent x . However, agent x can decide to initiate a process of belief revision by first *widening* the doxastic state, and second *narrowing* it down again by forming an intersection with W^φ .

The Evidence rule in terms of doxastic states The evidence rule has so far been stated in terms of belief propositions. Viewing it in terms of

the doxastic states supporting these belief propositions makes it possible to model belief revision as sketched above. Consider a case where an agent x is in a doxastic state which is included in $W^{\neg\varphi}$, so that $B_x\neg\varphi$ is supported, that is, agent x believe φ to be false. When the agent now encounters evidence supporting φ , defeasible inference is blocked, *i.e.* the doxastic state of the agent cannot be narrowed down to one included in W^φ . That is, the blocking condition can be formulated in terms of doxastic states as an empty intersection of x 's doxastic state with W^φ . I provide a revised definition the evidence rule to reflect that it can only narrow down doxastic states by intersection with W^φ , which straightforwardly derives the blocking condition as the case where the intersection with W^φ is empty. The accordingly revised evidence rule for belief formation is given below.

(2.39) Evidence rule for belief formation:

For any agent x , when $EV_x\varphi$ holds,

$$\text{update } \text{DOX}_x \text{ to } \text{DOX}'_x = \begin{cases} \text{DOX}_x & \text{if } \text{DOX}_x \cap W^\varphi = \emptyset \\ \text{DOX}_x \cap W^\varphi & \text{otherwise.} \end{cases}$$

This bifurcated version of the evidence rule states that the doxastic state of an agent x is to be updated to DOX'_x by intersection with W^φ if this results in a non-empty state, but remains unchanged otherwise (this is the case of blocked defeasible inference).⁹ In order to update the doxastic state to one included in W^φ , then, a non-monotonic update in which first the doxastic state is widened and then narrowed to φ is necessary. Whether or not the agent takes one or both of these steps depends on a number of factors, such as strength of the previous belief, or the evidence which backs it up, compared to strength of the newly available evidence, and should not be an automatic consequence of the availability of contradictory evidence, as otherwise belief states would arguably be too volatile¹⁰, and, more importantly, because utterances can convey that there is evidence contradictory to previous belief,

⁹This is a very rough approximation of what a realistic model of a belief revision process might look like, but is, I believe, sufficient to account for the phenomena in the empirical scope of this thesis.

¹⁰Note that if belief revision were automatic, *e.g.* given a certain strength of evidence, the evidence rule could be a relation of standard, rather than defeasible entailment.

either having caused belief revision, having caused suspension of belief, or not having lead to belief revision. I will argue that these are readings conventionally associated with different utterance types (with and without the particle *no*), and label them the mirative, incredulity, and doubt readings, respectively.

Context change and belief revision Context change will be implemented as the dynamic part of the framework in chapter three, where contexts that utterances operate on are defined as sets of sets of propositions compatible with a participant's beliefs. Each individual context can thus be understood as a constellation of doxastic states, which an utterance potentially changes by adding certain beliefs (implemented as conditions on the output context), provided that conditions on the input context are satisfied. Thus, context change can be construed as a case of belief formation, an obvious parallel to the evidence rule as formulated above. The differences between the two phenomena are that in the case of speech-act-based context change, not only one, but all participants are involved and the added beliefs are strictly second-order belief propositions, while in the case of evidence-based context change only one participant is involved and the added beliefs are first-order belief propositions.

In spite of these differences, there is an obvious parallel in the way that beliefs are narrowed, that is some possible worlds are excluded from a participant's doxastic state — in other world, the actual world changes with regard to the participants' beliefs. What is also parallel is that there are conditions on this narrowing, or transition from one world determining doxastic states to another in both cases: the blocking condition in that of belief formation, utterance preparatory conditions in the case of context change potentials.

The parallel between preparatory conditions and the blocking condition does not go all the way, however, as the preparatory conditions of utterances can be flouted in the case of insincere speech-acts, potentially leaving the utterance effective just as their sincere counterparts would be, while in case the blocking condition of the evidence rule is fulfilled, belief revision becomes necessary, as discussed below in more detail.

Schema for belief revision under evidence

To illustrate what belief revision means in the context of the present framework, I introduce a schema of belief revision under evidence in this section. The schema is idealized and simplified in that it does not take into account a threshold for belief, for instance by setting a subjective probability limit from which a doxastic state supports a belief state, but rather assumes that only when the agent deems a proposition completely impossible is belief revision necessary to change the doxastic state. The schema introduced here, thus, is not meant to be a realistic reflection of belief revision, but only to identify stages in a belief revision process which are conventionally associated with utterance types in the empirical scope of this thesis.¹¹

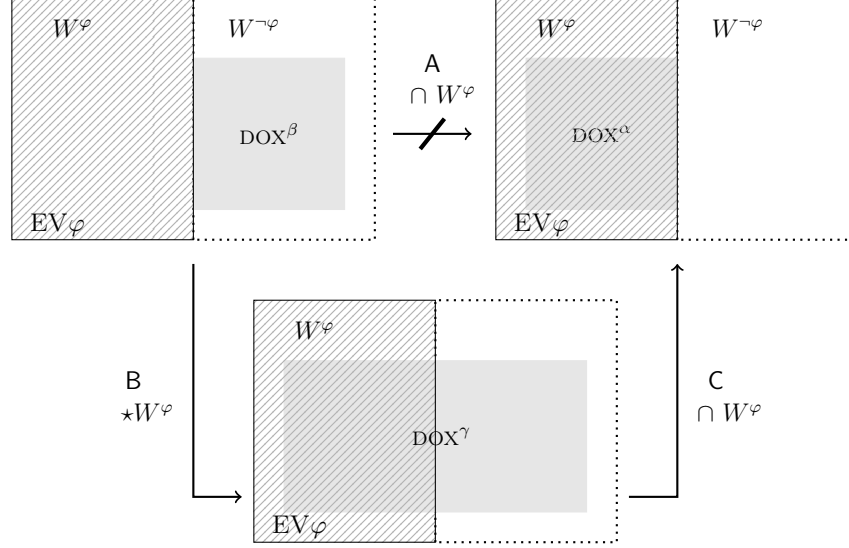
Belief revision on the simplified view means that when an agent's doxastic state is contained in $W^{\neg\varphi}$, *i.e.* the agent believes φ is false, and the agent encounters evidence which supports φ sufficiently to satisfy the evidence rule, then in order to change the doxastic state to one contained in W^φ , *i.e.* to adopt a belief that φ is true, the doxastic state of the agent first needs to be widened to have a non-empty intersection with W^φ in addition to $W^{\neg\varphi}$, *i.e.* the previous belief that φ is false needs to be abandoned, before narrowing the doxastic state down to φ -worlds. Three steps of belief revision illustrated in the schema, based on the sandbox model of doxastic states, in (2.41), and described in (2.40) below.

(2.40) Steps of belief revision:

- A $\text{DOX}^\beta \cap W^\varphi$ (Narrowing of non-committed state under evidence.)
- B $\text{DOX}^\beta \star W^\varphi$ (Widening of committed to non-committed state.)
- C $\text{DOX}^\gamma \cap W^\varphi$ (Narrowing after widening.)

¹¹The model is simplified in that, realistically, few things can be ruled out with complete certainty on the one hand, and in case an agent deems a proposition only marginally possible even strong evidence may not suffice for belief revision. Such issues go beyond the scope of this thesis, however.

(2.41) Schema of belief revision under evidence



Note that the second step of widening the doxastic state, here labeled **B**, is represented by a symbol $\star$, and is underspecified here. Belief revision is a complex issue as it is required to at first keep all but the possibility that φ holds constant, which is not possible by simply forming the union with φ -worlds (as this would result in the doxastic state by which the intersection of the entire universe with the extension of φ were compatible with the agent's beliefs). For the purposes of the present analysis, it is only relevant which stage in a process of belief revision the agent is in, while the details of this process are beyond the scope of the discussion (see for instance Gärdenfors (1985) and the articles in Gärdenfors (1992) for extensive discussion regarding belief revision and its formal implementation, and Alchourrón et al. (1985) for a seminal formal implementation). The crucial property of step **B** and thus of the update operator $\star$ is that the resulting state is one in which $B_x \neg \varphi$ is no longer supported, but $B_x \varphi$ is not either, *i.e.* agent x has suspended judgment with regard to the truth or falsity of φ .

A weaker, but obligatory evidence rule

There is a final possibility of accounting for cases of belief revision, namely weakening of the evidence rule as such in order to reflect that (sufficiently

strong) evidence results in doxastic-state widening. Such a weaker evidence rule could be defined on the lines of $EV_x\varphi \rightarrow \neg B_x\neg\varphi$. Note that this weaker evidence rule is not given as defeasible entailment. This is because there would be no conceivable blocking condition: if the agent already believes φ to be true, the consequent already holds, and in the case where the agent believes φ to be false the inference better go through (as this is the case of belief revision the rule is designed to characterize in the first place). Thus assuming belief revision as the default rather than a reaction to blocked defeasible inference does, however, not match up with the empirical observations of three readings with regard to contradictory evidence to be accounted for. Also, it comes with the problem of volatile belief states.¹² Finally, it does not actually directly account for cases of direct narrowing of the speaker's doxastic state, that is evidence-based belief formation from a non-committed state, which would require an additional rule of belief revision after all. In sum, the weaker version of the evidence rule is too weak and at the same time too rigid to make the right connections between belief and evidence.

Interim summary

In this section, I have proposed an evidence rule which makes a connection between evidence and belief from two perspectives: that of an observer of linguistic behavior (so far, assertion of a prejacent proposition) and that of belief formation or revision under evidence. The interpretive evidence rule is given below.

(2.42) Interpretive evidence rule:

$$EV_x\varphi > B_x\varphi, \text{ unless } B_x\neg\varphi$$

This rule characterizes not only the relation between evidence and belief, but also shows how commitment arises from assertion — on the premise that an agent has evidence which is sufficient (in isolation) to support the inference

¹²More precisely, it sweeps this problem under the rug of evidence — if belief revision is the default, and previous beliefs to the contrary are not taken into consideration (this is not possible, as shown by the unavailability of a blocking condition), then such beliefs can only be factored in as the grounds, or evidence, on which they are held, and the question becomes whether the *aggregated* evidence supporting the prejacent is strong enough.

that φ holds, it can be assumed that the agent believes φ to be true, unless there is an additional premise that the agent believes φ to be false. In the following section, I will argue that this is in line with Gricean conversational maxims of quality, and that it can explain how these maxims conspire to give rise to speaker commitment from assertion.

I have also argued that belief can occur when there is evidence for φ but the agent believes φ to be false. To capture this, I provided a bifurcated variant of the evidence rule in terms of doxastic states.

(2.43) Evidence rule for belief formation:

When evidence supporting φ is available to agent x ($EV_x\varphi$),

$$\text{update } \text{DOX}_x \text{ to } \text{DOX}'_x = \begin{cases} \text{DOX}_x & \text{if } \text{DOX}_x \cap W^\varphi = \emptyset \\ \text{DOX}_x \cap W^\varphi & \text{otherwise.} \end{cases}$$

This rule states that evidence can only narrow, but not widen doxastic states, from which the blocking condition $B_x \neg\varphi$ follows, as only a doxastic state that has no intersection with W^φ supports the belief state that is the blocking condition for the evidence rule. Belief revision, then, follows the following two steps, which will be labeled B and C throughout the thesis.

(2.44) Steps of belief revision as narrowing after widening:

$$\begin{array}{ll} \text{B } \text{DOX}^\beta \star W^\varphi & (\text{Widening of committed to non-committed state.}) \\ \text{C } \text{DOX}^\gamma \cap W^\varphi & (\text{Narrowing after widening.}) \end{array}$$

These two steps, as well as that of blocked inference or failed belief formation, will be crucial in accounting for the uses and conveyed meanings of different utterance types in the next chapter. Before this, however, I discuss preparatory conditions of assertions, the effect of *daroo*, and other speech acts in the remainder of this chapter, and the dynamic part of the analysis in the next.

2.3 Preparatory conditions of assertions

An obvious starting point for developing a model of preparatory conditions in the sense of conditions on utterance felicity are assertions, not only because I have defined evidence above in terms of belief sufficient as grounds

for assertion, but also as such conditions can already be found in the influential works of Searle (1969), as preparatory and sincerity conditions, and Grice (1975), as maxims of quality. This section discusses the differences between the two formulations within the basic framework developed so far and formalized preparatory belief and evidence conditions for unmodified assertions (settling for a version closer to Grice's proposal). Next, I proceed to *daroo*-modified assertions, introducing lowering of the quality threshold into the framework, and expand the analysis to interrogatives and to utterances with final rising intonation.

The conversational maxims of quality from Grice (1975) are reproduced in (2.45) below. I label (2.45a) **Quality I**, (2.45b) **Quality II**.

(2.45) **Gricean maxims of Quality:**

- a. Do not say anything you believe to be false.
- b. Do not say anything for which you lack adequate evidence.

As the wording “Do not *say*...” is presumably intended to suggest, these are maxims that are intended to characterize assertions (or, more generally speaking, declarative speech acts). In the course of the discussion in this chapter, I will assume that what the speaker of a declarative *commits* to is equivalent to “what is said”. I also expand the coverage of the first maxim of quality to interrogative speech acts by assuming that the condition on questions is the complement of that on assertions, defining a version of the first maxim “Do not *doubt* anything you believe to be *true*”, *cf.* (2.86) in the discussion of the felicity conditions of interrogative speech acts in section 2.4.3.

Note that the two maxims of quality align with the two types of bias that have been proposed *e.g.* for polar questions, as epistemic bias makes reference to belief states, evidential bias to the availability of evidence. I suggest that this is no coincidence, but that bias can be explained in terms of felicity conditions on the speech-act level.

There are obvious parallels to some of the preparatory conditions independently proposed by Searle (1969) for the speech act of assertion. Paraphrases of the first preparatory condition and the sincerity condition for declaratives,

corresponding to Gricean Quality I and Quality II are shown below, where S stands for the speaker, φ for the prejacent proposition. I label the sincerity condition in (2.46a) **Sincerity**, the first preparatory condition in (2.46b) **Preparatory I**.

(2.46) **Searlean sincerity and preparatory conditions for assertions:**

- a. S believes φ .
- b. S has evidence (reasons etc.) for the truth of the φ .

I will start the discussion with the preparatory belief conditions of assertions, before moving on to evidence conditions and their connection to commitments arising from assertions.

2.3.1 Belief conditions of assertions

Based on the two formulations of belief conditions in (2.45a) and (2.46a), there are two possible versions of the preparatory belief conditions on assertions, one Gricean, and one Searlean. They are shown in the notation introduced in section 2.1.

(2.47) **Preparatory belief condition of assertions:**

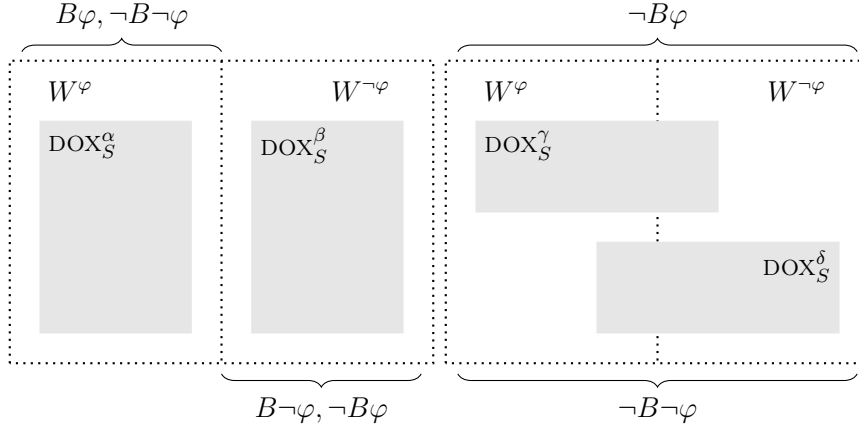
- a. $\neg B_S \neg \varphi$ (Belief condition from *Quality I*)
- OR
- b. $B_S \varphi$ (Belief condition from *Sincerity*, to be discarded)

The obvious difference between the Gricean and Searlean versions of the preparatory conditions for assertion is that the former include negation, the latter do not. In terms of the framework developed so far, (2.47b) is supported only by a committed first-order doxastic state, while (2.47a) is also supported by non-committed states.

In order to determine which version of the preparatory belief condition for assertions is appropriate for the model of utterance felicity conditions to be developed, it is useful to think of the alternatives in terms of the belief states they *exclude*. To illustrate this, a sandbox model of speaker doxastic states is shown, slightly modified from (2.32) by changing the participant

index x to S for the speaker, and by addition of braces indicating support of negated and non-negated belief propositions by doxastic states.

(2.48) **Sandbox model of first-order speaker doxastic states**



The left part of the illustration shows the committed doxastic states DOX_S^α and DOX_S^β supporting the belief states $B_S\varphi$ and $B_S\neg\varphi$, respectively. When taken to be preparatory conditions for assertion, both belief states exclude the non-committed states DOX_S^γ and DOX_S^δ shown in the right part of the illustration. The negated belief propositions $\neg B_S\varphi$ and $\neg B_S\neg\varphi$, on the other hand, only exclude one of the committed states, namely DOX_S^α and DOX_S^β , respectively. When a doxastic state is excluded by an utterance's preparatory belief condition, this means that this utterance is infelicitous when the speaker is in such a doxastic state. In the case of an assertion without negation in the prejacent proposition, the Searlean version of the belief condition $B_S\varphi$ means that the utterance is infelicitous if the speaker considers $\neg\varphi$ possible. Thus, the Searlean version of the preparatory belief condition $B_S\varphi$ is too strong for cases in which the speaker is in a doxastic state biased towards φ , but does not exclude the possibility that $\neg\varphi$ holds, which is a potential problem for the analysis of *daroo*-assertions to be discussed below.

Also, the Searlean version is the same as the commitment which arises from an assertion, which would make a differentiation between commitments and belief conditions superfluous. This is also problematic as in this way, an utterance cannot serve to introduce new commitments, only to make public

or reiterate existing commitments. This problem comes out clearly when applying the framework to rising declaratives, as discussed in section 2.4. The main reason to settle for the Gricean, rather than the Searlean, version of the preparatory belief condition for assertions, however, are issues within the present framework regarding the connections between the preparatory belief and evidence conditions, which I will discuss next along with commitment arising from assertions.

2.3.2 Evidence and commitment in assertions

In this section, the connection between evidence and commitment are discussed in terms of the evidence rule connecting them. Together with the belief condition of assertions, which is reflected in the evidence rule in form of the blocking condition, evidence and commitment are the building blocks for capturing the felicity conditions of assertions.

Evidence conditions of assertions

The evidence condition on assertions is straightforwardly derived from both Grice's and Searle's version of evidence-related felicity conditions:

(2.49) **Preparatory evidence condition of assertions:**

$$EV_S\varphi \quad (\text{Evidence condition from } \textit{Quality II} \text{ and } \textit{Preparatory I})$$

The definition of evidence given in section 2.2, above makes a connection between evidence and belief by stipulation of the evidence rule in (2.42) repeated below as (2.50). More precisely, the evidence rule makes a connection between evidence and commitment, which is implicit in both the Searlean and the Gricean preparatory belief conditions on assertions.

(2.50) **Interpretive evidence rule** (strong construal):

$$EV_x\varphi > B_x\varphi, \text{ unless } B_x\neg\varphi$$

As for the Gricean preparatory conditions, the strong construal of the evidence rule connects Quality I and Quality II indirectly. When $EV_S\varphi$ (Quality II) is satisfied, the antecedent of the evidence rule holds which allows for the

inference that $B_S\varphi$ holds as well, unless inference is blocked. $\neg B_x\neg\varphi$ (Quality I), on the other hand, is the negated blocking condition of the strong evidence rule, and thus, if satisfied, prevents the defeasible inference to be blocked. Thus, speaker commitment to φ arising from assertion of φ only arises when *both* of the preparatory conditions based on Gricean maxims of quality are satisfied. I take this to be a welcome prediction, as it is in line with the idea that the two conversational maxims, here in the form of utterance preparatory conditions, conspire to make it possible for the speech act to do what it does, *i.e.* for the speaker to “say” the prejacent in the sense of committing to it by making public a belief that the prejacent is true.

The Searlean versions of the preparatory evidence and belief conditions, on the other hand, are the evidence rule’s antecedent and consequent, respectively. If the evidence rule is on the right track as an interpretive rule with regard to utterance felicity, it cannot be derived from felicity conditions based on Searle’s Preparatory I and Sincerity, for the following reasons. When the preparatory evidence condition $EV_S\varphi$ is satisfied, the preparatory belief condition $B_S\varphi$ is, too, provided that defeasible inference is not blocked. While the blocking condition $B_S\neg\varphi$ is not reflected in the Searlean felicity conditions, the belief condition $B_S\varphi$ from Sincerity prevents defeasible inference from being blocked as its satisfaction entails $\neg B_S\neg\varphi$. However, if the only criteria to judge felicity that the Searlean utterance preparatory conditions provide are $EV_S\varphi$ and $B_S\varphi$, and the blocking condition is thus $\neg B_S\varphi$ (that is, the blocking condition of the weak construal), this renders the evidence rule powerless.¹³ I conclude that the Searlean preparatory conditions are thus not compatible with the evidence rule as a reflection of what I take to be the mechanism of felicitous assertion, as they make belief a prerequisite for successful assertion independently of evidence.

Only the weaker, Gricean version of the preparatory belief condition allows to defend the view of evidence as grounds for belief as stated in the evidence rule, which I believe, based on considerations on reasoning about

¹³If the evidence rule is taken to govern belief formation as well, it is fatal, as it means that an agent should not (be assumed to) believe a proposition which is supported by evidence if the agent does not previously believe the proposition to be true already.

other participants' doxastic states as well as on belief revision and formation processes, is the right way to go. Another possible way for the evidence rule to regain independence is to assume the weak version of the evidence rule so that non-committed doxastic states, such as those supporting $\neg B_S\varphi$ satisfy the blocking condition. However, this incapacitates the evidence rule as argued in section 2.2 above, thus not making a connection between belief and evidence. Furthermore, the connection between evidence and commitment via the evidence rule is vital for the analysis of biased utterances in the next chapter, as well as for integration of *daroo* into the framework as an operator lowering the quality threshold to be introduced in the following section. I take the connection between evidence, belief, and commitment as another argument in favor of the Gricean preparatory condition for assertions, which I consequently use as a basis for the analysis of utterance types other than assertions and their felicity conditions.

2.3.3 Commitment and the meaning of assertion

So far, mention has been made of commitment in terms of belief states, *i.e.* belief propositions which are only supported by committed doxastic states, such as the belief propositions $B_S\varphi$ and $B_S\neg\varphi$. The final definition of commitment will be given in the next chapter, where the CCP-model of utterances mapping input contexts to output contexts will be introduced. In such a model, commitments restrict output contexts, while preparatory conditions restrict input contexts. For now, suffice it to say that commitment arises from the performance of an utterance, making the speaker accountable for the doxastic state, backed with adequate evidence, supporting the belief state that constitutes commitment. As mentioned in the previous discussion as well, this is the view of the interpretive evidence rule as descriptive of the mechanism of felicitous assertion I defend.

To conclude this section, the preparatory belief and evidence rules are repeated here, alongside the commitment I propose arises from a plain assertion. For completeness, a version of assertion with a negated prejacent proposition is given below.

(2.51) **Preparatory conditions and commitment of plain assertion:**

	belief	evidence	commitment
$\text{DEC}_S(\varphi) \downarrow$	$\neg B_S \neg \varphi$	$EV_S \varphi$	$B_S \varphi$

Note that assertion is written as $\text{DEC}_S(\varphi) \downarrow$ in anticipation of the expansion of the framework to utterance types with interrogative force and such with final rising intonation, where assertion will be classified as a falling declarative utterance.

The next step before moving on to other utterance types, however, is a modification of the framework in terms of the strength of evidence and commitment in order to account for properties of Japanese *daroo*-assertions, which are also central in the analysis of the particle *no* as a marker of evidence.

2.3.4 Strength of commitment: the quality threshold

So far, no difference has been made between doxastic states which are biased towards either of the alternatives in terms of belief propositions. This is arguably not necessary as long as we assume that modification of the strength of belief in the sense of subjective probability with regard to the truth of a proposition is encoded on the prejacent level. In such cases, commitment targets, for instance, a modified prejacent proposition expressing the epistemic possibility or necessity¹⁴ rather than a plain prejacent. When asserting such a prejacent, the speaker's doxastic state must thus be such that all accessible worlds are such that the proposition in question is epistemically possible / necessary, and this doxastic state needs to be backed up by adequate evidence.

I argue, however, that there is an additional level at which subjective probability can be modified, namely the speech act level, by operators which directly influence the strength of commitment without modifying the prejacent proposition. I take Japanese *daroo*, the focus of this section, to be one of these operators, which I discuss because it interacts with the particle *no*,

¹⁴As mentioned, I for instance take Japanese epistemic modals like *kamoshirenai* and *nichigainai* to fall in this category.

the empirical focus of this thesis, in interesting ways.

Felicity of *daroo*-assertions

Daroo-assertions differ felicitously convey assumptions of the speaker which are not well-founded enough to be felicitously expressed as plain assertions. Thus, the addition of *daroo* must indicate that speaker's commitment to φ is weaker, or the speaker has weaker grounds for this commitment. The following observations with regard to the strength of commitment to be accounted for (see section 1.3.4 for details): plain *daroo*-assertions are bad when there is (perceptual) evidence supporting the speaker's assumption, the addition of the particle *no* makes them good in such cases, and *daroo*-assertions are bad with low-probability adverbs.

Previous accounts for these properties include Hara's (2006) analysis on which *daroo* has an evidential meaning component requiring the *absence* of evidence and a modal meaning component specifying the probability of the proposition to be higher than 50%. Hara and Davis (2013) update this proposal, taking *daroo* to be an "utterance-modal" (in the terms of the present thesis, a modal operating on the speech-act level), which lowers the quality threshold of assertion. I adopt a somewhat similar view, taking *daroo*-assertions to basically have the same preparatory conditions as plain assertions, with the difference that the quality threshold is lower, resulting in a lower threshold for speaker commitment.

Daroo-assertions and evidence

With the available inventory of preparatory conditions (belief and evidence) available so far, and the evidence rule as a connecting mechanism, there are two basic options to account for the properties of plain *daroo*-assertions. Both options are paraphrased below.

Option 1 *Daroo* introduces a negative evidence condition $\neg EV\varphi$.

Option 2 *Daroo* lowers the quality threshold.

The basic difference between these is that on the first view, an inference that the speaker believes φ (if not as strongly as in the case of a plain assertion) goes through, while on the other view, the premise for such an inference, namely evidence supporting φ , is ruled out. I discuss both options below, arguing for option 2 (note that Hara and Davis (2013) update Hara (2006) on similar lines), before discussing two ways of implementing option 2.

Option 1: Asserting without evidence

Option 1, in line with Hara (2006)'s early proposal and the tests on contextual evidence therein, appears to be a straightforward way of modeling the properties of *daroo*-assertions, arriving at predictions with regard to the acceptability of evidence in the utterance situation of *daroo*-assertions which have to be derived in a more roundabout manner when Option 2 is adopted. In the following, I discuss the issues that arise from its adoption within my analysis.

When adopting Option 1, the preparatory conditions of a *daroo*-assertion are as in (2.52b) below, shown alongside those of a plain assertion in (2.52a).

(2.52) **Prep. con. and comm. of plain and *daroo*-assertions (Opt. 1):**

	belief	evidence	commitment
a. $\text{DEC}_S(\varphi) \downarrow$	$\neg B_S \neg \varphi$	$EV_S \varphi$	$B_S \varphi$
b. $\text{DEC}_S(\text{daroo}(\varphi)) \downarrow$	$\neg B_S \neg \varphi$	$\neg EV_S \varphi$ ¹⁵	$B_S^{\text{daroo}} \varphi$

An obvious consequence of this Option would be that the evidence rule does not apply, as its premise is not satisfied, regardless of the possibility that there might be a biased belief state which supports φ to a lower degree than a committed state.

(2.53) **Evidence rule applied to *daroo*-assertions:**

$$[(EV_S \varphi > B_S \varphi) \wedge \neg EV_S \varphi] \not\models B_S \varphi$$

¹⁵I assume that the evidence condition must be negative rather than neutral (in that there is no evidence condition whatsoever) in line with Hara (2006), as otherwise the badness of *daroo*-assertions with perceptual evidence supporting the conjecture that the prejacent holds cannot be directly accounted for.

The condition on *daroo*-assertions that there be no perceptual evidence supporting (the inference that) φ is thus straightforwardly accounted for. This interpretation also shows that *daroo*-assertions are a way of conveying the possibility that φ holds in the absence of adequate evidence for excluding $\neg\varphi$. There are, however, at least two issues with this view in light of the observations on the data:

First, the addition of *no* makes *daroo*-assertions acceptable when there is perceptual evidence supporting an inference that φ holds. Analyzing the contribution of *daroo* as changing the preparatory conditions of assertion from (2.52a) to (2.52b), and assuming that *no* marks evidence on the speech-act level (for which there are independent grounds as discussed in the next chapter) results in the following two problems. First, it would mean that *no* does not only modify the preparatory conditions, but is able to somehow *undo* the changes resulting from addition of *daroo*, which is non-trivial compositionally. Second, it would erase the difference between plain assertions and *no-daroo*-assertions, which is contrary to observation: the latter are primarily used to convey results of speaker inference, but not “facts” in the sense of propositions the speaker believes to be true based on direct experience.

Second, *daroo*-assertions are only good with adverbs indicating relatively high probabilities. A straightforward explanation for this is that *daroo*-assertions are only compatible with doxastic states in which more accessible worlds are φ -worlds than $\neg\varphi$ -worlds. However, such a distinction is lost when the difference between *daroo*- and plain assertions is analyzed in terms of the absence or presence of an evidence condition, rather than in terms of the strength of evidence, or a quality threshold, as Option 2 has it.

Option 2: Strict and lax preparatory conditions

For the reasons stated above, Option 2 is preferable if it can capture the properties of *daroo*-assertions, explaining the effect of the addition of *no* compositionally and accounting for the *bias towards* φ (hence the compatibility with high-probability adverbs only) they convey. In order to evaluate Option 2 in these terms, it is necessary to propose how lowering of the quality

threshold is implemented. Again, there are at least two options for this as follows:

Option 2.1 Addition of *daroo* lowers the *evidence* threshold.

Option 2.2 Addition of *daroo* lowers the *belief* threshold.

Lax evidence condition Option 2.1, the lowering of the evidence threshold, translates to a change in the evidence condition on *daroo*-assertions as opposed to plain assertion. On the most basic level, this explains that *daroo*-assertions are felicitous even when the speaker does not have sufficient evidence to justify a doxastic state supporting B_φ — this is a parallel to the negative evidence condition $\neg EV\varphi$ from Option 1. Also similar to Option 1, the badness of *daroo*-assertions when there is indirect evidence¹⁶ for φ can conceivably be explained as a Quantity implicature triggered by the availability of an alternative *no-daroo* assertion, in which *no* marks stronger evidence.

However, there are issues with regard to compositionality similar to the case of Option 1 above, with the possible difference that the evidence condition introduced by *daroo* would be *overwritten* by *no* rather than undone. Also similar to option 1, if *no* were to thus overwrite or undo the evidence condition, then the *no-daroo* assertion should have the same conveyed meaning as a plain assertion in terms of strength of speaker commitment to the proposition, as the evidence rule would then allow for the inference that $B_S\varphi$ is supported if no further stipulations are made.

Lax belief condition Modifying the threshold for belief might seem counter-intuitive at first sight, as it does not pertain to the preparatory conditions of assertions directly if we adopt the Gricean, rather than the Searlean version of the first preparatory condition of assertions as I have defended above.

¹⁶I label “indirect evidence” the kind of evidence supporting the conjecture that φ holds (thus supporting *daroo*-, but not plain, assertion of φ), but is typically not of the kind allowing for certainty on part of the observer that this is the case. Whether or not evidence is strong enough to count as direct evidence is presumably dependent on a number of factors related to general questions of belief formation.

This is only under the assumption, however, that *daroo* “edits” the preparatory conditions of assertions, which is not necessarily the case. Lowering the threshold for belief in form of commitment, however, is intuitively more natural and potentially has a direct effect on the threshold for evidence as well — when the belief arising from assertion by speaker commitment is weaker, then the evidence supporting this belief can be weaker as well. The availability of a stronger option in terms of commitment — namely plain assertion — can then explain why *daroo*-assertions convey results of speaker inference or speaker assumptions rather than what the speaker believes to know for certain.

At this point in the construction of the framework it may seem like replacing the preparatory belief condition based on Gricean Quality I ($\neg B_S \neg \varphi$) with the stronger condition based on Searlean Sincerity ($B_S \varphi$) were easier, as this would allow for an implementation of a lower quality threshold solely in terms of utterance preparatory conditions which cover both belief and evidence. However, apart from the arguments against a Searlean version of the preparatory belief condition brought forward so far, the possibility of accounting for the felicity of *daroo*-interrogatives under the assumption of a lowered quality threshold for commitment (or, in the case of the interrogative, *forgone* commitment) speaks against such a step.

Modifying the evidence rule: weakening commitment

The solution I would like to propose is thus a change in the evidence rule reflecting a lowered threshold in terms of commitment arising from assertion. Specifically, I assume that there is a threshold for belief conditions (on the output, rather than the input context), regarding which degree of certainty (*i.e.* which portion of accessible worlds need to be φ -worlds) is required for a strictly non-competent state to support $B_x^{\mathcal{A}}\varphi$, where $\mathcal{A}$ stands for a type of (possibly modified) speech-act, which provides a value for this threshold. Note that this has the same effect on conveyed probability that φ holds as quantification over possible worlds within the proposition, but has clearly different effects on the discourse, as will be discussed in the next chapter.

On this view, the inference that the speaker believe φ becomes an inference of a *tendency* of the speaker to believe φ , or *speaker bias* towards φ . The rule I propose is as follows:

(2.54) **Evidence rule for lowered quality threshold**

$$EV_x\varphi > B_x^A\varphi$$

The lowered quality threshold that the addition of *daroo* brings about, then, is implemented in a similar way to the 50%-threshold suggested by Hara (2006), but in terms of doxastic states and the relative sizes of their intersections with φ -worlds and $\neg\varphi$ -worlds respectively. I defend the simple view that if there are more φ -worlds than $\neg\varphi$ -worlds compatible with an agent's beliefs, this means that the agent is biased towards φ . According definitions of belief states and negated belief propositions with a lowered quality threshold due to the addition of *daroo* are given below.

(2.55) **Belief states with *daroo***

- a. $B_x^{daroo}\varphi$ is satisfied iff $|\text{DOX}_x \cap W^\varphi| > |\text{DOX}_x \cap W^{\neg\varphi}|$
- b. $B_x^{daroo}\neg\varphi$ iff $|\text{DOX}_x \cap W^\varphi| < |\text{DOX}_x \cap W^{\neg\varphi}|$

Note that no numerical value or position on a scale is assigned to the quality threshold, as Hara (2006), who sets necessary probability at higher than 50%, and Hara and Davis (2013), who assign relative strengths to different kinds of evidence. The weakening of the quality threshold is here taken care of on the level of doxastic states: while a belief state $B_x\varphi$ requires a doxastic state which is included in W^φ , *i.e.* has an intersection with W^φ , but not with $W^{\neg\varphi}$, a belief state $B_x^{daroo}\varphi$, for instance arising as commitment from a *daroo*-assertion, only requires that the intersection of x 's doxastic state with W^φ be larger than that with $W^{\neg\varphi}$ to be supported. Note, however, that $B_x^{daroo}\varphi$ is also satisfied when $B_x\varphi$ is satisfied, that is there is no requirement for the doxastic state supporting a *daroo*-belief to be merely biased.¹⁷

When negation on the belief level comes into play, the effect is interesting, in that the doxastic state supporting a negated *daroo*-belief that φ be true

¹⁷Of course, when a speaker has evidence sufficient to serve as grounds for plain assertion of φ , choosing a *daroo*-assertion can be a violation of quality, and can have additional communicative effects.

can be either neutral or biased towards $\neg\varphi$, but cannot be biased towards φ , as is the case with negated plain belief. Negated *daroo*-belief propositions are defined below.

(2.56) **Negated belief propositions with *daroo***

- a. $\neg B_x^{daroo}\varphi$ is satisfied iff $|\text{DOX}_x \cap W^\varphi| \leq |\text{DOX}_x \cap W^{\neg\varphi}|$
- b. $\neg B_x^{daroo}\neg\varphi$ is satisfied iff $|\text{DOX}_x \cap W^\varphi| \geq |\text{DOX}_x \cap W^{\neg\varphi}|$

While the relative strength of negated *daroo*-belief compared to negated plain belief may come as an intuitive surprise, it becomes clear how this effect arises when thinking of negation on the belief level as complementation in the universe of possible doxastic states — the stronger the original condition is, that is the more it restricts supporting doxastic states, the weaker, or less restrictive, its complement must be.

Summing up, in the case of a *daroo*-assertion, it can be observed that the speaker has modified the utterance in a way that makes the evidence rule more easily satisfiable, which conveys biased towards, rather than full commitment to φ .¹⁸ “Adequate” evidence in the Gricean sense becomes *lesser* evidence (or weaker grounds for commitment) without modification of the evidence condition itself. The addition of *no*, then, conveys that the speaker has evidence which, in principle, would allow for the inference that in light of this evidence, a belief that φ is warranted, but also with the lower belief threshold is lowered — the salient interpretation of this is that the speaker has come to the conclusion that φ based on available (often perceptual) indirect evidence, and is therefore only biased towards φ .

Effects of the addition of *no*, however, can only be fully captured after introducing felicity conditions for interrogative utterances and such with final rising intonation, and will be discussed when the dynamic part of the framework has been introduced in the next chapter. Before, moving on, I would like to note one crucial point on the contrast between plain and *daroo*, and on that between *daroo* and *no-daroo* assertions. In the latter case, as discussed before, the evidence-based inference reading arises because there

¹⁸The exact mechanism will be discussed in more detail in the next chapter in the context of quantity implicatures

is the alternative of *not* marking evidence. Put the other way around, when a language has a way of overtly marking evidence on the speech-act level, as Japanese has in *no*, an absence-of evidence implicature arises whenever this marker is not present. In the case of *daroo*, a similar inference arises on another level, however: a salient alternative to a *daroo*-utterance is a plain assertion, which, in turn has an evidence condition, *i.e.* requires (relatively strong) evidence for the truth of its prejacent. When the speaker does have evidence strong enough to satisfy the requirement for a plain assertion, this should be the utterance of choice, and the *daroo*-utterance is blocked. When, on the other hand, there is evidence, but it is evidence that would not count as “adequate” for a plain assertion, then a *no-daroo* utterance is to be chosen. In this case, the plain assertion is out as it would come with a secondary inference ($B_S\varphi$) that the speaker should avoid in order not to risk commitment to φ given the weaker evidence, and the plain *daroo*-assertion is dispreferred as there is a means of conveying that there is evidence, making the utterance more informative.

2.3.5 Interim summary

Taking stock, we have so far discussed the preparatory conditions of plain assertions, developing a model where preparatory conditions are split into belief- and evidence conditions. We defined the belief propositions expressing belief conditions by the doxastic states supporting them, where negation of a belief proposition is supported by the complement of the doxastic states supporting the non-negated belief proposition. A negated belief state is the preparatory belief condition for assertions, in line with Grice’s formulation of the first maxim of quality “Do not say what you believe to be false”. The preparatory evidence condition for assertion is that there be evidence supporting the prejacent available to the speaker, which is in line with both Gricean and Searlean felicity conditions regarding evidence. The connection to commitments is made by the evidence rule, by which evidence supporting a proposition available to an agent narrows the agent’s doxastic state to be included in the worlds at which the proposition is true. This is not possi-

ble when the agent’s doxastic state has no intersection with worlds at which the proposition is true, *i.e.* when it is included in the worlds at which the proposition is false. In this case, belief revision is possible by first widening, then narrowing the doxastic state. The result of either process is a doxastic state which supports a non-negated belief proposition, *i.e.* a belief state, which states that φ is true. Such belief states are what assertions commit their speaker to.

We then expanded this model to *daroo*-assertions, concluding that they lower the belief threshold, *i.e.* in the case of a *daroo*-assertion the doxastic state required to support speaker belief that the asserted proposition holds is a state biased towards φ , rather than one committed to φ as in the case of plain assertion. This also means that commitment arising from a *daroo*-assertion is weaker than that arising from a plain assertion, and by the reverse evidence rule an observer can conjecture that the speaker has weaker evidence supporting φ . As this view requires to consider alternative utterances, detailed discussion has been left for the following chapter, along with the discussion of the contribution of *no* in *daroo*-assertions. The main result of this section was the modification of commitment and thus the evidence rules to reflect the possibility of a lowered quality threshold, while keeping the preparatory condition constant.

2.4 Prosody and force: four utterance types

This section applies the framework to utterance types other than assertions, classifying utterances by prosody and illocutionary force. The utterance types other than assertions, or falling declaratives, are falling interrogatives, rising declaratives, and rising interrogatives, or questions. First, preparatory conditions and commitments from falling interrogatives are stipulated based on empirical observations and the notion of forgone commitment is introduced to account for commitment in interrogatives. Next, rising declaratives require the introduction of addressee belief conditions into the framework, which will be accomplished via second-order speaker beliefs derived from a prosodically underspecified version of commitment arising from declaratives.

The discussion whether there is negation in the preparatory belief conditions of rising declaratives and where it scopes results in further support for the strong Gricean version of preparatory belief conditions. Returning to interrogatives, options for deriving the preparatory conditions and forgone commitment of rising interrogatives are discussed, defending the assumption of a conversational maxim for interrogatives which derives their belief conditions, and derivation of forgone commitment from the commitment complementary utterances made by negation on the level of speaker belief. Finally, the connection between evidence and commitment is discussed, leaving the question of which gives rise to which open.

2.4.1 Falling interrogatives

Falling interrogatives differ from assertions (*i.e.* falling declaratives) only in illocutionary force, but not prosodically. Thus, they are a good starting point for examining what differences there are in terms of belief, evidence and commitment between declaratives and interrogatives. In this section, preparatory belief conditions for falling interrogatives is stipulated, which will be further motivated when turning to questions (*i.e.* falling interrogatives) in section 2.4.3. Next, the notion of forgone commitment will be introduced, deriving the commitment arising from interrogatives as the complement of the commitment arising from declaratives.

Preparatory conditions of falling interrogatives

The discussion of preparatory conditions here is only the first step towards formulating the preparatory conditions of interrogatives — the main discussion will follow after addressee beliefs have been introduced to the framework in section 2.4.2.

The belief condition on interrogatives I propose that the preparatory belief condition on interrogatives with final falling intonation is the mirror image on that on assertions, *i.e.* when the speaker of a falling interrogative

believes its prejacent φ to be true, it is not felicitous, as shown in (2.57) below.

(2.57) **Belief condition on interrogatives:**

$$\neg B_S \varphi$$

This condition can be derived in different, which I discuss in more detail in section 2.4.3. Empirically, it is compatible with the uses of falling interrogatives shown in chapter 2: on the incredulity reading, the speaker believes $\neg\varphi$ to be true, while on other readings, the speaker is neutral with regard to φ , and there are no uses of falling interrogatives in which there is a previous belief of the speaker that φ is true.

It is also compatible with the first preparatory condition for question speech-acts proposed by Searle (1969) that the speaker of questions “not know the answer”. While this is a condition that is most likely not intended to hold for falling interrogatives, it is a requirement that holds for all interrogatives, the difference between falling interrogatives and questions (*i.e.* rising interrogatives) being that the latter request information from the addressee, which the former do not. A conversational maxim holding for all interrogatives from which the belief condition in (2.57) can be derived will be stipulated in section 2.4.3.

No evidence condition on interrogatives Falling interrogatives, and interrogatives in general, do not require any kind of evidence, either accessible to all participants or only to the speaker. There are several reasons for this.

First, as already mentioned in section 2.2.1, where the notation for evidence was introduced, there is no such thing as negative evidence which would support negated belief propositions, *i.e.* exclude belief states. As interrogatives do not give rise to commitments, but forgo them, there is no reason to assume an evidence condition which would support a belief proposition representing such a commitment.

Next, markers of negative evidence do not exist in Japanese to begin with, making it unlikely that evidence supporting the alternative rather than the prejacent proposition can be felicity condition. An obvious example is the

particle *no*, which as an utterance modifier can make evidence supporting the prejacent proposition a felicity condition, but there is no counterpart marking negative, or counter-evidence. More support comes from propositional evidentials in Japanese, which in their negated form do not indicate that there is such counter-evidence, but rather that there is no evidence supporting φ .

Finally, there is also no reason to assume that negative evidence conditions in the sense of the exclusion of evidence supporting either the prejacent proposition or its negation exist on the level of utterance types without modifiers. In the discussion of bias patterns of polar questions we have seen modified questions which exclude one type of evidence, but this can be derived from looking at their alternatives which are either unmodified or modified in different ways. In this sense, bare interrogatives, both rising and falling, have no evidence conditions of their own.

Thus, in contrast to belief conditions, which can be reversed as for instance in interrogatives, I assume as the most parsimonious and natural assumption that evidence conditions can only be positive, and that interrogatives lack evidence conditions.

Forgone commitment from falling interrogatives

Commitment from assertions means that the speaker is accountable for the truth of the prejacent proposition, and arises from declarative force. The idea of forgone commitment is simply that falling interrogatives, as the counterparts of assertions with interrogative force, *do not* give rise to the commitment that assertions make, that is, their speakers *forgo* commitment.

While preparatory conditions can be straightforwardly understood as felicity conditions in the sense that they need to be satisfied in order for the utterance to be felicitous, commitments are somewhat more complicated in that they are not required for the utterance's felicity, but arise by virtue of a speech act being performed. In the next chapter, I introduce a dynamic CCP-framework which captures this difference as preparatory conditions being conditions on the context the utterance is made in, and (forgone) commitments on the context after the utterance is made, *i.e.* (forgone) com-

mitments essentially describe how the utterance changes the context. With this in mind, forgone commitment from falling interrogatives can be represented by a negated belief proposition — while assertions make a speaker believe that the prejacent is true part of the context, interrogatives make it so that such a belief is *not* part of the context.

Forgone commitment from falling interrogatives thus derived as the negation of commitment arising from assertions is shown in (2.58).

(2.58) **Forgone commitment from FIs:**

$$\neg B_S \varphi$$

Note that forgone commitment is the same as the preparatory condition on falling interrogatives, which could lead to the assumption that they are somehow connected, or derived from one another. After introducing addressee belief in the next section, I will show that this is not the case in section 2.4.3 on rising interrogatives.

Preparatory conditions of utterances with falling intonation

The preparatory conditions and commitments for declaratives and interrogatives with falling intonation are summarized in (2.59) below.

(2.59) **Belief, evidence, and commitment with final fall:**

	belief	evidence	commitment
DEC(φ) ↓	$\neg B_S \neg \varphi$	$EV_S \varphi$	$B_S \varphi$
INT(φ) ↓	$\neg B_S \varphi$	—	$\neg B_S \varphi$

Only considering utterances with final falling intonation so far, we were able to keep things relatively simple. An additional layer of complexity is added by final rising intonation, which not only makes it necessary to introduce addressee beliefs and second-order speaker beliefs into the analysis. This is done in the following section on rising declaratives, before coming back to interrogatives as already announced, and finally discussing the addition of *daroo* to utterance types other than assertions.

2.4.2 Preparatory conditions of rising declaratives

The step from falling to rising intonation in declaratives is more complex than that from declarative to interrogative (while keeping falling intonation constant). This is because final rising intonation makes it necessary to include addressee beliefs into the framework.¹⁹ In this section, I propose that commitment can be defined as a prosodically underspecified second-order belief of the speaker over first-order belief. In the case of a rising declarative, the first order belief is resolved to the addressee, in the case of a falling declarative to the speaker, which, by transitivity, makes the commitment by second-order belief equivalent to that by first-order belief defined above.

Next, I turn to the preparatory belief condition of rising declaratives, which I assume also require reference to addressee beliefs, discussing in some detail the implication of where to assume the scope of negation in a Gricean version, along with the possibility of assuming a Searlean version. Concluding the discussion on belief conditions, I adopt the stronger Gricean version and propose a prosodically underspecified version of the belief condition parallel to that defined for commitment before.

Finally, I turn to the evidence conditions of rising declaratives, underlining the link between evidence, commitment, and the preparatory belief condition already mentioned in previous sections.

Commitment from rising declaratives

I first define the commitment arising from rising declaratives, in principle following the analysis proposed by Gunlogson (2003) for English rising declaratives²⁰ in which a sentence final intonational morpheme resolving an element denoting a participant within the meaning of the utterance to either speaker (falling intonation) or addressee (rising intonation).

¹⁹This goes for English, and also Japanese, but I do not claim that final rising and falling intonation universally have this function. This is likely not the case in languages with a rich tonal system in which functions that in English and Japanese are realized prosodically are borne by particles, and languages in which final rising intonation is used in plain declaratives.

²⁰A modified version of Gunlogson's proposal has been applied Japanese in Davis (2011).

Committing the addressee Gunlogson (2003) (and Davis (2011) for Japanese) model utterances as context change potentials (CCPs), which operate on contexts formed by commitment sets containing the public commitments of speaker and addressee. I will introduce a similar model of utterances as CCPs in the next chapter, with the modification that it is not possible for the speaker to commit the addressee to a proposition. Rather, the speaker can commit to a second-order belief state, which is supported by a second-order doxastic state which contains only those first-order doxastic states which are included in $\llbracket \varphi \rrbracket$. The crucial innovation of my proposal is thus that all preparatory conditions are in principle about speaker beliefs. When addressee beliefs are involved, this is implemented as a higher order belief, or, in potentially more intuitive terms, as speaker assumptions about the addressee's beliefs. Below, I implement an according definition of commitment from declaratives, which covers both final rising and final falling intonation.

Prosodically underspecified commitment Gunlogson shows in extensive discussion that rising declaratives differ from both questions (rising interrogatives) and assertions (falling declaratives) in a number of ways, leading her to the conclusion that rising declaratives commit the addressee, rather than the speaker, to the prejacent. I follow Gunlogson's view that the intonational morphemes $\uparrow$ (final rise) and $\downarrow$ (final fall) resolve an agent-variable within the meaning of the utterance to the addressee and speaker, respectively, applying this to belief propositions expressing commitment. Prosodically underspecified commitment from declaratives is defined below. Notice that commitment is given as a higher-order belief state, a choice that will be discussed below.

(2.60) **Prosodically underspecified commitment from declaratives:**

$\text{DEC}(\varphi)$: $B_S B_x \varphi$, where:

$\text{DEC}(\varphi)\uparrow$ resolves x to A ,

$\text{DEC}(\varphi)\downarrow$ resolves x to S .

This means that in the rising declarative, $\uparrow$ resolves the participant variable to the addressee, and commitment is a speaker belief that the addressee believes φ to be true, *i.e.* a belief state $B_S B_A \varphi$. In the case of a falling declarative, $\downarrow$ resolves x to S , and, assuming transitivity of doxastic states, the commitment belief state is $B_S \varphi$, as assumed in the previous section.

Commitment of the speaker to a second-order belief over addressee belief is directly related to the phenomenon of interrogative flip in questions which *forgo* such commitment. Explaining interrogative flip requires taking communicative intentions (concretely, information-seeking linguistic behavior) of the speaker into consideration and is a more complex matter than the current proposal can readily account for. For now, I leave it at the observation that, if my analysis is on the right track, the difference between assertions and questions as is manifest in interrogative flip must be explained in terms of final rising intonation (which shifts the object of commitment from speaker-to addressee belief) and interrogative force (which marks forgone speaker commitment).

If second-order belief conditions are assumed for rising declaratives, this makes it necessary to consider different options for preparatory belief conditions. Before turning to this difference, I make a brief excursus on the naturalness of the assumption that all commitments are relative to the speaker's doxastic states and its possible consequences for the notion of felicity.

Excursus: how relative is felicity?

The assumption that commitment must be relative to speaker belief follows straightforwardly when we take felicity in terms of conditions on quality as something that can only be enforced to the best of the speaker's knowledge. This does not make a difference with the belief conditions of utterances with falling intonation, assuming positive introspection — if the speaker does not believe φ to be false, then the speaker believes that they do not believe φ to be false and *vice versa*. Such a relativist view of felicity makes a potential difference with regard to evidence conditions: when the speaker believes to have adequate evidence for φ , but this evidence is not actually adequate

for reasons unknown to the speaker, would the utterance then be infelicitous? I tentatively answer this question negatively, as it is the speaker's beliefs regarding the fulfillment of requirements that decide on the felicity of a speech-act, not whether those requirements are actually fulfilled or not. However, I also assume that when the addressee reasons about the evidence available to the speaker, such considerations do not play a role, and neither do they for formation of beliefs on part of the speaker. That is, if required evidence is not adequate this makes the utterance infelicitous at first, but the speaker can redeem herself by claiming ignorance. These aspects of felicity go beyond the scope of this thesis, but see McCready (2015) for a discussion of how a speaker's reliability is evaluated according to the record of truth or felicity of her utterances.

Higher-order preparatory belief conditions

Assuming speaker-centered second-order beliefs is not only plausible for the commitments of rising declaratives, but also for preparatory belief conditions. This is because it seems entirely unreasonable to restrict the addressee's belief state in terms of the felicity of an utterance the speaker makes, even more so than assuming that an utterance by the speaker can commit the addressee.

Second-order belief states thus are the answer to the core question of how to translate the felicity conditions of falling declaratives to those of rising declaratives. If commitments are necessarily about speaker belief states, and, in the case of rising declaratives, about speaker beliefs over addressee beliefs, what about the preparatory belief conditions of rising declaratives? The intuition to be implemented is that, if the rising declarative indirectly commits the addressee to φ in the same way the falling declarative commits the speaker to φ , then the preparatory condition that the speaker not believe φ to be false on the falling declarative should have a corresponding version in the case of a rising declarative, which excludes a second-order belief of the speaker that the addressee believe φ to be false. In other words, if the speaker believes that the addressee takes φ to be false, an utterance publicly committing the addressee to φ is infelicitous.

Another intuition that the preparatory belief condition of a rising declarative should capture is that the preparatory condition excludes cases in which an utterance with a prejacent proposition of opposite polarity would be preferred. This is accomplished by $\neg B_S \neg \varphi$ in falling declaratives, as a belief that $\neg \varphi$ holds would motivate a falling declarative with the prejacent $\neg \varphi$. The question is how to implement this for a rising declarative.

Three options for second-order preparatory conditions There are two possibilities for the rising counterpart of the falling declarative's preparatory condition $\neg B_S \neg \varphi$, under the assumption that it, just as the commitment arising from rising declaratives, involves speaker beliefs over addressee beliefs, as given below.

(2.61) **Preparatory belief condition on RD, Option 1:**

$$\neg B_S B_A \neg \varphi$$

(2.62) **Preparatory belief condition on RD, Option 2:**

$$B_S \neg B_A \neg \varphi$$

This presupposes that a Gricean belief condition is assumed for declaratives. For the sake of argument, I reintroduce the possibility of a Searlean belief condition identical to the commitment arising from declaratives, which is $B_S \varphi$ for the falling declarative and given below for the rising declarative.

(2.63) **Preparatory belief condition on RD, Option 3:**

$$B_S B_A \varphi$$

The entailment relations between these three options are as follows:

(2.64) **Entailment relations of options for RD belief conditions:**

$$B_S B_A \varphi \rightarrow B_S \neg B_A \neg \varphi \rightarrow \neg B_S B_A \neg \varphi$$

That is, the doxastic states supporting Option 3 are a subset of those supporting Option 2, which are in turn a subset of those supporting Option 1 (this will be illustrated in the sandbox model below). Thus, when the belief proposition in Option 3 holds, all others hold too, making it the logically

strongest alternative. The conclusion to be reached in the following discussion is that Option 2 is the correct preparatory condition, Option 3 being too strong, Option 1 too weak. While the difference between the Searlean and the two Gricean options is rather obvious, that between the two Gricean options is more subtle. Potentially more intuitive paraphrases are given below, along with option 3 for illustration, in descending order of strength.

(2.65) **Belief condition on rising declaratives, Option 3:**

S believes that A believes φ to be true.

(2.66) **Belief condition on rising declaratives, Option 2:**

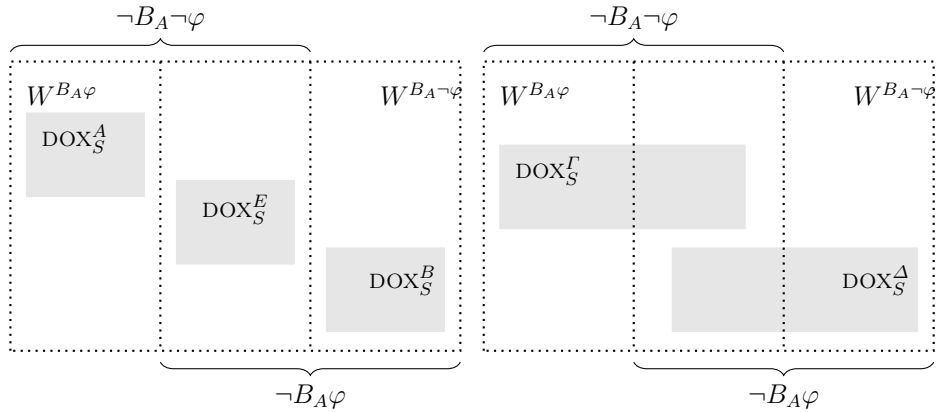
S believes that A does not believe φ to be false.

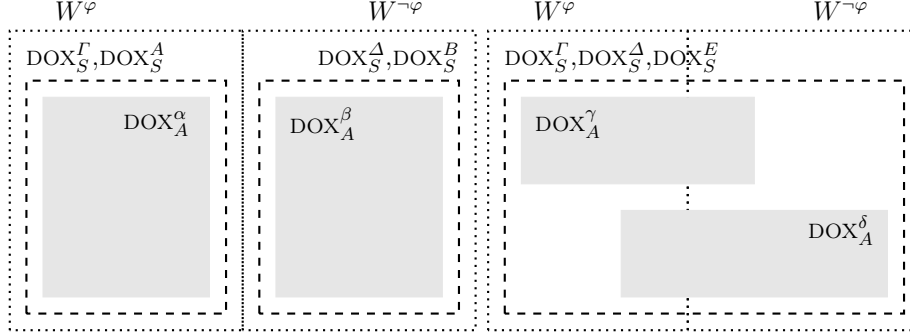
(2.67) **Belief condition on rising declaratives, Option 1:**

S does not believe that A believes φ to be false.

While the difference between the latter two options appears small, the choice has significant consequences. This is because it makes room for non-competent or ambiguous doxastic states on different levels. Put in short, Option 1 allows uncertainty on the part of the speaker, Option 2 on part of the addressee, from the speaker's perspective. Consider again the sandbox model of higher-order beliefs for illustration.

(2.68) **Second-order doxastic states and supported beliefs:**



(2.69) **Accessibility of first-order doxastic states:**

This illustration makes it easy to identify the doxastic states supporting the two Gricean options $B_S \neg B_A \neg \varphi$, but not $\neg B_S B_A \neg \varphi$, shown alongside the Searlean option to make the entailment relations fully transparent.

(2.70) **Doxastic states supporting the RD belief conditions:**

- | | | |
|-----------------|-----------------------------|--|
| a. Weak Grice | $\neg B_S B_A \neg \varphi$ | $\text{DOX}_S^A, \text{DOX}_S^B, \text{DOX}_S^\Gamma, \text{DOX}_S^\Delta, \text{DOX}_S^E$ |
| b. Strong Grice | $B_S \neg B_A \neg \varphi$ | $\text{DOX}_S^A, \text{DOX}_S^B, \text{DOX}_S^\Gamma, \text{DOX}_S^\Delta, \text{DOX}_S^E$ |
| c. Searle | $B_S B_A \varphi$ | $\text{DOX}_S^A, \text{DOX}_S^B, \text{DOX}_S^\Gamma, \text{DOX}_S^\Delta, \text{DOX}_S^E$ |

The two Gricean versions are set apart by the inclusion or exclusion of DOX_S^Δ , which is the only second-order doxastic state except for DOX_S^B supporting including DOX_A^β , the doxastic state of the addressee committed to $\neg \varphi$. This is to say that on the strong Gricean option, the speaker rules out the possibility that the addressee is committed to $\neg \varphi$, while on the weak Gricean option, the speaker does not rule this possibility out.

Finding the optimal strength The decision between the two states can be framed in terms of their complements on the secondary level, *i.e.* on the level of second-order doxastic states. The complement of the strong Gricean version of the negated belief proposition (as can be easily confirmed by including the excluded states in (2.70c) above and *v.v.*) is a set of second-order doxastic states *biased towards* $B_A \neg \varphi$, as it only includes DOX_S^B , which is committed to $B_S \varphi$, and DOX_S^Δ , which is biased towards $B_S \varphi$. This is precisely the case that needs to be excluded, as it would motivate a rising declara-

tive with a prejacent proposition of opposite polarity.²¹ As the condition $\neg B_S B_A \neg \varphi$ fails to exclude second-order doxastic states biased towards $B_A \varphi$, it is thus too weak.

An additional argument is that Option 1 does not exclude an ignorant second-order doxastic state, as neither biased state is excluded, and thus their union $\text{DOX}_S^\gamma \cup \text{DOX}_S^\delta$ is permitted. This would eliminate any motivation for uttering a rising declarative, as the speaker in an ignorant state regarding $B_A \varphi$ does not even have a “hunch” that the addressee might believe the prejacent to be true. Option 2, on the other hand, ensures that such a hunch exists, while not excluding the possibility of any first-order belief states of the addressee.

This latter feature of Option 2 is also the main reason for preferring it over the stronger Option 3, in addition to the fact that the latter is indistinguishable from the commitment arising from the utterance.²² The preparatory belief condition is not supposed to exclude any possibility regarding the beliefs of the addressee, considering that the speaker does not have direct access to the addressee’s doxastic state. Option 3, however, excludes all doxastic states but DOX_A^α . It is also empirically the wrong preparatory condition, as rising declaratives in English can felicitously be used to confirm whether the addressee believes the prejacent, which would be unnecessary would $B_S B_A \varphi$ hold. Thus, Option 3 is too strong, and gives additional support to the adoption of a Gricean rather than a Searlean version of preparatory belief conditions.

Unified belief conditions Concluding that Option 2 is the right preparatory belief condition for the rising declarative, the next step is to implement a single belief condition for both prosodic varieties of declaratives, in parallel to the underspecified version of commitment given in (2.60) above. I thus

²¹The reference to choice of alternative utterances foreshadows the later introduction of the concept of Q-implicature over alternative utterances, which I do not mention here in favor of a step-by-step approximation to utterance meaning.

²²The existence of such a distinction is highly relevant in terms of the quality threshold, as already discussed in section 2.3.4, for the CCP-model, and for the discussion of implicatures arising from the choice of alternative utterance.

propose the following belief condition for declaratives.

(2.71) **Prosodically underspecified belief condition on declaratives:**

$\text{DEC}(\varphi)$: $B_S \neg B_x \neg \varphi$, where:

$\text{DEC}(\varphi) \uparrow$ resolves x to A ,

$\text{DEC}(\varphi) \downarrow$ resolves x to S .

As in the case of commitment, when the participant variable is resolved to the speaker, the second-order belief becomes a first-order belief by transitivity, namely $\neg B_S \neg \varphi$, the preparatory belief condition on falling declaratives, or assertions, as stipulated in (2.47), section 2.3.1.

Evidence in rising declaratives

If the assumption that falling and rising declaratives in principle share the same felicity conditions is to be defended, one has to ask what happens of the evidence condition. The deeper question is, what is the evidence condition for? The original Gricean formulation “do not say that for which you lack adequate evidence”, together with the intuition that assertions commit the speaker to the truth of φ somehow (see for instance Gunlogson (2003) and Krifka (2015, 2017) among others), then evidence is what backs such a commitment up. There might be a chicken-and-egg problem here though: If, as the present proposal so far has suggested, a speaker belief that φ holds is derived from evidence condition and evidence rule, then the requirement that there be evidence, together with assumed felicity of the speech-act, or, in more Gricean terms, cooperativity of the originator, is what leads to commitment. If, on the other hand, an assertive speech-act when (successfully) performed somehow commits the speaker to the prejacent, then the evidence requirement could be a secondary effect arising from this commitment since, as a matter of course (or of cooperativity, to use the Gricean term again), one should have evidence to back up a commitment. I assume that these are but two sides of the same coin, and discuss here how an evidence condition can be implemented for rising declaratives.

Option 1: resolving evidence to participants This will probably not work as “the addressee must have access to evidence to φ ” is not a good condition for lack of access by the speaker. On the other hand, we could introduce a second-order layer of B_S over EV . However, this would still not work as it seems highly implausible that the speaker is required to believe that the addressee have evidence for φ (this may be the case with rising interrogatives with *no*, but even there it is questionable, as discussed in the next chapter).

Option 2: evidence for higher-order beliefs This option means that what needs to be backed up is the speaker’s belief over the belief of the participant resolved by prosody. While this appears to be an attractive option for the rising declarative, it has no deeper motivation and risks being an *ad-hoc* solution. Also, it makes no sense for the falling declarative: the speaker would in this case require evidence for their own doxastic state not being one which supports $B_x \neg \varphi$. Such evidence trivially exists if an agent has epistemic privilege over their own beliefs.

Option 3: linking commitment and evidence This option is what I will defend, for now while ignoring the chicken-and-egg problem (eventually, I will consider some sub-options for its realization within the framework). What evidence is required for is determined by the commitment the utterance (potentially) results in. In the case of a falling declarative, it results in commitment of the speaker: this commitment needs to be backed up by evidence supporting φ available to the agent of commitment, namely the speaker. In the case of a rising declarative, it is the addressee who is (potentially) committed to the prejacent. However, this commitment is initiated on the part of the speaker. Thus, it is the speaker who needs “adequate evidence” to back up “what is said”, *i.e.* adequate grounds for committing the addressee to φ .

This is naturally more complex to implement than “simple” support for a belief that φ holds, as it requires the evidence to be reason to assume a certain doxastic state of another agent, rather than a certain doxastic states

of the same agent doing the reasoning, and thus something indistinguishable from (simply, one might want to say) reasoning about states-of-affairs in the world. It is not a much more complex step, however, than introducing the additional level for belief conditions, and in a similar fashion reveals a hidden complexity in the role evidence plays in the case of falling declaratives. The condition that we will arrive at is, in fact, apparently simple, shown below along with that for a falling declarative.

(2.72) **Belief and evidence condition on rising and falling declaratives:**

	belief	evidence	commitment
$\text{DEC}_S(\varphi) \downarrow$	$\neg B_S \neg \varphi$	$EV_S \varphi$	$B_S \varphi$
$\text{DEC}_S(\varphi) \uparrow$	$B_S \neg B_A \neg \varphi$	$EV_S B_A \varphi$	$B_S B_A \varphi$

Note the newly introduced notation in the definitions above: the evidence condition is now linked to the belief condition, which leads to a natural connection between evidence and belief of the type that we require as an ingredient to concretize our assumptions about *daroo*-declaratives. The new notation is linked to the evidence rule as follows:

(2.73) **Evidence rule for higher-order belief**

$$EV_x B_y \varphi > B_x B_y \varphi$$

This is a departure from the previous notation: evidence is here linked to propositions via belief states rather than directly. This reflects the intuition that with regard to preparatory conditions of speech acts, evidence is only relevant insofar it backs up doxastic states, which in turn support belief conditions. Note that in the original evidence rule mentions beliefs of and evidence available to only one agent — assuming that $B_x B_x \varphi$ can be reduced to $B_x \varphi$, the original evidence rule can be derived from the rule for higher order belief in (2.73). The blocking condition for the revised evidence rule for higher-order belief is given below, reflecting the strong version of the blocking condition for the original evidence rule as argued for in section 2.2.

(2.74) **Blocking condition for Evidence rule for higher-order belief**

$$[(EV_x B_y \varphi > B_x B_y \varphi) \wedge B_x B_y \neg \varphi] \not\models B_x B_y \varphi$$

The blocking condition for the original evidence rule taking into account only one participant can be derived in the same way that the original evidence rule can be derived from the evidence rule for higher-order belief.

Evidence motivated in commitment

In order to derive the evidence conditions of rising declaratives, it was necessary to relate evidence to the doxastic state, and thus belief states, it supports, making agent and target of the relevant belief state relative to properties of the speech-act. The concrete implementation offered so far was that the belief state supported by evidence is a (higher-order) belief of the originator of the speech act, which in turn is supported by a first-order belief, the agent of which is resolved by intonation. The results for falling and rising declaratives are as follows.

A falling declarative gives rise to speaker commitment to φ . What needs to be supported is the belief state of the originator over primary beliefs (=commitments) of the speaker. As the speaker and the originator are identical in this case, the picture can be simplified, and commitment comes out as the Searlean sincerity condition, $B_S\varphi$. More formally, as the doxastic states of the originator and the speaker must be identical (epistemic privilege), we can conclude that the speaker is in a doxastic state supporting φ , and that this state is to be backed up with adequate evidence.

(2.75) Derivation of evidence condition for a falling declarative:

Commitment from declarative: $B_y B_x \varphi$

Falling intonation and originator identity resolve both x and y to S :

Commitment from declarative: $B_S B_S \varphi = B_S \varphi$

As a result, we have commitment parallel to Searlean Sincerity and an Evidence condition parallel to Gricean Quality II.

In the rising declarative, on the other hand, the agent of the first-order belief within the commitment to φ is resolved to the addressee by rising intonation, which is distinct from the agent of the higher order belief, which is the speaker (as the originator of the speech act). Thus, the addressee's commitment needs to be supported by the speaker's doxastic state, and this

support needs to be backed by evidence. As the originator of the speech act, who is the agent responsible for ensuing commitments, and the agent of those commitments are disjoint, the more complex structure of the evidence condition is revealed in rising declaratives.

(2.76) **Derivation of evidence condition for a rising declarative:**

Commitment from declarative: $B_y B_x \varphi$

Rising intonation and originator identity resolve x to A , y to S :

Commitment from declarative: $B_S B_A \varphi$

This is a departure from Searlean Sincerity, as the speaker now is required to be sincere about the addressee's beliefs. Conceivably, one could reformulate Sincerity stating that the speaker must be in a doxastic state supporting belief over whatever commitment the speech act makes. It also sheds an interesting light on Gricean Quality II, which states that one should not *say* for which one lacks *adequate evidence*. Applied to the present view on rising declaratives this would mean that what they “say” is something on the lines of “you believe φ ”, raising the question of just what kind of evidence is adequate in order to say such a thing, *i.e.* in order to back up a second-order belief on part of the speaker that in the addressee's doxastic state, only worlds which make φ true are accessible. I will return to these issues when the CCP-model of utterances is in place in the next chapter.

First, however, I return to another goal of the thesis: accounting for evidential bias in interrogatives. So far, we have looked at belief conditions for falling interrogatives, at belief conditions of declaratives, the commitments they give rise to, and what evidence these commitments require, arguing that the way evidence is relevant in declaratives is as a backer of commitments. In order to examine the role of evidence in interrogatives, then, it will be necessary to think in more detail about what kinds of commitments do or do not arise from interrogatives, and evidence for what it is that questions sometimes require.

2.4.3 Felicity conditions of rising interrogatives

This section discusses questions, which are the final combination of illocutionary force — rising interrogatives. The following two questions will be addressed:

1. Which commitments do rising interrogatives forgo, and what are their preparatory belief conditions?
2. Can the preparatory conditions and forgone commitments of falling and rising interrogatives be derived in the same way?

Before turning Before beginning to address this question, some remarks on the classification of rising interrogatives.

Notes on classifying rising interrogatives

I also refer to rising interrogatives as “questions” as they are information-seeking utterances. There are cases, however, where questions cannot be distinguished from other utterance types by the properties used for classification so far: final rising intonation and interrogative markers like the particle *ka*. The classification of questions as rising interrogatives has to be taken with a grain of salt for the following reasons.

As there is no syntactic marking of interrogatives in Japanese, rising interrogatives and rising declaratives can be hard to distinguish, in contrast to English. On the other hand, falling interrogatives are easily identified by the obligatory interrogative particle *ka*, which is optional in rising declaratives in non-polite speech. In polite questions, on the other hand, final rising intonation can be omitted. Thus, while the information-seeking quality of questions distinguishes them as an utterance type, interrogative force is not always overtly marked and final rising intonation can be absent.

Two points should be noted with regard to this issues. First, I will show below that in the derivation of the preparatory conditions and forgone commitment of rising interrogatives or questions, rising information does not play the same compositional role as an intonational morpheme as it does in the case of declaratives — forgone commitment in questions is derived from the

commitment rising declaratives make, thus sentence final information comes into play only indirectly. Second, the reader should keep in mind that utterances that appear to be questions are potentially rising declaratives. While there are subtle prosodic differences, the best criterion to differentiate the two types of utterances is the information-seeking character of questions, as well as their distinct preparatory conditions and (forgone) commitments to be determined in the remainder of this section.

Preparatory conditions and forgone commitments of RIs

I start the discussion in this chapter by answering the first question above, stipulating the preparatory conditions and forgone commitment of rising interrogatives as shown below.

(2.77) Preparatory conditions and commitments of RIs:

	belief	evidence	commitment
$\text{INT}_S(\varphi) \uparrow$	$\neg B_S \varphi$	—	$\neg B_S B_A \varphi$

For motivation of the evidence condition, see section 2.59 on falling interrogatives — put simply, as no commitment arises from interrogatives, no evidence is required.

As for the belief condition, the arguments put forward in section 2.59 also apply here, in spite of questions being oriented towards addressee belief, which is not the case with falling interrogatives. Recall, however, that the defining feature of questions is ultimately that they seek information, or invite commitment from the addressee. Information-seeking questions are clearly felicitous when the speaker has no assumptions whatsoever about the addressee's beliefs, which is a strong argument for not including addressee beliefs in the preparatory conditions of rising interrogatives, as *any* such kind of condition would potentially make the utterance infelicitous in such a case, leading to wrong predictions on what can be considered the basic, unmarked use of rising interrogatives.

The picture is different with regard to forgone commitment arising from rising interrogatives, as the commitment the question is seeking is clearly one of the addressee, rather than one of the speaker. Foregoing commitment to

$B_S B_A \varphi$ (which, not coincidentally, is the commitment from a rising declarative, see discussion below) on part of the speaker means to not exclude the possibility of any first-order doxastic states the addressee might be in, but at the same time signaling that the speaker does not know about the doxastic state of the addressee with regard to the prejacent proposition φ . Some reasons, related to the mechanism by which forgone commitment is derived from commitment, for why forgone commitment should be interpreted on the level of second-order rather than first-order beliefs, favoring $\neg B_S B_A \varphi$ over $B_S \neg B_A \varphi$, but the choice is also relatively straightforward based on the argument made with regard to forgone commitment below: $B_S \neg B_A \varphi$ *excludes* doxastic states in which the addressee is committed to φ from the speaker's perspective, not only going against the intuitive neutrality that questions (can) have, but also being biased in the wrong direction: a rising interrogative with a non-negated prejacent proposition, *i.e.* a positive polar question, should not exclude the possibility that the addressee is committed to φ , but rather that the addressee is committed to $\neg \varphi$, as otherwise a negative polar question should be the utterance of choice.

Moving on from general reasons for the stipulations above, I focus on theory-internal motivations in the remainder of this section, proposing mechanisms to link preparatory conditions and commitments of both kinds of interrogative, and also declarative utterances. The empirical plausibility of this proposal will come up again in next chapter, where I demonstrate that the claim makes the right predictions on the possible and impossible uses of utterance types.

Forgone commitments in questions

The simple premise for the following discussion is that forgone commitment from an interrogative utterance can be derived as the complement of the commitment that a corresponding utterance with declarative force makes. Note that this already points to consideration on alternative utterances, discussed in detail in the next chapter. The issue here is how to derive forgone commitment in rising interrogatives from commitment in rising declaratives repeated

in (2.78) from the prosodically underspecified version in (2.60), specifically where negation scopes, with the two options shown in 2.79 available.

(2.78) **Commitment from rising declaratives:**

$$B_S B_A \varphi$$

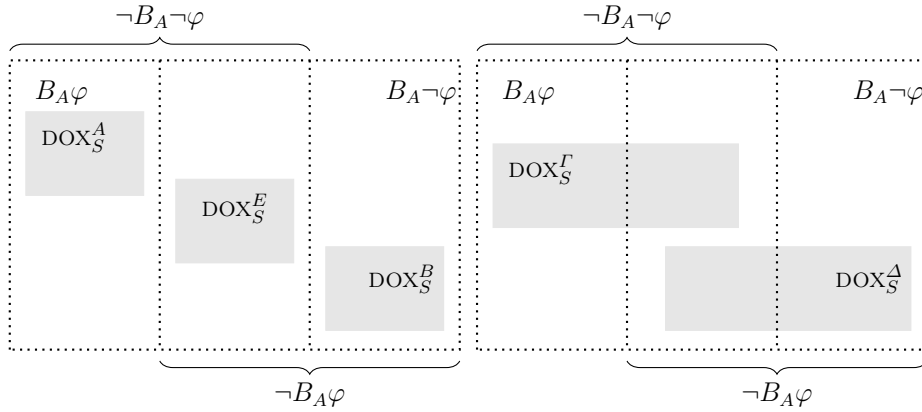
(2.79) **Two options for forgone commitment from RIs:**

a. $B_S \neg B_A \varphi$

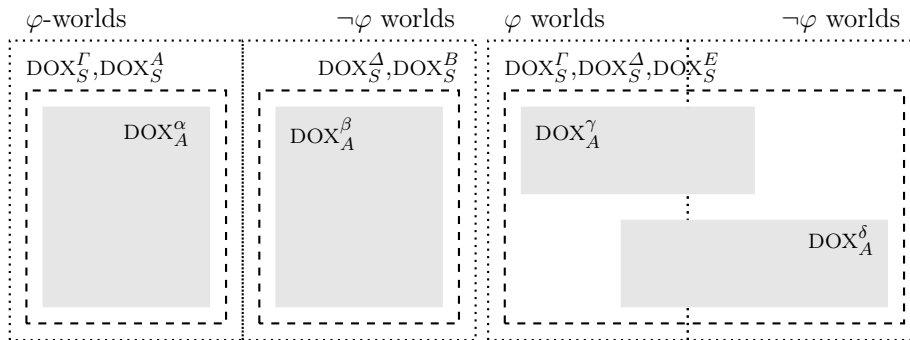
b. $\neg B_S B_A \varphi$

To facilitate discussion of these options, the illustration that we have used for higher-order doxastic states and the first-order states accessible from them are repeated below.

(2.80) **Second-order doxastic states and supported beliefs:**



(2.81) **Accessibility of first-order doxastic states:**



The premise on which both views of forgone commitment build on is that commitment arising from speech acts happens on the level of higher-order beliefs of the speech-act originator (*i.e.* the speaker). Technically, higher-order beliefs are sets of sets of accessible worlds. That is, each higher-order doxastic is a set of first-order doxastic states, which in turn contains those worlds accessible to the agent of first-order belief.

Option 1: negation of first-order belief When first-order belief is negated, this means that the speaker of the rising interrogative, or asker of the question, excludes the possibility that the addressee believes φ to be true, *i.e.* excludes the first-order doxastic state DOX_A^α . In the illustration above, this effectively means that the speaker does not only forgo committing to state DOX_S^A , but also excludes the possibility of belief in any non-committed state that has an intersection with DOX_S^A , thus excluding DOX_S^F as well, reflected in the inclusion notation introduced in (2.29) shown for $B_S \neg B_A \varphi$ in (2.82c) below.

(2.82) **Forgone commitment on first-order level**

- a. Commitment from $\text{DECL}(\varphi) \uparrow: B_S B_A \varphi$
- b. Forgone commitment from $\text{INT}(\varphi) \uparrow: B_S \neg B_A \varphi$
- c. $\llbracket B_S \neg B_A \varphi \rrbracket = \{w \mid \forall w' \in \text{DOX}_S^w : \text{DOX}_A^{w'} \not\subseteq W^\varphi\}$

Recall that when a doxastic state has no intersection with one of the options for commitment, the rule for belief revision stated in section 2.2.3 needs to be applied before such a commitment can be made. Thus, with regard to possible future commitments, Option 1 means that the speaker cannot simply adopt a belief that the addressee believes φ to be true, which effectively means that the speaker conveys a kind of “hidden bias” that the addressee believe φ to be false.

Option 2: negation of higher order belief Negation of the second-order speaker belief does not lead to hidden bias. In the sandbox model, commitment to DOX_S^A is forgone, but it is not entirely discarded as an option. Thus, as doxastic states which have intersection with DOX_S^A , such as

DOX_S^F , are not excluded, no first-order doxastic states of the addressee are. Representations for this version of forgone commitment from questions in the usual notation and in terms of second-order doxastic states is shown in (2.83a) and (2.83b) below.

(2.83) **Forgone commitment on second-order level**

- a. Commitment from $\text{DECL}(\varphi) \uparrow$: $B_S B_A \varphi$
- b. Forgone commitment from $\text{INT}(\varphi) \uparrow$: $\neg B_S B_A \varphi$
- c. $\llbracket \neg B_S B_A \varphi \rrbracket = \{w \mid \exists w' \in \text{DOX}_S^w : \text{DOX}_A^{w'} \not\subseteq W^\varphi\}$

Note that the least restricted second-order doxastic state of the speaker on this view is an ignorant state, that is a state in which the speaker can follow all addressee commitments without belief revision.

Unbiased forgone commitment

The crucial difference between Option 1 and Option 2 is that the former, but not the latter, the speaker excludes a primary-level doxastic state of the addressee, namely the doxastic state committed to the prejacent proposition (DOX_S^α in the sandbox model). This makes unwanted predictions, for the same reason that addressee beliefs should not be part of the preparatory belief conditions of rising interrogatives: Option 1 predicts that all questions are biased with regard to the addressee's beliefs.

Put in terms of an information question, Option 1 states that the speaker is certain that the addressee does not believe φ to be true, which only leaves two options with regard to addressee commitment from the speaker's perspective: either the addressee believes φ to be false, or the addressee is in a non-committed doxastic state in respect to the question whether or not φ holds. This amounts to a kind of "hidden commitment" on part of the speaker in respect to addressee beliefs. While a similar effect arises from falling interrogatives, this is in line with intuitions, as falling interrogatives can be used to express speaker doubt with regard to the truth of φ . Questions, on the other hand, clearly do not express that the speaker doubts that the addressee believes φ — rather, they convey uncertainty on the speaker's part with regard to the addressee's beliefs. This is only accomplished by Option

2, which leaves all options open with regard to addressee beliefs, forgoing *any* commitment the speaker might make in this regard.

Deriving belief conditions of rising interrogatives

In the following, I discuss three options for deriving preparatory belief conditions and forgone commitment in rising interrogatives. In anticipation of the introduction of a CCP-framework in the following chapter, where preparatory belief conditions will be reinterpreted as belief conditions on the input context, and (forgone) commitments as belief conditions on the output context, I also refer to both collectively simply as “belief conditions”.

First, there are three options for deriving the preparatory belief conditions of rising interrogatives:

Option 1 Compositional derivation: in parallel to the preparatory belief conditions of declaratives, those of interrogatives are prosodically underspecified, *i.e.* they contain a participant variable to be resolved to speaker or addressee.

Option 2 Derivation from commitment: in a similar fashion as preparatory belief conditions of declaratives are derived from the commitments they make (essentially as the blocking condition of the evidence rule), preparatory belief conditions of interrogatives are somehow derived from the commitments they forgo.

Option 3 Derivation from conversational maxims: the preparatory condition on belief in interrogatives follows a principle which is the interrogative version of Gricean Quality I.

Before discussing the individual options (and ultimately settling for Option 3), there are some points to be noted. First, Option 1 requires stipulation of a basic preparatory condition for interrogatives, which includes the participant variable to be resolved by prosody. I do not discuss how such a preparatory condition could be derived, as I discard Option 1 on independent grounds. Next, Option 2 requires the forgone commitments from rising interrogatives to be defined. As this is necessary anyway to answer the questions initially

posed for this section, I will define two ways of deriving forgone commitment when discussing Option 2, in which negation takes different scopes. Option 3 will be discussed last, completing the derivation of the belief conditions of rising interrogatives, followed by a summary of the rules to derive the felicity conditions and commitments from all four utterance types.

Compositional derivation of belief conditions

This option is a rather obvious starting point for deriving belief conditions from a theory-internal perspective as it makes the belief conditions of interrogatives and declaratives symmetric in that both are prosodically underspecified, thus the sentence final intonational morphemes do the same thing in utterances with either illocutionary force.

Prosodically underspecified belief conditions for interrogatives on this premise are given below.

(2.84) **Prosodically underspecified belief condition on interrogatives** (to be discarded):

INT(φ): $B_S \neg B_x \varphi$, where:
 INT(φ) $\uparrow$ resolves x to A ,
 INT(φ) $\downarrow$ resolves x to S .

Does this condition accurately predict the conditions on rising interrogatives? When x is resolved to the addressee, the belief condition on rising interrogatives comes out as follows, given alongside a paraphrase for illustration.

(2.85) **Belief condition on rising interrogatives** (to be discarded):

$B_S \neg B_A \varphi$
 “The speaker assumes that the addressee does not rule out all alternatives except for the prejacent.”

Apart from the issue already mentioned above that a question can, and is in the unmarked case of an information question, be neutral with regard to addressee beliefs, there is a problem with the preparatory belief condition above no longer making reference to first-order speaker beliefs.

Overwriting the condition on speaker belief There is a significant difference between falling/rising declarative pairs and falling/rising interrogative pairs: in the former case, the switch from speaker to addressee replaces the original belief condition: there are no particular restrictions on primary speaker beliefs in the case of the rising declaratives; in particular, rising declaratives are not infelicitous if the speaker believes that the prejacent is false (rather, this results in an incredulity reading). In the case of interrogatives, on the other hand, the condition that the speaker not believe the prejacent goes for the rising interrogative as much as for the falling interrogative (it is, after all one of Searle’s preparatory condition for questions, that the speaker not “know the answer”). Of course, this does not mean that interrogatives require the speaker to be in a neutral doxastic state. We have seen that falling interrogatives have an incredulity reading similar to rising interrogatives, on which the speaker utters the falling interrogative in order to cast doubt on the prejacent, and polar questions have similar biased readings.

From these observations, I conclude that that the same condition with regard to speaker belief are at work in both falling and rising interrogatives, making it implausible that they are derived from basic prosodically underspecified belief conditions as is the case in rising declaratives.

On a side note, there is also the issue of what Searle calls “Exam questions”, in which the speaker knows the answer, aiming to find out whether or not the addressee does, which are at odds with the condition that the addressee not know the answer, and which are in possible conflict with the preparatory condition on speaker belief $\neg B_S \varphi$. These can, on the contrary, be naturally accounted for with the compositional belief condition suggested above. I will return to this point in the next chapter.

Preparatory belief conditions as a property of interrogatives

In order to overcome the issues with the two other options for the derivation of the preparatory belief conditions of interrogatives, I suggest that they are derived from a general requirement on interrogatives which is the flip-side of

the belief requirement (*i.e.* essentially Gricean Quality I) on declaratives. I paraphrases it as below.

(2.86) **Maxim of quality for interrogatives**

“Do not doubt anything which you believe to be true.”

In this paraphrase, “doubt” is used in a rather specific and not immediately transparent way, similar to the way “say” is used in Grice’s formulation of the preparatory belief condition. In falling interrogative utterances, doubting occurs in it’s purest form, be it in an actual incredulity reading, as in Davis’s illustrative example, or in the form of “wondering”, as in falling *daroo-ka* interrogative utterances (see section 2.5 below). I take the function of questions to be an extension of this, expressing that the speaker is wondering whether or not the prejacent proposition holds, and at the same time “inviting” the addressee to make (or possibly forgo, conveying ignorance) a relevant commitment. As interrogatives thus doubt their prejacent proposition, their preparatory belief conditions come out as follows, regardless of sentence final prosody.

(2.87) **Belief condition on interrogatives**

$$\begin{array}{ll} \text{INT}_S(\varphi) & \neg B_S \varphi \\ \text{INT}_S(\neg \varphi) & \neg B_S \neg \varphi \end{array}$$

While there is thus no reference to addressee beliefs made in the preparatory conditions of rising interrogatives, the function of questions of seeking information by inviting commitment from the addressee is reflected in forgone commitment derived from the commitment made in rising interrogatives, which introduces addressee beliefs.

2.5 The quality threshold beyond assertions

This section brings together the modified concept of belief and evidence from section 2.3.4, which implemented lowering of the quality threshold by *daroo*, with the expansion of the framework to speech-acts other than assertions in section 2.4, which added addressee beliefs to preparatory conditions and

commitment and introduced the concept of forgone commitment in interrogatives.

After some remarks on the classification of *daroo-ka* utterances, the preparatory conditions and commitment of rising declaratives with *daroo* are provided, and *daroo*-interrogatives are discussed in some detail, arguing that while falling *daroo*-interrogatives are expressions of speaker ignorance, rising *daroo*-interrogatives are marginal because they convey a hidden commitment which is contrary to the communicative intention of information-seeking questions.

Notes on classifying *daroo-ka* utterances

Intuitions on *daroo-ka* utterances are such that authors such as Miyazaki (2002) propose to classify *darooka* as an expression of its own right, with properties distinct from those expected from the combination of *daroo* and *ka*, or the use of *daroo* in a question.²³ I assume that this classification is owed to the fact also observed by Hara and Davis (2013) that *daroo-ka* utterances do not go (well) with final rising intonation, that is *daroo* is not generally used in rising interrogatives (*i.e.* canonical questions).²⁴

Utterances with *daroo* and final rising intonation which lack the interrogative marker *ka* are a productive class, especially in the polite form *deshoo*, or a shortened semi-polite form *desho*. Recall from the notes on classification of rising interrogatives in section 2.4.3 that it can be difficult to differentiate between rising interrogatives and rising declaratives in Japanese as there is no marking of questions in terms of word order and other markers, like *ka*, are omitted in non-polite speech. Plain rising utterances can thus be ambiguous between a rising-interrogative and a rising-declarative reading, the interrogative (*i.e.* question) reading being more salient in most cases.²⁵ There are similar issues regarding the classification of rising utterances with *daroo*, but in contrast to plain utterances, the rising declarative reading is far

²³See chapter 1 for a more detailed discussion.

²⁴One exception reported by Hara and Davis (2013) are some carefully constructed, pragmatically highly marked contexts, which are incidentally, “game-show contexts”, similar to Searle’s “exam questions”.

²⁵I gloss over differences in prosody which may serve as cues to help identify the readings.

more salient with *daroo*, which is expected considering the marked utterance meaning of rising *daroo*-interrogatives.

2.5.1 The quality threshold in falling interrogatives

The account of *daroo*-assertions in section 2.3.4 implements lowering of the quality threshold on the belief states constituting speaker commitment, a choice made over lowering of an evidence threshold. For *daroo*-interrogatives, this is good news, as interrogatives do not have preparatory evidence conditions in the current framework (see section 2.4.1, p.2.4.1), but raises the question of what effect lowering of the quality threshold has on forgone commitment.

Lowering the quality threshold of forgone commitment

The felicity conditions of falling interrogatives are repeated in (2.88) below.

(2.88) **Felicity conditions of FIs:**

	belief	evidence	commitment
$\text{INT}_S(\varphi) \downarrow$	$\neg B_S \varphi$	—	$\neg B_S \varphi$

Assuming that *daroo* lowers the quality threshold of the commitment made by an utterance,²⁶ and that forgone commitment in interrogatives can be derived from the commitment made by a declarative with the same prosodic properties, the preparatory conditions of a falling *daroo*-interrogative are as shown below.

(2.89) **Preparatory conditions and commitment of falling**

daroo-utterances

	belief	evidence	commitment
$\text{DEC}_S(\text{daroo}(\varphi)) \downarrow$	$\neg B_S \varphi$	$EV_S \varphi$	$B_S^{\text{daroo}} \varphi$
$\text{INT}_S(\text{daroo}(\varphi)) \downarrow$	$\neg B_S \varphi$	—	$\neg B_S^{\text{daroo}} \varphi$

In the case of an assertion, the commitment arising from a *daroo*-declarative is weaker than that from a plain declarative, thus the *daroo*-assertion intuitively

²⁶(and thus leads to a weaker evidence condition, rather than lowering of the evidence threshold directly)

feels like a “weakened” speech act. In the case of a falling interrogative, on the other hand, the threshold is lowered for a commitment that the speaker *does not make*. Compared to the plan falling interrogative, the speaker thus forgoes an even weaker degree of commitment, which weakens the speech act in a similar way as that of the declarative, but has the additional effect of not allowing for an incredulity reading, on which the speaker’s doxastic state supports $B_S\neg\varphi$. All of this follows from negation of commitment under the lowered quality threshold.

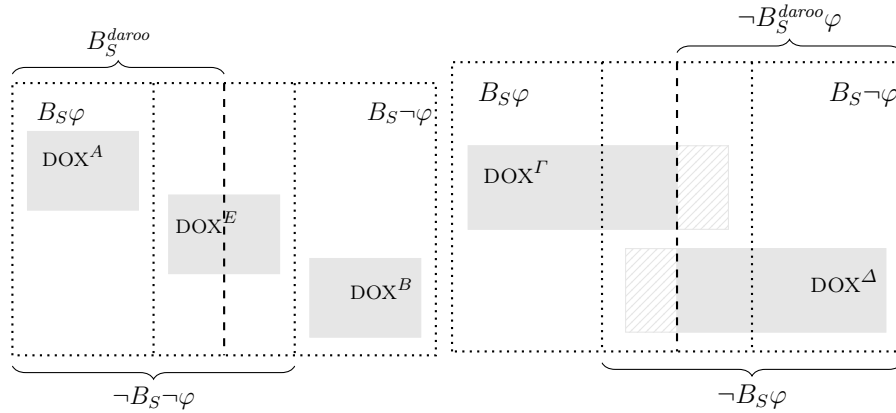
Negation of *daroo*-belief With the denotation of a *daroo*-belief proposition as introduced in chapter 2.3.4 and repeated below, forgone commitment with a lowered quality threshold as in *daroo* has the effect of conveying that the speaker either takes φ and $\neg\varphi$ as equally likely, or is biased towards $\neg\varphi$.

(2.90) **Negated belief propositions with *daroo***

- a. $\neg B_S^{daroo}\varphi$ iff $|\text{DOX}_S \cap W^\varphi| \leq |\text{DOX}_S \cap W^{\neg\varphi}|$
- b. $\neg B_S^{daroo}\neg\varphi$ iff $|\text{DOX}_S \cap W^\varphi| \geq |\text{DOX}_S \cap W^{\neg\varphi}|$

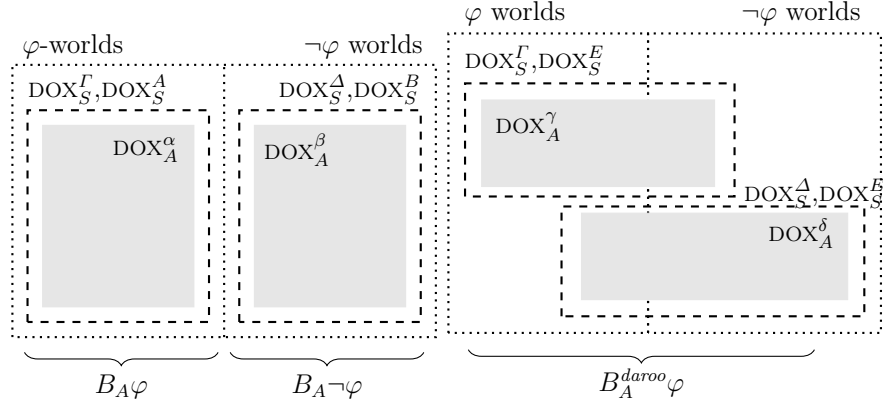
For illustration, the sandbox model of second-order doxastic states is repeated below, in an adapted version to show which doxastic states on the second-order level are compatible with the speaker’s first-order *daroo*-belief propositions, which have a lowered quality threshold, with and without negation.

(2.91) **Second-order doxastic states and supported *daroo*-beliefs:**



In the current framework, negation of *daroo*-beliefs only occurs in forgone commitments. In the case of forgone commitments, negation of speaker belief means that the speaker excludes (future) commitment to a belief state corresponding to the non-negated belief proposition. To capture forgone speaker commitment in cases where the quality threshold is not lowered, *i.e.* in plain falling declaratives, it is not necessary to make reference to second-order beliefs, as only the first-order belief committed to φ (DOX_S^α in the sandbox model) is excluded. Excluding only a committed state can be represented by non-inclusion in one of the cells of the partition into φ - and $\neg\varphi$ -worlds without partitioning on the second-order level. The definition of a *daroo*-belief states, on the other hand, compares the relative size of the intersections of a first-order doxastic states with the two cells W^φ and $W^{\neg\varphi}$ of the partition. Such a distinction can be represented as a partition on the second-order level, which quantifies over first-order doxastic states.

The effect of the shifted quality threshold is thus illustrated by the dashed line on the second-order level, representing a partition into $B_S^{\text{daroo}}\varphi$ -worlds and $B_S^{\text{daroo}}\neg\varphi$ -worlds which distinguishes first-order doxastic states biased towards φ and such biased towards $\neg\varphi$. The left side of the illustration shows that the doxastic states satisfying a belief condition $B_x\varphi$ are a subset of those satisfying $B_x^{\text{daroo}}\varphi$, which are in turn a subset of the doxastic states satisfying $\neg B_x\neg\varphi$. That is, a belief with a lowered quality threshold is supported by less first-order doxastic states than a negated belief proposition, but by more than a committed belief state. This reflects the different classification of first-order doxastic states caused by the lowered quality threshold, also resulting in the narrowing of biased higher-order doxastic states indicated in the right part of the illustration. The first-order doxastic states included in the higher order state DOX^A through DOX^Δ are shown on the primary level of the sandbox model for *daroo*-beliefs below.

(2.92) **Accessibility of first-order doxastic states:**

The left side of the illustration shows committed doxastic states of the speaker, which are included in the second-order doxastic states A and Γ for DOX_S^α supporting $B_S \varphi$ as well as the weaker $B_S^{\text{daroo}} \varphi$, and in B and Δ for DOX_S^β supporting $B_S \neg\varphi$ and $B_S^{\text{daroo}} \neg\varphi$.

The right side of the illustration shows the effect of DOX^Γ and DOX^Δ having been narrowed in (2.91) according to the new partition introduced by *daroo* on the second-order level: the first order belief states included in Γ are DOX_S^α and DOX_S^γ , but not DOX_S^δ , those included in Δ are DOX_S^β and DOX_S^δ , but not DOX_S^γ . These are the first-order belief states supporting $B_S^{\text{daroo}} \varphi$ and $B_S^{\text{daroo}} \neg\varphi$, respectively.

With only these first-order belief states in place, it appears that a negated *daroo*-belief proposition, *i.e.* the complement of doxastic state supporting a *daroo*-belief state on the first order level, is the same as a *daroo*-belief state with the prejacent proposition negated. This is not the case, however — inclusion or exclusion of balanced states on the first-order level makes the difference.

The role of balanced states Balanced states are those first-order doxastic states which have equal intersections with all cells of the partition, in the case of our model this means equal intersections with both cells W^φ and $W^{\neg\varphi}$, which holds for both union and intersection of DOX_S^γ and DOX_S^δ . The doxastic states supporting negated and non-negated *daroo*-belief propositions in the

sandbox model are summarized below:

(2.93) **Doxastic states supporting *daroo*-belief states:**

- a. $B_S^{daroo}\varphi$ is supported by: $\text{Dox}^\Gamma \supseteq \{\text{Dox}_S^\alpha, \text{Dox}_S^\gamma\}$
- b. $B_S^{daroo}\neg\varphi$ is supported by: $\text{Dox}^\Delta \supseteq \{\text{Dox}_S^\beta, \text{Dox}_S^\delta\}$

(2.94) **Doxastic states supporting *daroo*-belief states:**

- a. $\neg B_S^{daroo}\neg\varphi$ is supported by: $\text{Dox}^{\Gamma^c} \supseteq \{\text{Dox}_S^\alpha, \text{Dox}_S^\gamma, \text{Dox}_S^{\gamma \cup \delta}\}$
- b. $\neg B_S^{daroo}\varphi$ is supported by: $\text{Dox}^{\Delta^c} \supseteq \{\text{Dox}_S^\beta, \text{Dox}_S^\delta\}$

The notation Dox^c is used to indicate the complement of a doxastic state within the universe of doxastic states on the same level, which in the case of a second-order belief as in this example is the complement in all second-order doxastic states as illustrated in (2.91).

Thus, when a *daroo*-belief proposition is negated, this means that balanced doxastic states are one of the possibilities, while they are ruled out by non-negated *daroo*-belief states. Taking $\text{Dox}_S^\gamma \cup \text{Dox}_S^\delta$, written above as $\text{Dox}_S^{\gamma \cup \delta}$, as an example in the sandbox model, balanced states are included in the agnostic second-order doxastic state $\text{Dox}^E\varphi$. This is because within the partition $\{B_S^{daroo}\varphi | B_S^{daroo}\neg\varphi\}$ on the second-order level, balanced first-order doxastic states are those *exactly on* the dashed line. These are excluded by second-order doxastic states Γ and Δ , but included in their respective negation. Thus, balanced doxastic states are what distinguished the doxastic states supporting $B_S^{daroo}\varphi$ from those supporting $\neg B_S^{daroo}\neg\varphi$, and those supporting $B_S^{daroo}\neg\varphi$ from those supporting $\neg B_S^{daroo}\varphi$.

In regard to the meaning of *daroo*-utterances, this difference is decisive for distinguishing commitment from forgone commitment in the case of a lowered quality threshold.

Falling *daroo*-interrogatives

The following paraphrases can be given for the utterance meaning of *daroo*-interrogatives as shown in (2.89), on the account of negation of *daroo*-belief given above:

(2.95) **Paraphrase for $\text{INT}_S(\text{daroo}(\varphi)) \downarrow$:**

“The speaker does not believe the prejacent proposition to be true and forgoes to even tendentially commit to the prejacent proposition.”

On this view, falling *daroo*-interrogatives exclude more possible commitments of the speaker than plain falling interrogatives, while both have the same preparatory conditions. The communicative effects arising from falling *daroo*-declaratives will be discussed in the next chapter.

2.5.2 *Daroo* in rising declaratives

Before turning to *daroo* in rising interrogatives, I discuss rising declaratives with *daroo*. Rising *daroo*-declaratives are productive in Japanese and in many cases are the preferred form of a rising declarative. For instance, I assume that the examples which Sudo (2013) discusses in terms of their bias patterns as polar questions with final *desho(o)*²⁷ are actually rising declaratives rather than interrogatives, based on the fact that they cannot occur with outer negation, their prosodic properties, and on the predictions made by the analysis put forward below.

Weak commitment in rising declaratives

Recall the belief conditions on falling and rising declaratives, and the corresponding evidence conditions stipulated so far:

(2.96) **Belief and evidence conditions on plain declaratives:**

$$\text{DEC}(\varphi)\downarrow: B_S \neg B_S \neg \varphi \wedge EV_S B_S \varphi$$

$$\text{DEC}(\varphi)\uparrow: B_S \neg B_A \neg \varphi \wedge EV_S B_A \varphi$$

If the analysis that *daroo* lowers the quality threshold for belief is on the right track, the following are the conditions on *daroo*-declaratives.

²⁷*Desho* is a semi-polite variant of *daroo* with a shortened final vowel, which is chiefly used in what I take to be rising declaratives, but others classify as confirmation questions. I assume that the reason for the strong preference for adding *desho* in rising declaratives lies in the fact that Japanese is sensitive to perspective and epistemic privilege, see the next chapter for more discussion.

(2.97) **Belief and evidence conditions on *daroo* declaratives:**

	belief	evidence	commitment
$\text{DEC}_S(\text{daroo}(\varphi)) \downarrow$	$\neg B_S \neg \varphi$	$EV_S \varphi$	$B_S^{\text{daroo}} \varphi$
$\text{DEC}_S(\text{daroo}(\varphi)) \uparrow$	$\neg B_S B_A \neg \varphi$	$EV_S B_A \varphi$	$B_S^{\text{daroo}} B_A \varphi$

The assumption behind this representation is that *daroo* lowers the quality threshold for *commitments*, rather than for belief in general, and that a rising declarative, by virtue of being an utterance whose originator is the speaker, may be about addressee beliefs, but can ultimately only be about speaker commitments. Thus, the rising declarative does not give rise to complete commitment on the speaker's side that the addressee *daroo*-believes φ to be true, but to a weaker commitment on the speaker's side that the addressee believes φ to be true. There preparatory condition that the speaker not assume the addressee to believe φ to be true remains constant from the plain rising declarative, and, also like in the plain version, there are no requirements on speaker belief for the rising *daroo*-declarative to be felicitous.

2.5.3 Questions with *daroo*

The felicity conditions of rising *daroo*-interrogatives based on the discussion so far are as shown below, alongside the conditions of a bare rising interrogative for comparison.

(2.98) **Felicity conditions of rising *daroo*-interrogatives:**

	belief	evidence	commitment
$\text{INT}(\text{daroo}(\varphi)) \uparrow$	$\neg B_S \varphi$	—	$\neg B_S^{\text{daroo}} B_A \varphi$
$\text{INT}(\varphi) \uparrow$	$\neg B_S \varphi$	—	$\neg B_S B_A \varphi$

While the difference is rather small at first sight, it turns out to be significant, as is the comparison with the rising *daroo*-declarative. First, consider which doxastic states support a negated second-order *daroo*-belief proposition on speaker over addressee beliefs:

(2.99) **Paraphrase for $\text{INT}_S(\text{daroo}(\varphi)) \uparrow$:**

“The speaker does not believe φ to be true and forgoes to even tendentially commit to a belief that the addressee believes φ .

What forgoing such commitment means is a rather complex derivation, as it involves the following restriction on the doxastic state of the speaker:

$$(2.100) \quad |\text{DOX}_S \cap W^{B_A\varphi}| \leq |\text{DOX}_S \cap W^{\neg B_A\varphi}|$$

This can be paraphrased as follows:

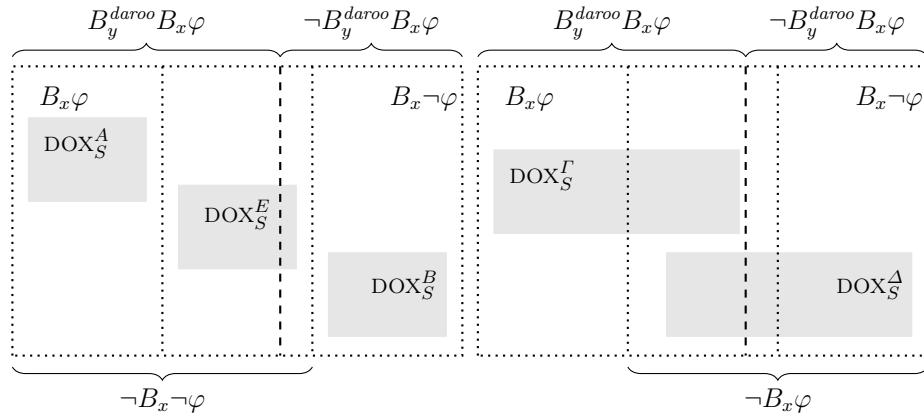
(2.101) “The speaker either tends to believe that the addressee does not believe φ to be true, or is neutral with regard to the addressee’s beliefs.”

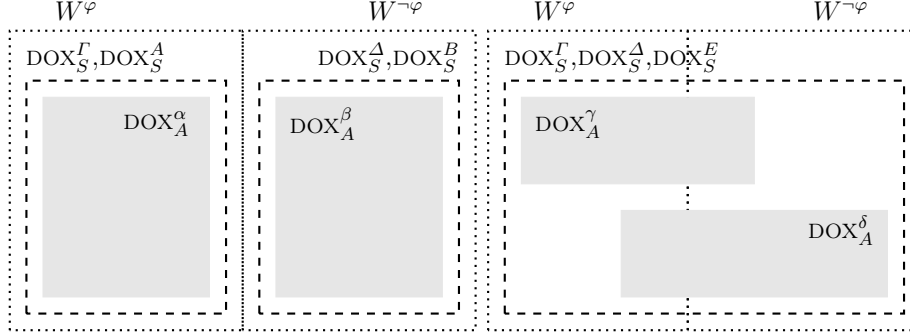
I return to the connection of this to “exam questions” and to the Searlean preparatory condition for questions that the speaker should deem it possible that the addressee knows the answer in the next chapter. For now, I will briefly illustrate why there appears to be a hidden commitment in rising *daroo*-interrogatives with help of the sandbox model.

Why rising *daroo*-interrogatives are marginal

This is a rather puzzling paraphrase, and one might wonder what such an utterance can be used for. It is instructive to compare the possible doxastic states according to the speaker after this utterance has been made to those after a plain rising interrogative in the sandbox model.

(2.102) **Second-order doxastic states and supported beliefs:**



(2.103) **Accessibility of first-order doxastic states:**

As for the plain rising interrogative, it rules out DOX_A^S and leaves all other options open, ruling out no first-order doxastic states of the addressee. The rising *daroo*-interrogative, on the other hand, as a negated second-order belief proposition does not partition the secondary level, but takes the complement of a committed second-order belief. This belief is a *daroo*-belief, thus supporting doxastic states must meet the requirement that they mostly fall into the desired cell of the secondary partition. In this way, the excluded second-order doxastic states are $\text{DOX}_S^A\varphi$ and $\text{DOX}_S^F\varphi$, leaving the *agnostic* and the *negatively biased states*, and *excluding the first-order state committed to φ* from the possibilities — this means that there is a *covert commitment in the forgone second-order commitment*, which amounts to the insinuation that the addressee does not know the answer. This can also explain the reason for the marginal status of rising declaratives with *daroo*, or their status of “quiz-show questions” as observed by Hara and Davis (2013) to be discussed in more detail in the next chapter.

2.6 Chapter Summary

Doxastic states and belief propositions

The basic building block of the framework developed in this chapter are belief propositions. Belief propositions represent the beliefs of agents, here the discourse participants, and are supported by doxastic states. On the premise that the denotation of propositions are the possible worlds at which

they are true, and that doxastic states are sets of worlds which are accessible to an agent via an accessibility relation, *i.e.* doxastic states contain all worlds compatible with an agents beliefs at a world, belief states were defined as non-negated belief propositions being supported by the doxastic states included in the denotation of their prejacent proposition. The definition of a belief state of agent x with the prejacent proposition φ is shown in (2.104).

(2.104) **Definition of belief state**

$$B_x\varphi \text{ is supported by } \text{Dox}_x^w \text{ iff } \text{Dox}_x^w \subseteq W^\varphi$$

Negation of belief propositions, which is crucial to model utterance felicity conditions, results in exclusion of the doxastic state supporting the belief state represented by the belief proposition which undergoes negation. This is equivalent to support by complementary doxastic states, and can be represented as non-inclusion as shown in (2.105).

$$(2.105) \quad \neg B_x\varphi \text{ is supported by } \text{Dox}_x^w \text{ iff } \text{Dox}_x^w \not\subseteq W^\varphi$$

The final necessary step was to define higher-order doxastic states in order to account for utterances with final rising intonation in this chapter, as well as for reasoning on speaker beliefs which is discussed in the next chapter. Higher-order doxastic states with negation require the introduction of quantification over accessible worlds and accessible doxastic states (*i.e.* sets of worlds), as represented in the inclusion notation for the extension of a second-order belief proposition in (2.106), a second-order belief proposition with negation on the first-order level in (2.107), and a second-order belief proposition with negation on the second-order level in (2.108).

$$(2.106) \quad \llbracket B_y B_x \varphi \rrbracket = \{w \mid \forall w' \in \text{Dox}_y^w : \text{Dox}_x^{w'} \subseteq W^\varphi\}$$

$$(2.107) \quad \llbracket B_y \neg B_x \varphi \rrbracket = \{w \mid \forall w' \in \text{Dox}_y^w : \text{Dox}_x^{w'} \not\subseteq W^\varphi\}$$

$$(2.108) \quad \llbracket \neg B_y B_x \varphi \rrbracket = \{w \mid \exists w' \in \text{Dox}_y^w : \text{Dox}_x^{w'} \not\subseteq W^\varphi\}$$

With these definitions, it is possible to capture the felicity conditions of the utterance types that are the scope of the thesis (see below for evidence conditions and their relation to commitment).

Felicity conditions of utterances

The preparatory conditions for and commitments arising from the four utterance type resulting from the combinations of force (declarative or interrogative = DEC or INT) and prosody (final falling or final rising intonation = $\uparrow$ or $\downarrow$) proposed in this chapter are summarized in (2.109) below.

(2.109) Belief, evidence, and commitment of utterances:

	belief	evidence	commitment
a. DEC _S (φ) $\downarrow$	$\neg B_S \neg \varphi$	$EV_S \varphi$	$B_S \varphi$
b. DEC _S (φ) $\uparrow$	$B_S \neg B_A \neg \varphi$	$EV_S B_A \varphi$	$B_S B_A \varphi$
c. INT _S (φ) $\downarrow$	$\neg B_S \varphi$	—	$\neg B_S \varphi$
d. INT _S (φ) $\uparrow$	$\neg B_S \varphi$	—	$\neg B_S B_A \varphi$

Deriving belief conditions

The rules by which these felicity conditions are derived are summarized below, starting with the conversational maxims from which preparatory belief conditions are derived.

(2.110) Conversational maxims governing belief conditions

- a. Do not say anything you believe to be false.
- b. Do not doubt anything you believe to be true.

These maxims, the first of which is taken from Grice (1975), the second stipulated here and will be further motivated by the limitation on uses of interrogative speech acts in the next chapter. (2.110a) derives the preparatory condition $\neg B_S \neg \varphi$ for the declaratives with the prejacent proposition φ in (2.109a) and (2.109b) above, (2.110b) the preparatory condition $\neg B_S \varphi$ for the interrogatives with the prejacent proposition φ in (2.109c) and (2.109d) above. It is not clear whether the preparatory condition of the rising declarative in (2.109b) can be straightforwardly derived from the Gricean maxim, and I have assumed that it is possible, in principle, to assume a stronger or a weaker version, concluding that the weaker version has unwanted consequences in section 2.2.3, 82 pp., and thus the stronger version given in (2.109b) is the right choice.

The maxims in (2.110) are not the only way of deriving the belief conditions. The preparatory belief conditions of declaratives can also be understood as part of the connection between evidence and commitment, as they prevent blocking of the defeasible inference from evidence to the belief state constituting commitment. The preparatory belief conditions of interrogatives, in turn, can also be understood as arising from the availability of the declarative alternatives, which would be preferred if the excluded belief states held, blocking the choice of interrogatives (choice of utterance will be discussed in the next section). However, the maxims are potentially preferable as they are primary sources of preparatory conditions rather than deriving them from other utterance types or felicity conditions, and can be motivated in a general cooperativity principle of communication.

Deriving commitment (and evidence)

The connection between commitment and evidence has been the focus of sections 2.2 on the conceptual connection, 2.3.2 on evidence and commitment in assertions, or falling declaratives, and section 2.4.2, 113 pp. on rising declaratives. In addition to this, strength of commitment and evidence are central to the discussion of *daroo*-utterances (see below), making the question of how evidence and commitment are connected one of the main topics of this chapter.

The rule connecting belief and evidence is shown in (2.111). The label “strong” evidence rule indicates that there are two possible construals of the evidence rule with different blocking conditions. Showing that neither the weak construal nor a strong construal of a weakened evidence rule reflect the connection between belief and evidence correctly as they render it ineffective when no further stipulations are made.

(2.111) **Interpretive evidence rule** (strong construal):

$$EV_x\varphi > B_x\varphi, \text{ unless } B_x\neg\varphi$$

Recall that the strong construal of the evidence rule can also be formulated in terms of doxastic states, showing that no narrowing of the doxastic state to only include W^φ (*i.e.* belief revision to $B_x\varphi$) is possible when there is no

intersection of the original doxastic state with W^φ (*i.e.* defeasible inference is blocked by $B_x \neg \varphi$). Thus, belief revision can optionally occur when there is evidence supporting a proposition conflicting with a previously held belief. The alternative formulation of the evidence rule and the steps for belief revision are shown in (2.112) and (2.113) below, where DOX^β denotes a doxastic state committed to $\neg \varphi$, DOX^γ a non-committed doxastic state w.r.t. φ which is the same as DOX^β in all other ways (see 2.41, p.82, for a graphical representation of belief revision).

(2.112) **Evidence rule for belief formation:**

When evidence supporting φ is available to agent x ($EV_x \varphi$),

$$\text{update } \text{DOX}_x \text{ to } \text{DOX}'_x = \begin{cases} \text{DOX}_x & \text{if } \text{DOX}_x \cap W^\varphi = \emptyset \\ \text{DOX}_x \cap W^\varphi & \text{otherwise.} \end{cases}$$

(2.113) **Steps of belief revision:**

- A $\text{DOX}^\beta \cap W^\varphi$ (Narrowing of non-committed state under evidence.)
- B $\text{DOX}^\beta \star W^\varphi$ (Widening of committed to non-committed state.)
- C $\text{DOX}^\gamma \cap W^\varphi$ (Narrowing after widening.)

Under the assumption that assertions (falling declaratives) commit the speaker to the prejacent proposition, rising declaratives the addressee, following the proposal of Gunlogson (2003) and reflected in the prosodically underspecified commitments from declaratives shown in (2.114), it is possible to derive commitment from the evidence condition of the declarative in conjunction with the evidence rule, which is not blocked if the belief condition is satisfied as well. That the evidence condition is primary and not derived from commitment has been stipulated by both Grice (1975) and Searle (1969).

(2.114) **Prosodically underspecified commitment from declaratives:**

- $\text{DEC}(\varphi)$: $B_S B_x \varphi$, where:
- $\text{DEC}(\varphi) \uparrow$ resolves x to A ,
- $\text{DEC}(\varphi) \downarrow$ resolves x to S .

Forgone commitment

The commitments arising from the interrogative speech-acts in (2.109c) and (2.109d) can be easily derived as forgone commitment, that is the speaker signaling that she is not making the commitment that arises from a corresponding declarative speech act. The rule for derivation of forgone commitment has not been made fully explicit, as it relies on anchoring of negated speaker belief propositions in addressee belief, which will be tackled within the CCP-framework introduced in the next chapter.

The quality threshold

The final modification on the basic framework of preparatory conditions and commitments was necessary to account for the function of *daroo*, which is also central to the subsequent discussion of the function of the particle *no*. I proposed that *daroo* lowers the quality threshold of utterances, and thus the support threshold for belief propositions so that not only doxastic states of x included in the denotation of the prejacent proposition φ support $B_x^{daroo}\varphi$, but also doxastic states which have a larger intersection with worlds at which φ is true than with worlds at which φ is false.

(2.115) Belief states with *daroo*

$$B_x^{daroo}\varphi \text{ is satisfied iff } |\text{DOX}_x \cap W^\varphi| > |\text{DOX}_x \cap W^{\neg\varphi}|$$

Negation an higher order belief also needed to be defined with the lowered quality threshold to account for all types of *daroo*-utterances. Section 2.5 demonstrated that the negation of a *daroo*-belief proposition, as the complement of first-order doxastic states, is supported by all worlds with larger intersections with the denotation of φ or equal intersections with worlds at which φ is true and such at which φ is false. In the definition of *daroo*-belief, this amounts to a less-or-equal relation as shown in (2.116), replacing the greater-than relation in (2.115).

(2.116) Negated belief propositions with *daroo*

$$\text{a. } \neg B_x^{daroo}\varphi \text{ is satisfied iff } |\text{DOX}_x \cap W^\varphi| \leq |\text{DOX}_x \cap W^{\neg\varphi}|$$

Second-order beliefs and their negations are even more complex, as they combine universal and existential quantifying with comparative relations. The necessary negated second-order belief was that representing forgone commitment in rising *daroo*-interrogatives (which, incidentally, are marginal, which needs to be explained). As argued in 2.5, *daroo* lowers the belief threshold of commitments, in this case of the second-order speaker belief over addressee beliefs which is the commitment arising from rising declaratives. The negation of higher order *daroo*-belief is shown in (2.117).

$$(2.117) \quad |\text{DoX}_S \cap W^{B_A\varphi}| \leq |\text{DoX}_S \cap W^{\neg B_A\varphi}|$$

See section 2.5 for details on this belief state and the problems arising from a hidden commitment it appears to make. Finally, the full preparatory conditions and commitments from *daroo*-utterances are shown in (2.118) below.

(2.118) **Belief, evidence, and commitment of *daroo*-utterances:**

	belief	evidence	commitment
$\text{DEC}_S(\text{daroo}(\varphi)) \downarrow$	$\neg B_S \neg \varphi$	$EV_S \varphi$	$B_S^{\text{daroo}} \varphi$
$\text{DEC}_S(\text{daroo}(\varphi)) \uparrow$	$B_S \neg B_A \neg \varphi$	$EV_S B_A \varphi$	$B_S^{\text{daroo}} B_A \varphi$
$\text{INT}_S(\text{daroo}(\varphi)) \downarrow$	$\neg B_S \varphi$	—	$\neg B_S^{\text{daroo}} \varphi$
$\text{INT}_S(\text{daroo}(\varphi)) \uparrow$	$\neg B_S \varphi$	—	$\neg B_S^{\text{daroo}} B_A \varphi$

Chapter 3

Bias: the interaction of *no* and conditions on contexts

3.1 Introduction

The gist of the proposal put forward in this section is simple: *no* marks *mutually accessible evidence* on the speech-act level of utterance meaning. Mutually accessible evidence in the context of the present proposal means evidence supporting the prejacent proposition which is available to both participants, a salient case of which is perceptual evidence in the utterance situation or extralinguistic context. By implementing this using the preparatory evidence conditions defined thus far within a dynamic version of the framework, bias patterns of utterances with and without *no* are predicted.

In this introductory section, an overview of the chapter is provided, followed by a preview of the upcoming claims with regard to the effect of *no* in different utterance types.

3.1.1 Overview of chapter structure

After this section's preview of the analysis of bias to be developed in the remaining chapter, section 3.2 introduces the CCP-model of utterances which serves as the framework for the analysis. The steps to develop the model are as follows. Section 3.2.2 defines commitment in terms of common belief,

differentiating (primary) commitment arising from speech acts, and (secondary) commitment arising from carried over preparatory conditions, and implementing addressee-oriented (higher-order) commitment. Next, section 3.2.3 defines forgone commitment within the definition of commitment from 3.2.2, discussing the optimal strength of forgone commitment and defining public beliefs, in terms of which commitment is implemented, as mutually introspective common beliefs. Section 3.2.4 introduces utterance situations in the form of (extralinguistic) context sets, characterized by salient preadjacent polarity and the presence or absence of mutually accessible evidence, into the framework. Finally, 3.2.5 provides the basic CCPs of the four utterance types discussed in chapter 3, concluding the introduction of the *ccp*-framework.

Section 3.3 introduces Q-implicatures, which arise by reasoning on the utterances that the speaker forgoes when choosing one of the active alternatives determined by communicative intentions introduced in 3.3.1. In order to formalize Q-implicatures, section 3.3.2 defines a notation for enriching CCPs with implicatures from forgone alternatives, and section 3.3.3 discusses the Q-implicatures arising from different forgone alternatives to some of the basic utterance types discussed so far.

The main part of this chapter is section 3.4, where the addition of *no* is discussed within the full framework, on the premise that it functions as a marker of mutually available evidence formulated in 3.4.1. The discussion starts in 3.4.2 with rising interrogatives and their interaction with polarity and evidence in the utterance situation, followed by falling interrogatives and two of their salient interpretations, the doubt- and the incredulity-reading discussed in 3.4.4. Next, falling declaratives (assertions) and the commitments they result in are discussed in 3.4.5, discussing the mirative reading of *no*-assertion and its connection to the aforementioned two readings in terms of belief revision, before moving on to rising declaratives in 3.4.6. This sequence is motivated in the function of *no* as an evidence-marker which comes out more clearly in interrogatives than in declarative as the former do not have an evidence condition before *no* is added, while in declaratives *no* modifies a pre-existing evidence condition. Finally, 3.4.7 discusses *daroo*-utterances and closes the analysis of the effects that the addition of *no* has

on utterance meaning, and final conclusions are provided in 3.5.

3.1.2 Communicative effects of *no* by utterance type

Before moving on to introducing the dynamic CCP-model to the framework and discussing its application to different utterance types in detail, this section previews some of the findings. This is in order to demonstrate that the motivation for developing the dynamic framework of utterance meaning is the empirical focus of this thesis, namely the phenomena observable w.r.t. utterances with (and without) the particle *no*, and to make as transparent as possible what an analysis of *no* as an evidence marker on the speech-act level of utterance meaning seeks to explain.

Reversing the sequence in which utterance types were discussed in the previous chapter, I start the preview with interrogatives, and then move on to declaratives, and continue to follow this sequence in the application of the dynamic framework to the data in 3.4. This is because the effects of *no* as an evidence marker are more clearly seen in interrogatives which forgo commitment and thus, in the unmarked case where there is *e.g.* no polarity mismatch, come without evidential bias of their own — under such circumstances, the introduction of an evidence condition by addition of *no* has a clear effect on utterance felicity.

No in falling interrogatives (falling *no-ka* utterances)

The first of the four utterance types distinguished in chapter 3 I discuss here are falling interrogatives. As they have no preparatory evidence conditions and do not involve reference to addressee, but only speaker beliefs in both forgone commitments and preparatory belief conditions,¹ they are a suitable starting point for exploring the effects of the addition of *no*. The representative example for falling *ka*-interrogatives in Japanese is repeated as (3.1)

¹As final rising intonation resolves the first-order agent of preparatory belief conditions and commitment to the addressee, this raises the question what for evidence is required (a speaker belief, an addressee belief or the preadjacent proposition, for instance) and is thus a possible confounding factor making utterances with final falling intonation the less complex case.

below. Recall that out of the two possible interpretations, for the doubt reading the bare version is preferred, while the incredulity reading requires *no*.

- (3.1) *Tori-ga konna tokoro-ni sum-eru (no) ka.*
 bird-NOM such_a place-in live-POT no ka
 “Can birds live in a place like this?”

What I claim happens here is that the doubt reading of bare falling interrogatives can be derived from forgone speaker commitment to the prejacent: in case the utterance is a reaction to an utterance of the addressee which made public a belief that the prejacent holds, forgoing commitment to the prejacent gives rise to the salient interpretation that the speaker rejects the addressee’s public belief as a proposition to be added to the common ground. In the case of the example at hand, this means that (3.3) in the version without *no* conveys that the speaker does not commit to “birds can live here”, so that this proposition will not be part of a common ground taken to be the intersection of all propositions which are publicly believed by *all* participants. This plausibly means that the speaker is at least not (sufficiently) sure whether or not the prejacent holds, *i.e.* cannot exclude that the prejacent is false.

When *no* is added, the conveyed meaning that the speaker cannot exclude that the prejacent is false together with the marking of mutually available evidence supporting the prejacent favors an interpretation on which the speaker is in a process of belief revision or -formation — in spite of the evidence supporting the prejacent, the speaker forgoes publicly committing to it. According to the process the evidence rule is designed to capture, the only reason for not believing a proposition in the face of (adequate) evidence is a previous belief to the contrary, namely that the proposition is false. Thus, *no*-FIs give rise to epistemic bias, which can also be taken as an instance of strengthening of the preparatory condition that the speaker not believe the prejacent to be true to an assumption that the speaker believes the prejacent to be false. Another plausible reading is that the speaker is willing to accept the observed evidence and form a belief based on it, but that the evidence

is surprising, as the speaker has a previous expectation that the prejacent might be false — this is the mirative reading of *no*-FIs.

***No* in rising interrogatives (polar questions)**

In the case of positive polar questions, the evidence-marking function of *no* comes out equally clearly, as the discussion of bias in Japanese polar questions in section 1.3 has shown. The relevant example of a Japanese PPQ is repeated as (3.2). When there is evidence supporting the prejacent in the utterance situation (extralinguistic context), the version with *no* is strongly preferred, when there is no such evidence, the bare version is. This split does not occur in English, as the translation is good when there is evidence as well as in the neutral case.

- (3.2) *ima ame fut-teru* (*no*)?
 now rain fall-PROG.NPST *no*
 ‘Is it raining now?’

While the addition of *no* in PPQs can thus be straightforwardly accounted for, the case of negative polar questions is more complex, as it involves not only evidential bias, as in the example above, but also epistemic bias. As also discussed in chapter 2, NPQs give rise to evidential bias in positive-salient contexts, and when *no* is added, an additional felicity condition arises that the speaker believe, or expect, the prejacent to be true prior to utterance.

The explanation within the CCP-framework I propose for the properties of NPQs in positive-salient context is polarity mismatch. The NPQ invites commitment to the negated prejacent, which in a positive-salient utterance situation gives rise to evidential bias. When evidence is marked with *no*, this gives rise to a belief-revision inference as occurs in falling *no-ka* interrogatives, and thus both evidential *and* epistemic bias. Crucially, however, neither evidential bias from plain NPQs nor epistemic bias from *no*-NPQs arise in the case of negative-salient contexts. Conversely, PPQs in negative-salient contexts are predicted to give rise to the same bias pattern as NPQs in positive-salient contexts, with reversed prejacent polarity — the additional

complexity of the bias patterns of NPQs is a result of polarity mismatch, *i.e.* a context-relative property of NPQs, not some property inherent to them.

***No* in falling declaratives (assertions)**

Declaratives, both rising and falling, have a preparatory condition requiring evidence to be available to the speaker which supports commitment arising from the utterance. Adding *no*, then, changes this requirement in that the evidence needs to be available to all participants, or mutually accessible.

One salient reading of *no*-assertions arising from this additional requirement is the mirative reading. While surprise over the prejacent proposition can also be expressed by a bare assertion with surprise intonation, the addition of *no* indicates that the speaker is committing to the prejacent not based on some private conviction, but based on mutually accessible evidence, such as extralinguistic evidence available in the utterance situation. To illustrate the connection to interrogatives on the incredulity reading, a declarative version of (3.1) is given in (3.3).

- (3.3) *Tori-ga konna tokoro-ni sum-eru n da.*
 bird-NOM such_a place-in live-POT.NPST *no* COP
 “So birds can live in a place like this.”

This example of a falling *no*-declarative differs from the falling *no*-interrogative (3.1) in that the speaker forgoes commitment to the prejacent proposition in the interrogative, but commits to the prejacent in the declarative. Also, while (3.3) conveys surprise over the apparent truth of the prejacent, it does not necessarily convey a strong tendency of the speaker to believe its negation (*i.e.* does not give rise to negative epistemic bias) in the way that the interrogative does.

These observations are accounted for in the framework developed in this thesis by taking, assertions with *no*, falling interrogatives with *no*, and questions with *no* and polarity mismatch to correspond to different stages in a belief revision process under evidence — complete belief revision, belief revision in progress (or reconsidering the other alternative), and blocked belief revision, respectively.

A closely related use of *no*-assertions is that of confirming information learned from the addressee, such as the discourse-structuring phrase shown in (3.4), expressing (mild) surprise on the part of the speaker over the truth of the proposition denoted by the deictic *soo* in the prejacent.

- (3.4) *A, soo na n da.*
 oh so COP.ADN *no* COP
 ‘Oh, is that so.’

I argue that uses of *no*-assertions like (3.4) are best understood in terms of consensus-seeking communicative behavior, where a goal of the discourse participants is to add to the common ground.

The common ground also plays a role in related discourse-structuring cases, where *no* adds an emphatic nuance to an assertion by marking information that the speaker has previously committed to.² Such cases may involve flouting of Gricean maxims where the speaker strategy is to convince the addressee of the truth of the prejacent by presenting it as supported by mutually accessible evidence.

In summary, the uses of *no* in assertions are more diverse than in other cases, which is expected as the contribution of *no* is rather subtle in minimally changing the existing evidence condition by adding mutual accessibility, leaving room for interpretation.

No in rising declaratives

Moving on to declarative force, the issue that rising declaratives and rising interrogatives are hard to distinguish in Japanese comes to the surface. The sharpest distinction occurs when *daroo* is added, as rising interrogatives with *daroo* are marginal, as discussed in chapter 2, thus the combination of final rise and *daroo*, often in the variant *desho*, are unambiguously rising declaratives.

The felicity conditions of a rising declarative with *no* and a rising interrogative with *no* differ in that the rising interrogative requires evidence support-

²There is a considerable degree of overlap with the discourse-structuring functions of the complementizer *no* in such uses of the particle *no*.

ing the truth of the prejacent in the utterance situation, the rising declarative evidence supporting the assumption that the addressee believe the prejacent to be true in the utterance situation.³ This makes the two utterance types hard to distinguish in examples like (3.2), especially in their, rather salient, incredulity readings, on which the speaker has reason to assume that (the addressee believes that) the prejacent holds due to the available evidence, but believes the prejacent to be false. In the case of the RD, a reading on which the speaker has revised a second-order belief over addressee beliefs is available. This is the mirativity reading, which is salient in *no*-assertions.

No in *daroo*-utterances

The core example for a *daroo*-assertion is repeated as (3.5) below.

- (3.5) *Kanojo-wa moo kekkon shi-ta (no) daroo.*
 she-TOP already marry-PST no daroo
 ‘‘She is married already I guess.’’

Unlike plain assertions, there is a clear contrast between plain *daroo*-assertions and such with *no*, as in (3.5). This is because lowering of the quality-threshold results in the preparatory evidence condition to be weakened to a point at which (plain) *daroo*-assertions disallow perceptual evidence that would support the inference that the prejacent holds. When *no* is added, *daroo*-assertions become felicitous in such utterance situations. In the analysis proposed here, this is straightforwardly explained as addition of a mutually accessible evidence condition. Thus, the bias of the speaker towards the prejacent is rooted in external evidence rather than a ‘‘mere hunch’’, *i.e.* private evidence or grounds for the belief that the prejacent is true.

The effect of adding *no* to rising declaratives is similar, conveying that speaker bias is based in mutually accessible evidence. Rising declaratives with *daroo*, in the reduced form *desho*, are highly productive, which is predictable when assuming that assumptions about addressee beliefs are preferably presented as tendencies rather than convictions. In cases where the addition of

³The RD requires such evidence in the first place, and the addition of *no* merely makes it necessary that this evidence be mutually accessible.

daroo is in this sense a strategy to soften the communicative effect of the utterance, the addition of *no* can serve to strengthen the utterance by presenting the second-order assumption it as supported by mutually accessible evidence.

Finally, the addition of *no* to falling *daroo*-interrogatives has a different communicative effect than in plain falling declaratives. This is because *daroo*-ka interrogatives convey that the speaker is agnostic towards the prejacent, biased towards the negation, or committed to the negation, but excludes that the speaker is biased towards the prejacent, as shown above. When *no* is added, this conveys that the speaker is not even biased towards the prejacent while there is mutually accessible evidence supporting its truth. This amounts to a doubt reading under evidence rather than an incredulity reading.

3.2 The dynamic framework

This section introduces a model of utterances as context-change potentials (CCPs, *cf.* Heim 1983 for the original proposal aimed at solving problems of presupposition projection), defined as sets of pairs of input- and output contexts, contexts being defined as sets of propositions including belief and evidence conditions. The context pairs contained in a CCP representing a given utterance type need to satisfy constraints specific this utterance type in the form of conditions on admissible input and output contexts. Within this model, preparatory belief and evidence conditions of utterances as defined in the previous chapter are implemented as conditions on input contexts, commitments and forgone commitments as conditions on output contexts. In addition to this, extralinguistic context sets representing perceptual (“contextual”) evidence and salient prejacent polarity are defined in order to capture the interaction of utterance felicity and the utterance situation as matching of properties of the extralinguistic context with the conditions imposed on contexts by the utterance.

Some communicative effects of utterances on the discourse which go beyond utterance felicity cannot be directly captured in this model, such as

the ways in which (forgone) commitment constrains future discourse moves (see Krifka (2015, 2017) for a recent proposal where discourse structures are represented in the form of a commitment space, representing the participants' commitments, possible future continuations of which different utterance types constrain in different ways). For instance, the information-seeking property of some questions have cannot be directly reflected, but the commitments that rising interrogatives forgo provide hints as to which commitments of the addressee the utterance invites, and whether such commitments are invited at all. In this way, the present proposal aims at predicting which utterance types can be used for a given communicative intention in a given utterance situation based on utterance felicity conditions and their interfaces, but not at predicting the full communicative effect of a given utterance or at exhaustively accounting for how exactly the communicative effect comes about. Summing up, the overall goal of the CCP-framework to be introduced in the remainder of this section, together with enrichment by Q-implicatures added in the following section, is thus to predict which communicative intentions can be realized, or are compatible, with which type of (modified) utterance in which utterance situation.

3.2.1 The CCP-model

The CCP-model I introduce in this chapter is based on that developed for the analysis of rising declaratives in Gunlogson (2003) and the modification by Davis (2011) in his application of Gunlogson's model to Japanese. Gunlogson analyzes utterances as context change potentials (CCPs), which map input contexts to output contexts. Davis implements CCPs as sets of ordered pairs of input and output contexts. For both authors, contexts are defined in terms of participant-specific commitment sets, which contain the commitments of each participant. Commitments, in turn, are defined as sets of worlds in which the respective participants public beliefs hold, which is equivalent to sets of propositions believed by the respective participant. Below, I give an overview of relevant of Gunlogson's and Davis's models relevant to the present analysis, then proceeding to introduce the CCP-model used for the

analysis here as a variation of these extant frameworks.

Extant CCP-frameworks In the previously mentioned implementations of a CCP-model of utterances, contexts on which CCPs operate have been defined as follows. Gunlogson (2003, 42) defines contexts in terms of participant-specific commitment sets, *i.e.* the “set of worlds of which that individual’s public beliefs are true”, which is equivalent to the set of propositions representing the public beliefs of the participants. The definition I give is wider, in that CCPs add public beliefs to contexts, but impose conditions on private beliefs as well, which is crucial to account for utterance felicity in terms of belief and evidence conditions. Davis (2011, 44pp) reformulates Gunlogson’s proposal as “relational CCPs”, modeling them as sets of ordered pairs of input and output contexts, which in turn consist of the participants’ commitment sets. Relational CCPs are non-deterministic, but restricted by restrictions on the output context Davis labels “postsuppositions” (*ibid*, 48) in addition to restrictions on the input context, or presuppositions. I adopt Davis’s model of CCPs, with the aforementioned modification that I take CCPs to operate on private as well as public belief propositions, and the additional modification of formulating output conditions in terms of (deterministic) additions to input contexts. This is to reflect utterance preparatory belief and evidence conditions as input conditions, and commitments as the effect that the CCP has on the context. I furthermore model contexts as sets of propositions rather than sets of the worlds as in the extant proposals in order to straightforwardly integrate the utterance felicity conditions postulated as propositions the previous chapter into the CCP-model. While I propose a wider definition of context, where each context is a set of propositions not restricted to such believed by the participants, the part of the context that a CCP operates on is restricted by formulating conditions on contexts only in terms of belief propositions.

The CCP-model of utterances

The basic definition of a CCP is given in (3.6) below. The components of the notation are defined in the remainder of this section.

(3.6) **Basic model of utterance as CCP:**

$$\llbracket \mathcal{U}(\varphi) \rrbracket = \{ \langle c, c' \rangle \mid \mathcal{B}^{\mathcal{U}} \subseteq c \wedge \mathcal{E}^{\mathcal{U}} \subseteq c \wedge c' = c \cup \mathcal{P}\mathcal{B}^{\mathcal{U}} \}$$

On this definition, an utterance $\mathcal{U}$ with the prejacent φ is defined as a set of ordered sets of input contexts c and output contexts c' . Contexts are defined as sets of propositions essentially corresponding to possible worlds, which include all propositions including those representing the participants' beliefs, in contrast to extant definitions of participant-specific contexts in form of commitment sets. In order to make this departure transparent, I start from a participant-specific definition of context sets below.

Utterance felicity Utterance preparatory conditions as modified by the particle *no*, which are the empirical focus of this thesis, are formulated in terms of belief propositions in the CCP-model (this also goes for evidence conditions as discussed below). In order to model these felicity conditions, CCPs impose conditions on belief propositions included in the utterance context, making an alternative definition of contexts in terms of belief propositions without first-order propositions possible. On this view, each context represents a constellation of possible doxastic states compatible with the requirements of the CCP.

On my view, contexts do not represent mutually accepted propositions (or the worlds making them true), but each context is associated with a possible world — as each input context c is a set of propositions (equivalent to the set of worlds making them true), then there is exactly one possible world for each context at which the propositions in c and only the propositions in c are true. All input contexts in a given CCP must satisfy its preparatory belief and evidence conditions, and thus represent worlds at which the utterance type the CCP denotes is felicitous.⁴ This view on utterance felicity is represented in (3.7), where the sets $\mathcal{B}^{\mathcal{U}}$ and $\mathcal{E}^{\mathcal{U}}$ respectively contain belief and evidence propositions that the input context needs to satisfy, *i.e.* that are part of each

⁴This holds, in principle, for belief propositions as well as non-belief propositions, the latter of which I am not interested in as there are no relevant conditions to influence utterance felicity in the cases discussed here, and discussions of the nature of presupposition in this context would take us too far afield.

input context c in the CCP and have to be true at the utterance world for the utterance to be felicitous. c^w , as will be defined further below, is the set of all true propositions at w .

(3.7) **Utterance felicity by conditions on input context:**

$\mathcal{U}(\varphi)$ is performed felicitously at w iff:

- a. $\mathcal{B}^{\mathcal{U}} \subseteq \{\varphi \mid V(\varphi, w) = 1\} \wedge \mathcal{E}^{\mathcal{U}} \subseteq \{\varphi \mid V(\varphi, w) = 1\}$
- b. $\varphi \in \mathcal{B}^{\mathcal{U}} \rightarrow \varphi \in c^w \wedge \varphi \in \mathcal{E}^{\mathcal{U}} \rightarrow \varphi \in c^w$

Note that there is no inherent restriction on what kinds of propositions can be contained in the sets $\mathcal{B}^{\mathcal{U}}$ and $\mathcal{E}^{\mathcal{U}}$. As they contain the belief and evidence conditions defined in the previous chapter, however, they only contain belief and evidence conditions to be satisfied in the input context, but no bare prejacent propositions.

Input contexts, output contexts When these conditions are satisfied, the CCP makes the most parsimonious change to the input context possible: it adds the (forgone) commitments of the utterance, in form of public belief propositions to be defined below, to the input context set, as modeled by the condition $c' = \mathcal{PB}^{\mathcal{U}} \cap c$ in (3.6), rather than a conceivable filter-condition as on output contexts $c' = \mathcal{PB}^{\mathcal{U}} \subseteq c$ (*i.e.* a non-deterministic postsupposition).

There is thus a crucial difference between preparatory belief and evidence conditions, which are conditions on input contexts, on the one hand, and (forgone) commitments, which are conditions on the output context, on the other. Preparatory belief and evidence conditions on input contexts function as filters, *i.e.* context change will be unsuccessful and the utterance infelicitous if the context set at the utterance world is such that it does not contain the required belief or evidence propositions, and thus the CCP provides no suitable pair of input and output contexts. Belief conditions on output contexts, or commitments and forgone commitments, are an effect of context change brought about by the utterance. While they also potentially influence utterance felicity for instance in cases where the addressee does not adapt the higher-order beliefs the CCP is supposed to add to the output context, I will not have much to say about this case, focusing on cooperative

discourse.

Carry-over of preparatory conditions There is a way in which preparatory belief and evidence conditions influence the output context: under the assumption that preparatory conditions are satisfied, the conditions on the input context are carried over to the output context as *secondary commitments*, or higher-order public beliefs (to be defined below) of the addressee. When a speaker, for instance, utters an interrogative with the prejacent φ , the addressee must assume that the preparatory belief condition $\neg B_S \varphi$ is satisfied if the speaker is thought to be cooperative, giving rise to a secondary commitment $B_A \neg B_S \varphi$.⁵ Note that secondary commitments are weaker than primary commitments arising from the speech act itself: they can, for instance, not give rise to Q-implicatures.

To sum up, the felicity of the utterance depends on whether or not the participants' doxastic states at the utterance world are compatible with utterance-specific requirements on the input context, that is, whether or not the CCP contains an input context matching the context set representing the utterance world. These restrictions on input contexts, and what the CCP does to the context when these requirements are fulfilled, is what the current framework aims to capture.

A participant-specific CCP-model

Before moving on to define contexts encompassing the beliefs of all participants, I provide an alternative, participant-specific definition of context sets as sets of propositions characterizing the beliefs of and the evidence available to *a given participant* at a given world, in order to connect the present proposal to its aforementioned predecessors Gunlogson (2003) and Davis (2011). In order to integrate evidence into the commitment set and make the connec-

⁵This follows directly from an assumption of speaker cooperativeness and preparatory conditions being defined in terms of speaker belief. When a cooperative speaker makes an utterance being aware of its felicity conditions, these conditions must be satisfied from the perspective of the speaker. That is, the speaker must believe that the preparatory belief and evidence conditions hold, which by epistemic privilege means that the speaker actually entertains the required beliefs and has access to the required evidence.

tion between belief and evidence more explicit, evidence propositions will be defined as parallel to belief conditions below (this is also necessary for the non participant-specific, final version of the model). In the participant-specific version of the model, the conditions on input and output contexts represented in (3.6) as $\mathcal{B}^{\mathcal{U}}$, $\mathcal{E}^{\mathcal{U}}$, and $\mathcal{PB}^{\mathcal{U}}$, are also participant-specific, *i.e.* there are three sets $\mathcal{B}_x^{\mathcal{U}}$, $\mathcal{E}_x^{\mathcal{U}}$, and $\mathcal{PB}_x^{\mathcal{U}}$ for each participant x and each utterance $\mathcal{U}$.

The participant-specific version of the CCP-model introduced in (3.6) is shown in (3.8) below, where $\mathcal{U}(\varphi, x)$ represents the CCP for an utterance with the prejacent φ with regard to the context set of participant x .

(3.8) Participant-specific model of utterance as CCP:

$$\llbracket \mathcal{U}(\varphi, x) \rrbracket = \{ \langle c_x, c'_x \rangle \mid \mathcal{B}_x^{\mathcal{U}} \subseteq c_x \wedge \mathcal{E}_x^{\mathcal{U}} \subseteq c_x \wedge c'_x = c_x \cup \mathcal{PB}_x^{\mathcal{U}} \}$$

This version of utterance meaning represents the effect that an utterance potentially has on the context set representing the beliefs of and evidence available to an individual participant x .⁶

The three sets characterizing the preparatory belief and evidence conditions, and (forgone) commitments of an utterance can be defined participant-specifically as shown below, introducing notations $B_x^c\varphi$, $EV_x^c\varphi$ and $PB_x^{c'}\varphi$ for belief conditions, evidence conditions, and commitments which will be used in the non participant-specific model as well.

(3.9) Participant-specific utterance felicity conditions on CCPs:

- a. $\mathcal{B}_x^{\mathcal{U}} = \{ \varphi \mid PB_x^c\varphi \}$ belief conditions for x of $\mathcal{U}$
- b. $\mathcal{E}_x^{\mathcal{U}} = \{ \varphi \mid EV_x^c\varphi \}$ evidence conditions for x of $\mathcal{U}$
- c. $\mathcal{PB}_x^{\mathcal{U}} = \{ \varphi \mid PB_x^{c'}\varphi \}$ commitments of x from $\mathcal{U}$

The desired effect of constraining participant-specific input and output contexts to supersets of (3.9) a. through c. as defined in (3.8) is for the CCP only to contain context pairs which are compatible with the participant-specific

⁶As the felicity conditions of utterances defined in the previous chapter only differentiate between speaker and addressee, the maximally necessary number of such participant-specific context sets and thus versions of any given utterance type is two. Furthermore, as input conditions are all speaker-specific, and output conditions can be expressed by belief propositions added as common beliefs, one speaker-specific version suffices to model the felicity of an utterance at a given world, while commitments can be modeled by addition of a belief proposition to both participant-specific contexts.

belief and evidence conditions and contain the participant-specific commitments associated with the utterance type of $\mathcal{U}$.

Defining context sets

Participant-specific context sets are defined below as all propositions believed by a given participant. In order to integrate evidence into such sets, evidence propositions as paraphrased in (2.34), section 2.2.1 are redefined as parallel to belief conditions.

Evidence propositions as belief propositions For the purposes of this thesis, it suffices to characterize conditions on contexts in terms of the belief propositions without making reference to the truth of their prejacent propositions, as I defend that for utterance felicity, only beliefs matter, but not whether or not they actually hold. The simplest way to include evidence propositions is thus to frame them as belief propositions. This can be easily achieved by assuming that the evidence propositions introduced as paraphrases in (2.34) are positively introspective. The crucial property of evidence propositions that makes this possible is that they are relative to an agent — (3.10) defines positive introspection for evidence based on this.

(3.10) **Positive introspection for evidence:**

$$EV_x\varphi \rightarrow B_xEV_x\varphi$$

Positive introspection for evidence in place, a belief proposition $EV_x\varphi$ indicates that in all worlds compatible with x 's beliefs, there is evidence available to x sufficient to back up a doxastic state committed to φ . backing up doxastic state committed to φ available to the agent. I further assume epistemic privilege for evidence, in parallel to epistemic privilege for belief states, that is $B_xEV_x\varphi \rightarrow EV_x\varphi$ in parallel to $B_xB_x\varphi \rightarrow B_x\varphi$. This means that in terms of the preparatory conditions of utterances, not only beliefs over own beliefs, but also beliefs over evidence available to oneself are realistic, reflecting that an agent is the best judge of not only her own beliefs, but also the avail-

ability of evidence to herself.⁷ As with belief propositions, a belief of one agent over another agent's evidence proposition cannot be reduced in this way, *i.e.* $B_y EV_x \varphi$ cannot be further reduced.

For second-order belief propositions over evidence propositions (that is, belief of one agent over the availability of evidence to another agent) as shown in (3.11), positive introspection also holds on the first-order level.

(3.11) **Positive introspection for evidence (second-order):**

$$B_y EV_x \varphi \rightarrow B_y B_x EV_x \varphi$$

$B_y EV_x \varphi$ indicates that the doxastic state of agent y is such that in all worlds compatible with y 's beliefs, the beliefs of agent x are such that there is evidence supporting φ , that is there is evidence available to x allowing for assertion of φ or at least backing up a doxastic state committed to φ .

Participant-specific context sets With the definition of evidence propositions in place, the definition of context sets relative to worlds and participants is shown in (3.12), where x is a discourse participant, and w a possible world.

(3.12) **Definition of participant-specific context sets:**

$$c(x, w) = \{\varphi \mid V(B_x \varphi, w) = 1\}$$

This defines the context set c relative to a discourse participant x and a world w as all propositions which x believes to be true at w . According to the definition of the extension of a belief state repeated in (3.13) from (2.12), this is equivalent to all propositions φ the extension W^φ of which includes the doxastic state of x , as defined in (3.14).⁸

⁷There are some potentially unsettling questions with regard to epistemic privilege over evidence, as it seems much more obvious that an agent would be the best judge of her own beliefs than of the evidence available to her, in the light of judgments with regard to the quality, or sufficiency, of this evidence. However, recall that I have defined evidence as a motivation for speaker belief sufficient for assertion, so that for positive introspection to be valid it is only necessary for the speaker to be the best judge of whether they have *grounds to believe* a proposition to the point of asserting it.

⁸Note that this can equivalently be defined as the intersection of the extensions of all propositions in c_w^x , that is the set of worlds at which all propositions that x believes to be true are true, which is a view parallel to those of Gunlogson (2003) and Davis (2011).

(3.13) **Extensions of belief propositions**

$$\llbracket B_x \varphi \rrbracket = \{w \mid \text{DOX}_x^w \subseteq W^\varphi\}$$

(3.14) **Definition of context sets in terms of doxastic states:**

$$c_x^w = \{\varphi \mid \text{DOX}_x^w \subseteq W^\varphi\}$$

In this definition and henceforth, I write c_x^w for the context set specific to x at w , *i.e.* for all propositions believed by x at w . As for the input contexts written as c_x in (3.8), input contexts included in the pairs $\langle c_x, c'_x \rangle$ represent all sets c_x^w at worlds w where the conditions on x 's doxastic state (preparatory belief and evidence conditions in $\mathcal{B}^u$ and $\mathcal{E}^u$) are satisfied. The set of admissible input contexts, written as $\mathcal{C}_x$, is defined accordingly below.

(3.15) **Set of admissible input contexts:**

$$\mathcal{C}_x = \{c_x^w \mid B_x^c \varphi \rightarrow \varphi \in c_x^w \wedge EV_x^c \varphi \rightarrow EV_x \varphi \in c_x^w\}$$

Note that the set of admissible input contexts is thus defined by all belief conditions $B_x^c \varphi$, and all evidence conditions $EV_x^c \varphi$. This is the place where the felicity conditions of utterance types from the previous chapter are implemented. To conclude the discussion of the participant-independent variant of the CCP-framework, a reverse definition of preparatory belief and evidence conditions in the notation used in (3.15) is given below.

(3.16) **Belief and evidence conditions, participant-specific:**

- a. $B_x^c \varphi \rightarrow \forall c_x^w \in \langle c_x, c'_x \rangle \in \llbracket \mathcal{U} \rrbracket : \varphi \in c_x^w$
- b. $EV_x^c \varphi \rightarrow \forall c_x^w \in \langle c_x, c'_x \rangle \in \llbracket \mathcal{U} \rrbracket : EV_x \varphi \in c_x^w$

Negative belief conditions are straightforwardly derived from this as shown below.⁹ Note, however, that such conditions cannot be directly reflected in the participant-specific version of CCP-meaning in (3.8), as the context sets as defined above only allow to model conditions that require a participant to believe a proposition to be true, or such that require a participant to believe a proposition to be false.

⁹Recall that, if the considerations in the previous chapter are on the right track, there are no negated preparatory evidence conditions.

(3.17) **Negated belief conditions on input contexts,
participant-specific:**

$$\neg B_x^c \varphi \rightarrow \exists c_x^w \in \langle c_x, c'_x \rangle \in \llbracket \mathcal{U} \rrbracket : \varphi \notin c_x^w$$

In order to implement such negated input conditions, the next step is to develop a non participant-specific version of the CCP-model.

Non participant-specific CCPs

I suggest that it is not necessary to complicate the framework by formulating participant-specific contexts and conditions on contexts, which requires a separate CCP for each participant. Rather, I suggest that contexts should be considered sets of propositions, and that it follows straightforwardly from the conditions that are associated with the CCP of a given utterance which part of the context, in the present case belief propositions, the utterance operates on. To connect such a model with the participant-specific version formulated above, consider first the option of assuming contexts consisting of belief propositions only. Assuming, as it has been assumed in previous proposals, that context sets should be defined so that they represent only those portions of contexts that CCPs operate on, we require contexts that contain information about not only shared (common or public) beliefs, but also private beliefs to reflect utterance preparatory conditions, but do not contain “bare” prejacent propositions. Such a definition could go as follows:

(3.18) **Definition of contexts as sets of belief propositions:**

$$c^w = \{B_x \varphi \mid x \in \mathcal{X} \wedge V(B_x \varphi, w) = 1\}$$

The difference to the participant-specific context sets is that on this definition, not the believed propositions, but the corresponding belief propositions are in the context set, thus preserving information on which participant believes a proposition and making participant-specific sets superfluous. Conditions on such contexts must be formulated in terms of belief propositions, as follows:

(3.19) **Belief and evidence conditions, participant-independent:**

$$a. B_x^c \varphi \rightarrow \forall c^w \in \langle c, c' \rangle \in \llbracket \mathcal{U} \rrbracket : B_x \varphi \in c^w$$

$$\text{b. } EV_x^c \varphi \rightarrow \forall c^w \in \langle c, c' \rangle \in \llbracket \mathcal{U} \rrbracket : B_x EV_x \varphi \in c^w$$

While contexts only allowing belief propositions are intuitively appealing and have the advantage of not requiring separate CCPs for each participant (these become necessary due to the participant-specific restrictions on input contexts), the context definition in (3.18) is clearly *ad hoc*. The participant-independent belief and evidence conditions also work for context representing all kinds of propositions, and the formulation of restrictions on context in terms of belief proposition naturally restricts the part of context sets that CCPs operate on. Thus, it appears that nothing speaks against adopting the widest definition of contexts possible.

The last step towards such a definition is to take belief conditions out of the picture completely, treating contexts as sets of (true) propositions, as announced in the introduction.

(3.20) **Definition of contexts as sets of propositions:**

$$c^w = \{\varphi \mid V(\varphi, w) = 1\}$$

This is precisely the same definition as that of possible worlds given in (2.1), repeated as (3.21) below.

(3.21) **Definition of possible worlds**

$$w = \{\varphi \mid V(\varphi, w) = 1\}$$

Thus, each context corresponds to a possible world, and the set of all permissible input contexts $\mathcal{C}^{\mathcal{U}}$ is equivalent to the intersection of the extension of all preparatory belief and evidence conditions. In other words, the permissible input contexts for an utterance $\mathcal{U}$ are those containing at least the propositions in $\mathcal{B}^{\mathcal{U}}$ and $\mathcal{E}^{\mathcal{U}}$. From the view of worlds as sets of propositions, utterance felicity in terms of preparatory belief and evidence conditions can be defined in two alternative ways shown in (3.22).

(3.22) **Utterance felicity by conditions on input context:**

- a. $\mathcal{U}(\varphi)$ is performed felicitously at w iff $w \in \mathcal{C}^{\mathcal{U}}$
 where $\mathcal{C}^{\mathcal{U}} = \{c^w \mid \mathcal{B}^{\mathcal{U}} \subseteq c^w \wedge \mathcal{E}^{\mathcal{U}} \subseteq c^w\}$
- b. $\mathcal{U}(\varphi)$ is performed felicitously at w iff $\mathcal{B}^{\mathcal{U}} \subseteq w \wedge \mathcal{E}^{\mathcal{U}} \subseteq w$

(3.22a) states that an utterance is performed felicitously if the utterance world w (which is equivalent to the context set c^w on its widest definition) is a member of the set of contexts satisfying the input conditions of the CCP, that is, if there is pair of contexts in the CCP containing an input context identical to the utterance world. This can be simplified further as (3.22b), which states, as in the text above, that an utterance is felicitous at worlds which contain at least the propositions in $\mathcal{B}^u$ and $\mathcal{E}^u$.

What an utterance as represented by a CCP does when used felicitously is to change the input context by adding commitments, forgone commitments, and secondary commitments. That is, the CCP assigns a unique output context to any admissible input context representing the world at utterance time.

Commitment and the context set In order to make transparent what commitment means in terms of belief propositions, *i.e.* to model the changes to the context set brought about by successful context change, commitments are implemented in the CCP-model as *public beliefs*. This notion is meant to capture both primary commitments, which arise by virtue of the utterance being made, and secondary commitments as addressee assumptions on speaker beliefs and evidence available to the speaker originating in carried-over preparatory conditions. In the following sections, commitment and forgone commitment are defined in terms of *common belief*, followed by the definition of public belief as mutually accessible common belief, and the introduction of extralinguistic context to the model.

3.2.2 Commitment as common belief

This section defines commitment arising from declaratives and secondary commitment from carried-over preparatory conditions in terms of public belief, the next section forgone commitment in terms of negated public belief. Thereby, all types of commitment are implemented in the CCP-model in the form of public belief defined as mutually introspective common belief.

Common belief

In the following discussion, I return to the simplified model where there are two agents or participants S (peaker) and A (addressee). Belief and evidence conditions as well as (forgone) commitments are thus defined as belief propositions representing the beliefs of S and A , the evidence available to S and A , respectively.¹⁰ The symbol $\mathcal{X}$ will be used to represent the set of all discourse participants, *i.e.* $\mathcal{X} = \{S, A\}$. Common belief is defined as a belief which all participants share as in (3.23).

(3.23) Common belief:

φ is a common belief of S and A at w
iff $B_S\varphi$ and $B_A\varphi$ are supported at w .

Since a proposition that is a common belief can itself be a belief proposition, common beliefs can also be of (any) higher order, as shown in (3.24), where the first-order agent is the speaker S , anticipating the analysis of commitment by assertion as public, *i.e.* mutually introspective common belief.

(3.24) Higher-order common belief:

$B_S\varphi$ is a common belief of S and A at w
iff $B_SB_S\varphi$ and $B_AB_S\varphi$ are supported at w .

Assuming epistemic privilege, $B_SB_S\varphi$ can be reduced to $B_S\varphi$, so that when $B_S\varphi$ is a common belief of S and A , the context set contains the belief propositions $B_S\varphi$ and $B_AB_S\varphi$. When defining speaker commitment from assertion in terms of common belief, assuming (3.24) as a condition on the output context would therefore mean that asserting φ gives rise to a speaker belief that φ be true. Below, I defend that this is too strong a condition for commitment.

Common belief from commitment

The weaker condition from commitment is that defined in (3.25) below, where “becomes a common belief” indicates that the common belief is a condition

¹⁰The model can be expanded to a greater number of participants by assuming A to represent all participants but S , or up to arbitrary complexity, if there are speech-acts which differentiate multiple speaker(s), addressee(s), or other participants.

on the output context.

(3.25) **Common belief from commitment:**

When S commits to $B_S\varphi$, $B_AB_S\varphi$ becomes a common belief.

This means that when a speaker S commits to a belief $B_S\varphi$, then $B_AB_S\varphi$ and $B_SB_AB_S\varphi$ need to be supported in the output context, but there is no requirement that there be a first-order speaker belief $B_S\varphi$, in contrast to the stronger condition above.

What speaks for the weaker condition is that assertions can be used deceptively: assuming that the speaker actually believes φ to be false, the utterance is infelicitous as the preparatory belief condition is not satisfied — in fact, the speaker is lying. However, the utterance does not fail to commit the speaker to φ in the eyes of the addressee, who is (if the speaker is lying successfully) not aware that the preparatory condition is not satisfied. As such utterances clearly exist, we do not want assertions to add a belief of the speaker that φ holds to the output context, as this is not a mandatory effect of assertions — a speaker can assert a prejacent without believing it, which is potentially infelicitous as it means that the preparatory belief and evidence conditions are likely not satisfied, but still makes the addressee believe that the speaker believes the prejacent to be true, as long as the addressee assumes that the speaker is cooperative.

This also follows from the interpretive evidence rule which derives the belief $B_AB_S\varphi$ — if the addressee assumes that the speaker is cooperative, this allows for the conjecture that $B_S\varphi$ *from the addressee's perspective*, which directly gives rise to the belief state $B_AB_S\varphi$, but not necessarily $B_S\varphi$ (not in the deceptive case mentioned above).

Committing the addressee

The weaker version of common belief from commitment is also compatible with rising declaratives, where the speaker tentatively ascribes a belief to the addressee by committing to a higher-order belief over an addressee belief. There are, again two options for implementing addressee commitment from the speaker's perspective, as shown below.

(3.26) **Common belief from second-order commitment:**

When S commits to $B_A\varphi, \dots$

- a. $\dots B_S B_A\varphi$ becomes a common belief. (Option 1)
- b. $\dots B_A B_S B_A\varphi$ becomes a common belief. (Option 2)

Note that there is no option where $B_A\varphi$ becomes a common belief. This is to reflect that commitment needs to be anchored in a belief state of the originator of the speech act, that is, the speaker can only indirectly commit the addressee to a belief. The difference between the two options is that after speaker commitment over an addressee belief, $B_S B_A\varphi$ is part of the context set when adopting Option 1, but not when adopting Option 2.

Option 2 is preferable both in terms of consistency with the definition of speaker commitment to $B_S\varphi$ in (3.25) if following the argument that commitments are best represented in the form of addressee belief over speaker belief, reflecting reasoning over speaker beliefs on part of the addressee parallel to the interpretive evidence rule. From the preparatory evidence condition $EV_S B_A\varphi$ and the preparatory belief condition $B_S \neg B_A \neg \varphi$ of rising declaratives, the addressee can conclude that $B_S B_A\varphi$, which results in a belief state $B_A B_S B_A\varphi$. Also in parallel to the falling declarative, the rising declarative is thus sincere if the speaker actually believes that the addressee believes φ to be true, *i.e.* $B_S B_A\varphi$ is in the input context set. The deceptive use of a rising interrogative would accordingly mean the speaker is *pretending to assume* that the addressee believe φ .

3.2.3 Forgone commitment

Forgone commitment is defined in this section in terms of negated common belief. It should be noted here that forgone commitment from interrogative speech acts can also be explained as a Q-implicature which arises due to the choice of alternative utterance by negation of the forgone alternatives. This is demonstrated in section 3.3, where the conditions interrogatives impose on the output context are shown to be the Q-implicatures introduced as forgone commitments in the previous chapter, which are additionally strengthened by carried-over preparatory belief conditions. Forgone commitment can be

distinguished from those Q-implicatures which arise from interaction with the extralinguistic context (see section 3.2.4), and from those Q-implicatures which arise from forgone alternatives which contain different utterance modifiers than the chosen alternative. It differs from Q-implicatures arising from forgone alternatives with different illocutionary force, only in that it presumably arises obligatorily, but Q-implicatures can be blocked. The remainder of this section defines forgone commitment within the dynamic framework.

Negation of speaker commitment in terms of common belief

Forgone commitment from falling interrogative utterances has been defined as $B_S \neg B_S \varphi$, which is equivalent to $\neg B_S \varphi$ by epistemic privilege. There are at least the three options shown in (3.27) below for implementing forgone commitment in terms of common belief.

(3.27) Negation of common belief from forgone commitment:

S forgoes commitment to $B_S \varphi$ when...

- a. $B_A B_S \varphi$ does not become a common belief. (Option 1)
- b. $\neg B_A B_S \varphi$ becomes a common belief. (Option 2)
- c. $B_A \neg B_S \varphi$ becomes a common belief. (Option 3)

In terms of conditions on the output context within a CCP-framework of utterance meaning, the first option shown in (3.27a) essentially means that nothing happens, *i.e.* no context change takes part. At first sight, there is nothing wrong with this, as, after all, no commitment is made, thus the context set conceivably does not change with regard to speaker beliefs. However, the fact that the speaker chooses the non-committing alternative over the committing one should be somehow reflected in the context update, as otherwise the utterance remains without trace in the context set.

The effect that forgone commitment minimally needs to have in order for the utterance to be registered in this way is $\neg B_A B_S \varphi$, the option shown in (3.27b). According to this option, the addressee *cannot be certain* that the speaker is in a doxastic state committed to φ when the speaker chooses an utterance over an alternative what would lead to speaker commitment to φ , while the stronger version $B_A \neg B_S \varphi$ in (3.27c) *excludes*, from the addressee's

perspective, that the speaker is in a doxastic state committed to φ — when the speaker forgoes commitment to φ , this should intuitively be the case, as otherwise the speaker could have asserted φ .

However, if the preparatory condition $\neg B_S\varphi$ for interrogatives is satisfied and the addressee assumes that the speaker is cooperative, *i.e.* that the utterance is felicitous, then $B_A\neg B_S\varphi$ arises as a secondary commitment or carried-over preparatory condition. Thus, it does not necessarily need to be introduced to the output context set by forgone commitment. What speaks for independence in the contributions of carried over preparatory conditions and forgone commitment in the output context is that it makes the right predictions in cases such as falling interrogatives with *daroo*, where the lowering of the quality threshold is effective for forgone commitment (in the weaker version), but not for the carried over preparatory belief condition. Another possible complication for the stronger (3.27c) is that it requires the assumption that the addressee is competent with regard to the speaker's doxastic state (*n.b.* that this does not mean that the speaker needs to be competent with regard to the prejacent proposition), which is at least not obviously the case.

Excursus: forgoing alternatives and the epistemic step

There is an alternative perspective on forgone commitments as a Q-implicature in terms of addressee reasoning on the speaker's beliefs, which for Geurts (2010) is at the core of the phenomenon, where pragmatic strengthening (in the form of an epistemic step) leads to the assumption of Option 2 above from the perspective of the addressee.

Assertions give rise to speaker commitment, *i.e.* impose conditions on the public beliefs of the speaker on the output context within the CCP-model. These restrictions can be interpreted as signals from the speaker to the addressee to make assumptions about speaker beliefs. By choosing an utterance *not* making such a commitment, that is an interrogative, the speaker signals to the addressee not to not make the assumptions about speaker beliefs that the forgone utterance invites, but to make the *complementary assumptions*

on the level of addressee belief. This is basically what Sauerland (2004) calls the *epistemic step* occurring in quantity implicatures, which is a label for the addressee assumption that the speaker, by forgoing a (for instance scalar) alternative, is not merely ignorant with regard to this alternative, but believes that the alternative does *not* hold. The prime example for this are scalar implicatures, where from an assertion “Some students came”, the addressee can derive the implicature that the speaker not only does not believe that “all students came”, but indeed believes that “not all students came”. I suggest that such reasoning can occur not only on the level of the prejacent proposition, but also on the level of public commitments.

In terms of forgone commitment, the reasoning goes as illustrate in (3.28) below.

(3.28) **The epistemic step in Q-implicatures:**

- a. Forgone alternative: $(B_A)B_SB_AB_S\varphi$
- b. Weak implicature: $(B_A)\neg B_SB_AB_S\varphi$
- c. Epistemic step: $(B_A)B_S\neg B_AB_S\varphi$

When the speaker utters an interrogative with the prejacent φ , the speaker forgoes asserting φ and thus public commitment to a belief $B_S\varphi$. This is shown in (3.28a), representing addressee assumptions about speaker beliefs arising from assertion of φ : when the speaker publicly commits to φ , the resulting speaker belief w.r.t. public commitments is $B_SB_AB_S\varphi$,¹¹ *i.e.* the speaker regards herself committed to φ before the addressee. If the speaker forgoes such commitment by making an interrogative utterance, then, the minimal assumption w.r.t. public commitments is that the speaker does not regard herself committed to φ in the same way, as represented in (3.28b). Under the assumption that the speaker is competent with regard to the effect that her utterance has on public commitment, this can be strengthened to (3.28c), which states that forgone assertion allows for the conjecture that the speaker assumes *not to be publicly committed* to φ , rather than *not assuming* to be publicly committed to φ .

¹¹ Assuming that utterances change the context w.r.t. *public* commitments only, adding $B_S\varphi$, a private belief, is not possible, thus the strongest possible speaker belief that can be added is $B_SB_AB_S\varphi$.

Forgone higher-order commitment

Forgone commitment from rising interrogative utterances, or questions, that is forgone higher-order commitment, has been defined as $\neg B_S B_A \varphi$. Before implementing this in terms of common belief, recall the two options for commitment to addressee belief in (3.26), repeated below as (3.29).

(3.29) Common belief from second-order commitment:

When S commits to $B_A \varphi, \dots$

- a. $\dots B_S B_A \varphi$ becomes a common belief. (Option 1)
- b. $\dots B_A B_S B_A \varphi$ becomes a common belief. (Option 2)

The arguments in favor of Option 2 were consistency with the derivation of speaker commitment arising from assertions as addressee over speaker belief, and the related point that $B_A B_S B_A \varphi$ follows from the interpretive evidence rule, *i.e.* addressee reasoning over speaker beliefs, as well as the possibility of deceptive utterances, which makes $B_S B_A \varphi$ a sincerity condition which, however, does not need to be fulfilled for the utterance to have its effect in terms of addressee beliefs.

Furthermore, regarding derivation of output conditions from forgoing speaker commitment, I have argued that negation in a common belief condition on the output context should scope over addressee belief, that is $\neg B_A B_S \varphi$ is a sufficiently strong output context condition for falling interrogatives, carrying over of the preparatory condition $\neg B_S \varphi$ as a secondary commitment strengthening the output conditions and thus commitment.

This is the background on which to consider the two options for forgone second-order commitment arising from questions as shown in (3.30) below, the last of the output conditions associated with the four utterance types.

(3.30) Common belief from forgone second-order commitment:

When S forgoes commitment to $B_A \varphi, \dots$

- a. $\dots \neg B_S B_A \varphi$ becomes a common belief. (Option 1)
- b. $\dots \neg B_A B_S B_A \varphi$ becomes a common belief. (Option 2)

We can observe that the weaker Option 2 for forgone higher-order commitment in (3.30b) is the negation of the weaker Option 2 for higher-order

commitment in (3.29b), which I have argued to adopt, and that in the case of Option 2 here, negation occurs on the level of addressee belief, just as in the weaker Option 2 for forgone commitment in (3.27b), which I have also argued to adopt over both the stronger option and non-commitment. The stronger Option 1 for forgone higher-order commitment in (3.30a), on the other hand, is the negation of the stronger non-negated Option 1 in (3.29a), and involves negation on the level of speaker belief, in parallel to Option 3 for forgone commitment in (3.27c), both of which I have discarded as unnecessarily strong above. Apart from continuity with the choices so far, there is the following argument favoring Option 2 with regard to the felicity conditions of rising interrogatives (questions), which strengthen the argument for the choices made so far.

Rising interrogatives have a special status with regard to forgone commitment. In all other three basic utterance types, the preparatory condition, when carried over, strengthens the weak version of (forgone) commitment — for the falling declarative, this means a condition $\neg B_S\varphi$ together with $EV_S\varphi$ on the output context, for the rising declarative $B_S\neg B_A\neg\varphi$ and $EV_S B_A\varphi$, and for the falling interrogative $\neg B_S\neg\varphi$. As the stronger version of commitment thus arises anyway when the utterance is felicitous, *i.e.* the speaker is not violating Quality, it seems like stronger commitment could be assumed in the first place. The rising interrogative, however, is different, as its preparatory belief condition is the same as that of the falling interrogative. This has been argued for above, the reason for such a stipulation being that (neutral, information-seeking) questions invite commitment of the addressee, but require no assumptions regarding addressee belief on part of the speaker. As no condition $\neg B_S B_A\varphi$, let alone the stronger $B_S\neg B_A\varphi$, hold for the input context of rising declaratives, and in all other basic utterance types it is the carried over preparatory conditions that give rise to the stronger alternatives, Option 2 should be preferred in order to not predict commitment in questions to be stronger than it intuitively is.¹²

¹²This is not to say that a question *cannot* give rise to a public commitment as in Option 1 — in fact, biased questions likely give rise to such commitments. Note that the difference between the two Options can be framed in terms of the epistemic step as mentioned above on yet another level, *i.e.* whether or not the speaker is assumed to be

Summing up, I settle for the weaker of the conceivable alternatives which still leave a trace in the context set for defining output conditions reflecting (forgone) commitment in terms of common belief. These output conditions are strengthened by carried-over preparatory conditions in all but the case of questions (rising interrogatives). The full summary of (forgone) commitments from the basic utterance types is provided after the introduction of public belief below.

Mutual introspection and public belief

When a common belief arises from commitment originating in a speech act, and thus from observable linguistic behavior, this means that all discourse participants are aware of this belief. While chances are slim that common belief as defined above is coincidentally supported by the participants' doxastic states, but there is no mutual awareness of this, it is a possibility that should be ruled out so as to approximate the framework to a realistic reflection of discourse and its effects on the participants' beliefs (and their higher-order beliefs over each other's beliefs). In order to thus exclude the case of coincidental common belief, I introduce the notion of *public belief*, written as *PB*. Essentially, public beliefs are those common beliefs which arise from the performance of a speech act as commitments, forgone commitments, or secondary (carried-over) commitments. The source of these common beliefs thus being public, they are *mutually introspective*, *i.e.* there is a potentially infinite number of higher-order belief states over the original common belief. This is reflected in the definitions of public belief below, for a simplified model with two participants represented by x and y .

(3.31) Public belief as common belief:

$PB_x\varphi$ is supported at w iff $B_yB_x\varphi$ is a common belief of x and y at w .

(3.32) Mutual introspection:

$PB_x\varphi \rightarrow PB_yB_x\varphi$

(If φ is a public belief of x , then $B_x\varphi$ is a public belief of y .)

competent w.r.t. *first-order* addressee beliefs.

When mutual introspection is thus applied recursively on a common belief, that is the rule in (3.32) is reapplied to the public belief resulting from its previous application, an additional public belief $PB_x B_y B_x$ is generated, and so on *ad infinitum*. While an infinite number of belief states is not plausible considering resource-boundedness of doxastic agents,¹³ public belief as mutually introspective common belief ensures that incidental common belief is differentiated from public belief by commitment. To sum up, paraphrases for positive and negative public belief is given in (3.33).

(3.33) **Public belief paraphrases:**

- a. $PB_S \varphi$ is supported at w
iff $B_A B_S \varphi$ is a mutually introspective common belief.
- b. $\neg PB_S \varphi$ is supported at w
iff $\neg B_A B_S \varphi$ is a mutually introspective common belief.

Commitment as public belief I have proposed common belief conditions on the output context for (forgone) commitment as summarized in (3.34) for the four utterance types, along with the public belief notations to be used henceforth.

(3.34) **(Forgone) commitment as common belief, public belief:**

	commitment	common belief	public belief
FD	$B_S \varphi$	$B_A B_S \varphi$	$PB_S \varphi$
RD	$B_S B_A \varphi$	$B_A B_S B_A \varphi$	$PB_S B_A \varphi$
FI	$\neg B_S \varphi$	$\neg B_A B_S \varphi$	$\neg PB_S \varphi$
RI	$\neg B_S B_A \varphi$	$\neg B_A B_S B_A \varphi$	$\neg PB_S B_A \varphi$

Abbreviations of utterance types: **F**alling, **R**ising, **D**eclarative, **I**nterrogative.

As the building block for commitment in the CCP-model, public beliefs in the output context will include not only commitments arising from the speech act proper, but also carried-over preparatory conditions. I will also use the term *public commitment* as an alternative label for all public beliefs that arise

¹³This is a general problem of theories of belief formation, see for instance Fermé and Hansson (2011) for an overview of recent developments towards cognitively realistic AGM-based models of belief states.

from an utterance, including secondary commitments. As a last step towards the CCP-model, contexts sets for the extralinguistic context are defined in the next section.

3.2.4 Extralinguistic context: polarity and evidence

The bias patterns of utterances and some of the implicatures which arise from them need to be analyzed relative to the salient polarity of the prejacent and the (typically perceptual) evidence in the extralinguistic context the speech act is performed in, *i.e.* the part of the context which is not relative to the doxastic states of the participants. As an alternative term for this part of the context I also use utterance situation, in order to avoid confusion with the (linguistic) context set as defined in the previous sections that utterances as context change potentials operate on. Based on the discussion of bias patterns in chapter 2, utterance situations are characterized by the following two properties:

- Which out of the prejacent proposition and its alternatives is most salient (here: which out of the prejacent proposition and its negation).
- Whether or not evidence accessible to both participants supporting the prejacent proposition or an alternative are available (here: perceptual evidence supporting the prejacent proposition or its negation).

In order to capture such properties of the utterance situation, I use extralinguistic context sets defined relative to a proposition φ . The context set $C(\varphi)$ contains the salient proposition out of the alternatives to φ , which in the cases discussed in this thesis means that it contains either φ or $\neg\varphi$ (in the polar questions discussed below, for instance, the truth or falsity of φ is under discussion, but not that of any other propositions). In addition to this, the context set contains any *mutually accessible* evidence supporting either of the alternatives. I write $EV_{\mathcal{X}}$ for evidence that is available to all participants $x \in \mathcal{X}$, so that $EV_{\mathcal{X}}\varphi$ and $EV_{\mathcal{X}}\neg\varphi$ are possible members of the context set. When there is no mutually accessible evidence in the utterance situation, the extralinguistic context set does not contain an evidence proposition. The six

types of extralinguistic context sets and labels for the utterance situations they represent are listed in (3.35) below.

(3.35) **Context sets for types of utterance situations:**

	Polarity and evidence	Label
a.	$C_{\varphi}^0 = \{\varphi\}$	positive-salient, neutral context
b.	$C_{\varphi}^+ = \{\varphi, EV_{\mathcal{X}}\varphi\}$	positive-salient, positive context
c.	$C_{\varphi}^- = \{\varphi, EV_{\mathcal{X}}\neg\varphi\}$	positive-salient, negative context
d.	$C_{\neg\varphi}^0 = \{\neg\varphi\}$	negative-salient, neutral context
e.	$C_{\neg\varphi}^+ = \{\neg\varphi, EV_{\mathcal{X}}\varphi\}$	negative-salient, positive context
f.	$C_{\neg\varphi}^- = \{\neg\varphi, EV_{\mathcal{X}}\neg\varphi\}$	negative-salient, negative context

The notation C_{φ}^- , for instance, indicates a context with evidence for $\neg\varphi$, or against φ , as indicated by the superscript $-$, and out of φ and $\neg\varphi$, φ is the salient polarity of the prejacent. Note that for instance in $C_{\neg\varphi}^-$, the salient polarity is $\neg\varphi$, but evidence for $\neg\varphi$, and against φ , is still indicated by superscript $-$, that is the reference polarity of the context w.r.t. evidence is fixed to the non-negated prejacent proposition, following the labeling customs in previous works on bias patterns of polar questions.

It is important to note that that the extralinguistic context set C has at most two members for each prejacent proposition, one salient proposition and one evidence proposition in the cases discussed here. That is, there is no context set in which both φ and $\neg\varphi$ are salient, and there are no context sets with conflicting evidence. It should also be noted that while the extralinguistic context set influences the choice of utterance by the speaker and the interpretation of that choice by the addressee, and can provide the evidence to satisfy a preparatory evidence condition, it is not what utterances operate on and remains constant while the (linguistic) context set is changed by CCPs (unless, of course, the utterance situation changes for reasons unrelated to the utterances made).

Relative polarity and polarity mismatch

The polarity of evidence and that of the salient alternative are independent, and can be opposed. For instance, contexts in which there is evidence for the

non-salient alternative can initiate belief revision, and motivates choice of the non-salient polarity for the prejacent proposition. As a default, the positive alternative is salient, which explains the perceived markedness of negative polar questions and evidential bias arising from them (when the positive alternative is salient choosing the negative alternative must generally be motivated by evidence for the negated alternative). This type of evidential bias can, however, be neutralized by constructing an utterance situation where the negative alternative is more salient, as discussed with the bias patterns of negative polar questions in section 1.3.1.

One way to think of saliency is taking the salient alternative is the “null-hypothesis” from which to start in a given utterance situation when the truth or falsity of φ is in question, which gives rise to bias from polar questions with *polarity mismatch*, *i.e.* the case when prejacent polarity in the utterance and salient prejacent polarity in the utterance situation are opposed. For instance, I claim in section 3.4.3, p215 that evidential bias from negative polar questions in positive-salient, negative contexts (C_φ^-) can be explained as an effect of salience shifting, that is switching the null-hypothesis the neutral speaker assumes to the negative prejacent in light of the evidence. In order to capture the effects of polarity mismatch in such cases, I define the *relative polarity* of an utterance as in (3.36).

(3.36) Relative utterance polarity:

- The relative polarity of $\mathcal{U}(\varphi)$ where $\varphi \vee \neg\varphi$ is under discussion. . .
- . . . is matching the utterance situation if $\varphi \in C$.
- . . . is reversed w.r.t. the utterance situation if $\neg\varphi \in C$

Polarity mismatch occurs when the polarity of the prejacent proposition is reversed compared to the salient alternative in the utterance situation. As mentioned, this notion is used to explain evidential bias arising from negative polar questions in positive-salient contexts, which predicts the same effect, with reversed prejacent polarity, from positive polar questions in negative-salient contexts.

Public evidence in the utterance situation

From the definitions so far, an important difference between mutually accessible and public evidence follows. Recall that preparatory conditions are carried over to the output context as secondary public commitments. For instance, an assertion of a prejacent φ has the preparatory condition $EV_S^c\varphi$, *i.e.* there is a requirement that the input context contain $B_S EV_S\varphi$. Under an addressee assumption of speaker cooperativity (which in turn the speaker is aware of) the evidence proposition becomes a public belief of the speaker $PB_S' EV_S^c\varphi$, *i.e.* $B_A B_S EV_S\varphi$ is added to the output context set as a common (and public) belief. As mentioned in section 3.2.1, p160, when the agent of a belief over an evidence proposition and that of the evidence proposition are not identical, this means that the agent of the higher-order belief does not have access to the evidence, as shown in (3.37) below.

(3.37) **Belief states over evidence:**

$$B_S EV_S\varphi \rightarrow EV_S\varphi$$

$$B_A EV_S\varphi \text{ cannot be reduced}$$

However, the agent of the higher-order belief is aware of the availability of evidence to the agent of the evidence proposition. In more intuitive terms, when for instance the speaker beliefs to have access to evidence supporting φ , the speaker knows the contents of this evidence. When the speaker makes the availability of evidence public, for instance by assertion of φ , the addressee knows of the existence of evidence accessible to the speaker, but does not (necessarily) know the contents of this evidence. I define this as the difference between *public evidence*, or private evidence made public, and *mutually accessible evidence*, or publicly available evidence, which *no*-utterances require for felicity.

(3.38) **Public evidence:**

If $EV_S\varphi$ is conveyed by an utterance of S , then $B_A EV_S\varphi$ becomes a mutually introspective common belief, *i.e.* $PB_S' EV_S^c\varphi$.

On a side note, mutually accessible evidence in the utterance situation ($EV_{\mathcal{X}}\varphi \in C$) does not necessarily mean that the availability of evidence is a public be-

lief, as public beliefs by definition only come about when an utterance is made. However, it is plausible that $B_A EV_S \varphi$ and $B_S EV_A \varphi$ are common beliefs in such an utterance situation.

3.2.5 Defining context change

This section introduces the CCP-model of utterance meaning is introduce to capture utterance felicity conditions in terms of context change. The term context change is used in a sense limited to instances where an utterance causes the addition of public beliefs to the context set as defined above. Under this understanding of context change, utterances are modeled as context change potentials, which map suitable input contexts to output contexts which contain the public commitments brought about by the utterance. So far, commitment from declarative speech acts, forgone commitment from interrogative speech acts, and carried over preparatory conditions have been identified as ingredients for public commitment. Q-implicatures, which arise in a way similar to forgone commitment, will be added shortly. The basic model of utterances as CCPs is given in (3.39) for the model with two participants S and A .

(3.39) **Basic model of utterance as CCP:**

$$\llbracket \mathcal{U}(\varphi) \rrbracket = \{ \langle c, c' \rangle \mid \mathcal{B}^{\mathcal{U}} \subseteq c \wedge \mathcal{E}^{\mathcal{U}} \subseteq c \wedge c' = c \cup \mathcal{PB}^{\mathcal{U}} \}$$

$\mathcal{U}$ stands for an utterance, c is the input context and c' the output context, $\mathcal{B}^{\mathcal{U}}$ and $\mathcal{E}^{\mathcal{U}}$ are the sets of preparatory belief and evidence conditions determined by the utterance type of $\mathcal{U}$, and $\mathcal{PB}^{\mathcal{U}}$ represents the set of public beliefs arising from the utterance, *i.e.* its public commitments. CCPs operates on context sets defined as sets of propositions, which they require to contain certain belief propositions on the input side, and add certain belief propositions to on the output side, thus only operating on the belief propositions within the context set.

In the CCP-model, preparatory conditions are implemented as conditions on the input context c , public commitments as conditions on the output context c' . The crucial difference I assume between input and output conditions,

as mentioned in section 3.2.1 above, is that the former, but not the latter, can make the utterance infelicitous. As mentioned, this is because the context change potential provides a set of pairs of input and output contexts, but does not include contexts in which the input conditions, *i.e.* the preparatory conditions, are not satisfied. If the addressee is not aware of the violation of input conditions, the output context still comes out as changed. When, on the other hand, an input condition is verifiable by the addressee, such as the marking of mutually accessible evidence with *no*, the addressee can reject context change as infelicitous due to the unavailability of a suitable input context.

Secondary commitment: carried over preparatory conditions The public commitments of a CCP also contain carried over preparatory conditions from the input context under the conditions that The addressee assumes the speaker to be cooperative, *i.e.* assumes that the speaker would not make an utterance the preparatory conditions of which are not satisfied, and that the speaker is aware of this cooperativity assumption. I take these to be fulfilled in all cases discussed here, thus generally assume secondary commitments to arise.

Formally, secondary commitment can be defined as in (3.40), where (a) states that for all utterance types, preparatory belief conditions on speaker belief are carried over as public belief, and (b) states that for all utterance types, preparatory evidence conditions on evidence available to the speaker are carried over as public evidence.

(3.40) **Secondary commitment:**

- a. $B_S\varphi \in \mathcal{B}^u \rightarrow PB_S\varphi \in \mathcal{PB}^u$
- b. $EV_S\varphi \in \mathcal{B}^u \rightarrow PB_SEV_S\varphi \in \mathcal{PB}^u$

With these definitions in place, the CCPs for basic utterance types are defined in the following section.

CCPs of utterance types

CCPs for all unmodified utterance types with their belief and evidence conditions and (forgone) commitments as defined in chapter 2 are provided in this section. A notation for elements in $\mathcal{B}^u$, $\mathcal{E}^u$ and $\mathcal{PB}^u$, *i.e.* for belief and evidence conditions on input contexts, and (forgone) commitments as members of the output context set, will be used as summarized below.

(3.41) $B_x^c\varphi$ stands for a belief condition $B_x\varphi \in \mathcal{B}^u$, *i.e.* $B_x\varphi$ is a condition to be satisfied by the input context c .

(3.42) $EV_x^c\varphi$ stands for an evidence condition $EV_x\varphi \in \mathcal{E}^u$, *i.e.* $B_xEV_x\varphi$ is a condition to be satisfied by the input context c .

(3.43) $PB_x^{c'}\varphi$ stands for a public commitment $PB_x\varphi \in \mathcal{PB}^u$, *i.e.* the CCP, by successful update, adds $PB_x\varphi$ to the output context c' .

A negated condition such as $\neg B_x^c\varphi$ does not indicate that the belief proposition in question is *not* required to be part of the context set, but rather that it is required to *not be part* of the context set, which can be achieved by adding a higher-order belief of the same agent $B_x\neg B_x\varphi$ (which can be derived from $B_x\neg B_x\varphi$ by negative introspection) to the context set, or by the following rule:

(3.44) $\neg B_x^c\varphi$ stands for a belief condition $B_x\varphi \notin \mathcal{B}^u$, *i.e.* the $B_x\varphi$ is a condition that *must not be* satisfied by the input context c .

A negated public commitment such as $\neg PB_x^{c'}\varphi$ for instance has been defined in section 3.2.3 as $\neg B_AB_S\varphi$ becoming a common (and mutually introspective) belief, that is $B_AB_S\neg B_AB_S\varphi$ is added to the context set, which by epistemic privilege is equivalent to $\neg B_AB_S\varphi$.

Using the notation introduced here, the CCPs of the four basic utterance types are defined below.

Declarative CCPs First, the CCP for a bare declarative is shown in (3.46), encoding the preparatory conditions and commitments as repeated in (3.45).

(3.45) **Belief, evidence, and commitment of declaratives:**

	belief	evidence	commitment
a. $\text{DEC}_S(\varphi) \downarrow$	$\neg B_S \neg \varphi$	$EV_S \varphi$	$B_S \varphi$
b. $\text{DEC}_S(\varphi) \uparrow$	$B_S \neg B_A \neg \varphi$	$EV_S B_A \varphi$	$B_S B_A \varphi$

As there are no forgone commitments from declarative CCPs, the result is straightforward. CCPs are shown for the falling declarative in (3.46a), and the rising declarative in (3.46b).

(3.46) **Declarative CCPs:**

- a. $\llbracket \text{DEC}(\varphi) \downarrow \rrbracket = \{ \langle c, c' \rangle \mid \neg B_S^c \neg \varphi \wedge EV_S^c \varphi \wedge PB_S^{c'} \varphi \}$
 b. $\llbracket \text{DEC}(\varphi) \uparrow \rrbracket = \{ \langle c, c' \rangle \mid B_S^c \neg B_A \neg \varphi \wedge EV_S^c B_A \varphi \wedge PB_S^{c'} B_A \varphi \}$

Note that the secondary commitments $PB_S^{c'} EV_S \varphi$ and $PB_S^{c'} \neg B_S \varphi$ are not shown here. This is because secondary commitments that result from carried over preparatory conditions can be derived from the original representation and, in the case of the carried over belief condition, because it would have no strengthening effect as $PB_S \varphi$ entails $PB_S \neg B_S \neg \varphi$. When discussing alternative utterances, secondary commitments will be shown where relevant. A prosodically underspecified CCP of declaratives, in parallel to the prosodically underspecified version of the declarative is shown in (3.47) below.

$$(3.47) \llbracket \text{DEC}(\varphi) \rrbracket = \{ \langle c, c' \rangle \mid B_S^c \neg B_x \neg \varphi \wedge EV_S^c B_x \varphi \wedge PB_S^{c'} B_x \varphi \}$$

Interrogative CCPs Next, the interrogative CCPs are given in (3.49) in accordance with the preparatory conditions and commitments repeated in (3.48), and with the claims made regarding negation in the discussion above.

(3.48) **Belief, evidence, and commitment of interrogatives:**

	belief	evidence	commitment
a. $\text{INT}_S(\varphi) \downarrow$	$\neg B_S \varphi$	—	$\neg B_S \varphi$
b. $\text{INT}_S(\varphi) \uparrow$	$\neg B_S \varphi$	—	$\neg B_S B_A \varphi$

The two CCPs are for falling interrogatives in (3.49a) and for rising interrogatives, *i.e.* questions, in (3.49b).

(3.49) **Interrogative CCPs:**

- a. $\llbracket \text{INT}(\varphi)\downarrow \rrbracket = \{ \langle c, c' \rangle \mid \neg B_S^c \varphi \wedge \neg P B_S^{c'} \varphi \}$
- b. $\llbracket \text{INT}(\varphi)\uparrow \rrbracket = \{ \langle c, c' \rangle \mid \neg B_S^c \varphi \wedge \neg P B_S^{c'} B_A \varphi \}$

Note that carrying over the preparatory belief condition from the input context would make a difference in the case of the falling interrogative, namely strengthen the output conditions to $P B_S^{c'} \neg B_S \varphi$, and will be added to the representation when relevant to the discussion of Q-implicatures and bias patterns as *no*.

This concludes the introduction of the CCP-model of utterances. The following section discusses how the choice of utterance from the available alternatives influences conveyed meaning, introducing Q-implicatures as the last ingredient to the framework before moving on to the main part of the chapter, the analysis of *no* as a marker of evidence and its interaction with bias.

3.3 Choosing an utterance: Q-implicatures

The term Q-implicatures (from Gricean Quantity implicatures) is taken from Geurts (2010), who uses it in the sense of implicatures arising from addressee reasoning over the speaker's beliefs from the perspective of utterance choice. This phenomenon, that Geurts labels “the intentional stance”, as the addressee reasons on the speakers intentional state, is also what happens when implicatures arise from considerations on forgone utterances, which in turn give rise to forgone commitments. How to derive additional output conditions from these implicatures will be the focus of this section.

The salient readings of instances of utterances depend on three factors: utterance meaning, *i.e.* its felicity conditions and commitments, the available alternatives and contextual factors. The utterance's meaning allows for a number of readings, which are constrained by preparatory conditions and (forgone) commitments. A given utterance context, *i.e.* an input context on the CCP-view of utterances, allows for a number of different alternative utterances, which map the input context to different output contexts. When an

observer of the utterance is aware of its meaning and that of the alternatives, inferences about the communicative intention of the speaker can be made. Conversely, the speaker chooses one of the available alternatives based on her communicative intention.

3.3.1 Utterance choice and communicative intention

Before starting to derive implicatures from alternatives not chosen, or forgone alternatives, it is necessary to determine what the available alternatives are. For this, I stipulate the following principles.

1. Only *minimal alternatives* count. Minimal alternatives are such where only one of the following four factors differs:
 - Prosody
 - Illocutionary force
 - Prejacent polarity
 - Presence or absence of an utterance modifier
2. The communicative intention of the speaker determines the availability of force alternatives (conveying vs. seeking information) and of prosodic alternatives (orientation towards speaker- vs. addressee-belief). Thus, the choice of utterance allows for reasoning over communicative intentions, leading to the conventional association of utterance types with communicative intentions.
3. The availability of prejacent polarity alternatives and of *no*-alternatives, depends on the utterance situation, for instance on the availability of evidence that contradicts a previously held belief of the speaker (or the salient “null-hypothesis”).
4. On a similar vein, only alternatives which are less or equally marked, for instance in terms of evidence-marking, are obligatorily active (the activation of more marked alternatives must be motivated).

Some remarks on the motivation of the first stipulation are in order. Deriving Q-implicatures from alternatives with more than one minimal difference has to be done in a step-wise manner, that is the meaning of the selected alternative would have to be incrementally enriched with the complement of each factors by which the forgone alternatives differ from it. This means that the same Q-implicatures can be derived from forgoing two separate alternatives, each differing by one of the factors from the selected alternative, and it would have to be shown that the same communicative effect indeed arises in examples where this is the case. The considerable added complexity and the additional questions raised when non-minimal alternatives are considered are best avoided when it is not necessary to do so, for which reason I stick to deriving implicatures from one alternative only. I briefly come back to the option of deriving implicatures from multiple alternatives on page 196.

In the remainder of this section, I first discuss communicative intentions associated with properties of utterance types, and the alternatives they make available, then moving on to the calculation of Q-implicatures and a brief overview of the implicatures arising from some minimal pairs of basic utterance type alternatives.

Seeking commitment: speaker vs. addressee belief

This first split in communicative intentions is encoded prosodically as final rising intonation (orientation towards addressee-belief) and final falling intonation (orientation towards speaker-belief). Both rising interrogatives and rising declaratives invite commitment from the addressee by either forgoing or making a speaker commitment over addressee beliefs, in both cases putting addressee belief on the table before conceding the discourse move to the addressee. Both falling interrogatives and declaratives, on the other hand, are solely oriented towards speaker belief, and do not usually seek addressee commitment.

In terms of utterance choice, this means that if the speaker's intention is to elicit commitment to φ or its alternatives, the rising alternatives become active. Among the rising alternatives, the declarative is preferred when seek-

ing to confirm assumptions about addressee belief, the rising interrogative otherwise. This is reflected in the Q-implicature of forgone commitment to addressee belief and evidence therefore arising from choice of the rising alternative. When the speaker is not seeking commitment from the addressee and intends to convey information about her own beliefs w.r.t. φ , on the other hand, the falling alternatives become active.

Seeking vs. conveying information

This split corresponds to the split between questions, *i.e.* rising interrogatives, and all other speech acts (see also the discussion of forgone higher order commitments in section 3.2.3 for remarks on the special status of questions within the current framework). In the neutral case, where the intention of the speaker is purely information-seeking and the communicative goal is to find out whatever information the addressee has with regard to φ , *i.e.* essentially to find out whether $B_A\varphi$ is supported and backed by evidence, the neutral strategy is to ask, *i.e.* to invite addressee commitment to φ by uttering a rising interrogative. This is the only way of seeking information without conveying it, as the rising declarative, which also invites commitment from the addressee, at the same time conveys a speaker belief that the addressee believes φ . An example for this are rising *daroo*-declaratives, which demonstrate their information-conveying function as opposed to the information-seeking function of questions.

Committing vs. forgoing (doubting vs. saying)

This is a split which follows naturally from illocutionary force and is thus rather trivial. It is important to point out, however, how this split relates to the other two, and that it appears to be secondary in influencing utterance choice. This is because given a communicative intention, would have to choose between alternatives of the same illocutionary force but with different prosody, are rather hard to come up with. This is reflected by the absence of informative Q-implicatures in the case of the interrogative minimal pair of utterance types as discussed in 3.3.3, p.196.

Regarding the declarative alternatives, I have pointed out above that in the case of the falling declarative, forgone commitment if the rising declarative is an alternative could mean that the speaker is inviting commitment from the addressee with the falling declarative just as with the rising interrogative. I have mentioned that this is part of a consensus-seeking strategy. From the perspective of the committing vs. forgoing split, this can be framed as the speaker seeking commitment of both participants to the prejacent proposition (thus adding it to the common ground, see below), and chooses to commit first, inviting subsequent commitment from the addressee. In such a situation, choosing to commit the addressee first indicates not having enough evidence to commit oneself, as the Q-implicature predicts.

In the doubting case, there is the possibility that the speaker's strategy is to have both participants *forgo* commitment to the prejacent. I briefly discuss this possibility in the context of consensus-seeking strategies below.

The common ground and consensus-orientation

The focus of this thesis is accounting for bias patterns and their interaction with the particle *no*, which can be accomplished in a model formalizing private and public beliefs of the participants, and the availability of evidence, but does not necessary require reference to the common ground (which other analysis, tacitly or explicitly, often require).

In order to understand communicative strategies which can involved the use of *no*-marked utterances, *i.e.* in order to predict which *no*-marked utterance matches which communicative intention and utterance context, on the other hand, I propose belief revision as a central notion, *cf.* sections 3.4.4 (p228) and 3.4.5 (p236). As for the choice of utterance, there are cases in which the common ground matters indirectly: where both basic declarative utterance types are active alternative, the speaker's communicative strategy is consensus-seeking, *i.e.* aims to maximize the common ground.

There are two straightforward ways of defining a common ground in the present framework, as shown below.

(3.50) **The common ground: Definition 1:**

$$\mathcal{CG}(c, w) = \{\varphi \mid \forall x \in \mathcal{X} : B_x \varphi \in c\}$$

On this definition, the common ground contains all of the propositions that are common beliefs of the participants. However, it is of little use in the present proposal, where in terms of commitments only public beliefs are relevant.

(3.51) **The common ground: Definition 2:**

$$\mathcal{CG}(c, w) = \{\varphi \mid \forall x \in \mathcal{X} : PB_x \varphi \in c\}$$

On this definition, the common ground contains all belief propositions that all participants (or both in the simplified model) are publicly committed to. This is what I argue a consensus-seeking strategy seeks to maximize. As discussed above, a consensus-seeking strategy thus makes the declarative alternatives available — depending on the evidence available to the speaker, she will commit herself or the addressee first, in both cases inviting commitment from the addressee.¹⁴

Consensus-orientation and the notion of a common ground can also serve to distinguishing rising interrogatives from rising declaratives with *no*, as utterances with final rising intonation either assume or invite addressee commitment. For instance, rising *daroo*-declaratives can have a consensus-seeking, and at times consensus-forcing effect, while rising *no*-declaratives are more confrontational in the sense of opposing a speaker belief to an apparent addressee belief, in which case consensus can only come from belief revision of either participant. However, a full account of the communicative effect of Japanese rising declaratives is beyond the scope of this thesis, which focuses on the contribution of *no*, and is left for further research.

¹⁴While it would lead to far afield, it is an interesting question under what circumstances the assertion of φ by one of the participants can serve as evidence to make subsequent assertion of φ by the other participant felicitous. Evidence chains would be possible, where inviting commitment by a rising declarative, followed by assertion of φ by the addressee, could conceivably be followed by assertion of φ by the speaker.

Finding alternatives: communicative intentions

The combinations of communicative intentions of the speaker and basic utterance types, determining which alternatives are active, are summarized below.

(3.52) **Utterance types and communicative intentions:**

utterance		information	belief	commitment
INT	↑	seeking	addressee	forgoing
DEC	↑	conveying	addressee	committing
INT	↓	conveying	speaker	forgoing
DEC	↓	conveying	speaker	committing

These communicative intentions are the background on which the alternatives for calculating Q-implicatures become active. How the utterance meanings of the selected alternatives are thus enriched with the complement of the factors that make the forgone alternatives stronger is the topic of the following section.

3.3.2 Calculating Q-implicatures

The derivation of Q-implicatures is rather straightforward, and similar to that of scalar implicatures. First, it is necessary to determine the active alternatives, guided by the principles stated above. Next, the differences between the alternatives need to be expressed. This is the purpose of the Δ -notation introduced below, which shows what makes an alternative utterance stronger. Q-implicatures are calculated by enriching the CCP of the chosen alternative with the negation of what makes the forgone alternative stronger.

Notation for differences between utterances: Δ -sets

In order to capture the implicatures which arise from the differences between the public commitments of two alternative utterance types, I introduce the notation defined in (3.53).

$$(3.53) \quad \Delta\mathcal{U}(\varphi) = \mathcal{PB}^{\mathcal{U}'}(\varphi) \setminus \mathcal{PB}^{\mathcal{U}}(\varphi) \quad (\text{w.r.t. } \mathcal{U}'\varphi)$$

This defines the Δ -set of an utterance as those public commitments which deviate from the common core of conditions on the output context shared by the alternative utterances.¹⁵ A concrete example is given in (3.54), which shows the declarative and the interrogative alternative of an utterance with final falling intonation.

(3.54) Δ -sets of falling alternatives:

- a. $\Delta\text{DEC}(\varphi)\downarrow = \{PB_S B_S \varphi, PB_S EV_S \varphi\}$ (w.r.t. $\text{INT}(\varphi)\downarrow$)
- b. $\Delta\text{INT}(\varphi)\downarrow = \{PB_S \neg B_S \varphi\}$ (w.r.t. $\text{DEC}(\varphi)\downarrow$)

Importantly, this definition includes all differences in public beliefs, including those members of $\mathcal{PB}^u$ which are preparatory conditions (members of $\mathcal{B}^u$ and $\mathcal{E}^u$), carried over into the public commitments as secondary commitments.¹⁶ In the case of the minimal basic alternatives with final falling intonation, the output context conditions of the declarative differ from that of the interrogative in that (3.54a) commits the speaker to φ and in that the evidence condition is carried over from the input context, represented here as $PB_S EV_S \varphi$. As the preparatory belief condition $\neg B_S \neg \varphi$ would not strengthen the output belief conditions,¹⁷ it does not become an additional output condition, and is thus not included in the Δ -set. In the case of the interrogative, on the other hand, the preparatory belief condition $\neg B_S \varphi$ is carried over, as it strengthens forgone commitment.¹⁸

Calculating implicatures

From Δ -sets of the falling alternatives (each calculated under the assumption that the other illocutionary force alternative is active), the Q-implicatures which arise when the other alternative is forgone can be derived by adding the negation of each public belief that arises from the forgone alternative to the chosen alternative, *i.e.* the negation of each member of the Δ -set, to the public belief set of the chosen alternative.

¹⁵Note that this is equivalent to the relative complement of the common core $\mathcal{PB}^u(\varphi) \cap \mathcal{PB}^{u'}(\varphi)$ of the public commitments that the two alternatives share in $\mathcal{PB}^{u'}(\varphi)$.

¹⁶But not forgone commitments, since these arise as Q-implicatures themselves and can thus not be the source of further Q-implicatures.

¹⁷ $B_A B_S \varphi$ entails $B_A \neg B_S \neg \varphi$

¹⁸ $B_A \neg B_S \varphi$ is not entailed by $\neg B_A B_S \varphi$

$$(3.55) \quad \Delta^{\text{ALT}}\mathcal{U}(\varphi) \text{ w.r.t. } \mathcal{U}'(\varphi) = \{\neg\varphi \mid \varphi \in \Delta\mathcal{U}(\varphi)\}$$

This means that the implicatures arising from an utterance $\mathcal{U}$ forgoing an alternative $\mathcal{U}'$ is the complement of the Δ -set of $\mathcal{U}'$ w.r.t. $\mathcal{U}$. In (3.56), this is illustrated by example of the falling alternatives — Q-implicatures are thus derived as the negation of the public beliefs unique to the forgone alternative.

(3.56) Δ^{ALT} -sets of falling alternatives:

- a. $\Delta^{\text{ALT}}\text{DEC}(\varphi)\downarrow = \{\neg PB_S \neg B_S \varphi\}$ (w.r.t. $\text{INT}(\varphi)\downarrow$)
- b. $\Delta^{\text{ALT}}\text{INT}(\varphi)\downarrow = \{\neg PB_S B_S \varphi, \neg PB_S EV_S \varphi\}$ (w.r.t. $\text{DEC}(\varphi)\downarrow$)

The Δ^{ALT} -set in (3.56a) we get in the case of the falling interrogative is a weaker version of forgone commitment, as stipulated above. This does not mean, however, that the discussion there has yielded the wrong result, but rather that a stronger, positive public belief arises from carrying over the preparatory condition of the falling interrogative, so that the resulting condition on the output context is $B_A \neg B_S \varphi$ rather than $\neg B_A B_S \varphi$. The additional implicature thus has no effect, as stronger commitment is already in place. The negated public belief over the evidence condition allows a more differentiated view of forgone evidence conditions, as it is not a condition on the input context in the first place. Thus, it can be canceled when not compatible with the utterance meaning, which is the case when there is a preparatory condition that there be evidence supporting φ , as in the case of *no-ka* utterances with final falling intonation.

As for the Δ^{ALT} -set for the falling declarative (*i.e.* the assertion) in (3.56b), the additional implicature adds no information, as by $B_A B_S \varphi$, the output condition arising from commitment, *i.e.* positive public belief, is stronger than $\neg B_A \neg B_S \varphi$.

Enriched CCPs

The final notation to be introduced is that of an enriched CCP, that is a CCP to which the forgone commitments arising as a Q-implicature have been added, as shown below.

(3.57) **Enriched CCP of utterance with Q-implicatures:**

$$\llbracket \mathcal{U}(\varphi) \rrbracket^{\text{ALT}} = \{ \langle c, c' \rangle \mid c \subseteq \mathcal{B}^{\mathcal{U}} \wedge c \subseteq \mathcal{E}^{\mathcal{U}} \wedge c' = c \cup \mathcal{P}\mathcal{B}^{\mathcal{U}} \cup \Delta^{\text{ALT}}\mathcal{U} \}$$

To illustrate, a CCP representing a falling interrogative which is uttered forgoing the falling declarative alternative is shown below. It contains both the original preparatory conditions and commitments and those that arise from forgoing the alternative utterance, as for the falling interrogative with the Q-implicatures arising from the forgone declarative alternative.

(3.58) **Basic and enriched CCP of FI with forgone FD alternative:**

- a. $\llbracket \text{INT}(\varphi) \downarrow \rrbracket = \{ \langle c, c' \rangle \mid \neg B_S^c \varphi \wedge \neg PB_S^{c'} \varphi \}$
- b. $\llbracket \text{INT}(\varphi) \downarrow \rrbracket^{\text{ALT}} = \{ \langle c, c' \rangle \mid \neg B_S^c \varphi \wedge \neg PB_S^{c'} [B_S \varphi \wedge EV_S \varphi] \}$

This shows that the only Q-implicature arising for the falling interrogative, apart from forgone commitment as discussed in the previous chapter, is forgone commitment to the availability of evidence to the speaker. Note that, as a Q-implicature, it can be canceled by secondary commitments, for instance from *no*-marking, as in the case of falling *noka*-interrogatives mentioned above. The stronger public commitment to $\neg B_S \varphi$, which arises as a secondary commitment from the carried over preparatory belief condition, is not shown order to keep the origins of the commitments transparent.¹⁹ In the case of falling declaratives, meaning is not enriched by Q-implicatures as no strengthening would occur — the possible implicature is weaker than commitment arising from the speech act.²⁰

3.3.3 Alternative utterances: prosody and force

In the remainder of this section, I discuss the effects that forgoing minimal alternative utterances on the level of prosody and force have in other pairings of basic utterance types, before moving on to the main type of alternative utterance that gives rise to bias phenomena — alternatives with opposed preajacent polarity, and modified alternatives with *no* and *daroo*. The previous

¹⁹Secondary commitment from carried over preparatory condition strengthens forgone commitment results in $\{ \langle c, c' \rangle \mid \neg B_S^c \varphi \wedge PB_S^{c'} \neg B_S \varphi \wedge \neg PB_S^{c'} \neg EV_S \varphi \}$.

²⁰ $\neg PB_S^{c'} \neg B_S \varphi$ is stronger than $PB_S \varphi$, as $B_A B_S \varphi$ entails $\neg B_A \neg B_S \varphi$.

section has shown how to derive enriched utterance meanings by considering the Q-implicatures arising from alternatives.

Rising alternatives

The case of interrogatives and declaratives with final rising intonation is parallel to that of their counterparts with final falling intonation, with the difference that the secondary commitment from the carried over preparatory condition $\neg B_S\varphi$ gives rise to forgone commitment to this in the rising declarative, if the interrogative is considered an alternative. The enriched CCP of a rising declarative with a forgone interrogative alternative is shown below.

(3.59) **Enriched CCP of RD with forgone RI alternative:**

$$\begin{aligned} \llbracket \text{DEC}(\varphi) \uparrow \rrbracket^{\text{ALT}} = \{ \langle c, c' \rangle \mid \\ B_S^c \neg B_A \neg \varphi \wedge PB_S^{c'} [B_A \varphi \wedge EV_S B_A \varphi] \wedge \neg PB_S^{c'} [\neg B_S \varphi] \} \end{aligned}$$

This is an interesting result, namely a mutually introspective common belief $\neg B_A \neg B_S \varphi$ as a condition on the output context, but crucially without a corresponding preparatory condition on the input context. This is to say that, if a question is forgone as an alternative when uttering a rising declarative, this leads to the implicature preventing the addressee to exclude that the speaker believe φ in the output context.

Next, the rising interrogative gets a forgone evidence condition, just as the falling interrogative, but with evidence over addressee belief, as in the enriched CCP of the rising interrogative in (3.60).

(3.60) **Enriched CCP of RI with forgone RD alternative:**

$$\llbracket \text{INT}(\varphi) \uparrow \rrbracket^{\text{ALT}} = \{ \langle c, c' \rangle \mid \neg B_S^c \varphi \wedge \neg PB_S^{c'} [B_A \varphi \wedge EV_S B_A \varphi] \}$$

Again, as with the falling interrogative, the Q-implicature is canceled when it is incompatible with utterance meaning, for instance when *no* adds an belief condition which gives rise to secondary commitment.

Declarative alternatives

The next set of minimal pairs to consider are those where illocutionary force is kept constant, and the alternatives are determined by prosody. For the

moment putting the question aside whether or not it is reasonable to assume such alternatives, the enriched CCPs for falling and rising declaratives are shown in (3.61a) and (3.61b), assuming that the forgone alternative is the other prosodic variant, respectively.

(3.61) **Enriched declarative CCPs:**

- a. $\llbracket \text{DEC}(\varphi) \downarrow \rrbracket^{\text{ALT}} = \{ \langle c, c' \rangle \mid$
 $\neg B_S^c \neg \varphi \wedge EV_S^c \varphi \wedge PB_S^{c'} [B_S \varphi \wedge EV_S^c \varphi] \wedge \neg PB_S^{c'} [B_A \varphi \wedge EV B_A \varphi] \}$
- b. $\llbracket \text{DEC}(\varphi) \uparrow \rrbracket^{\text{ALT}} = \{ \langle c, c' \rangle \mid$
 $B_S^c \neg B_A \neg \varphi \wedge EV_S^c B_A \varphi \wedge PB_S^{c'} [B_A \varphi \wedge EV B_A \varphi] \wedge \neg PB_S^{c'} [B_S \varphi \wedge EV_S^c \varphi] \}$

Starting with the falling declarative, what the enriched meaning states is that the speaker makes no commitment with regard to addressee belief. Note that this is the same effect that forgoing the rising declarative alternative has on questions. This is interesting, as it could mean that if the rising declarative is indeed an active alternative, the falling declarative invites commitment of the addressee to the prejacent (provided that forgone commitment w.r.t. addressee beliefs invites addressee commitment). I propose that this is the case if the speaker's communicative goals are consensus-oriented, *i.e.* aim at increasing the common ground of propositions that both participants are committed to, *cf.* 3.3.1 (p187).

In the case of the rising declarative, the enriched meaning states that the speaker makes no commitment with regard to her own beliefs. This is the same enrichment that falling interrogatives undergo. The difference between the falling interrogative and the rising declarative, then, is that commitment of the addressee arises from the latter, but no commitment arises from the former. Committing the addressee while forgoing own commitment indicates that there is possible disagreement. This is the results of choosing the rising alternative over the falling alternative when both are active, which is the case when the speakers communicative intentions are commitment-oriented, as will be discussed shortly.

Interrogative alternatives

Finally, when considering interrogative alternatives, there is no enrichment in terms of forgone utterances, as there are no positive beliefs in the output context which could be forgone. Recall that the negative public beliefs in the output conditions of interrogatives arises as forgone commitment, or Q-implicatures from forgoing declarative alternatives. They are thus not part of the basis on which the differences (see the Δ -notation above) between the alternatives are calculated. The only candidates are negative belief conditions carried over to the output context as public beliefs, but these are the same for both interrogative prosodic varieties and thus do not give rise to implicatures.

Forgoing multiple alternatives

The option of forgoing both alternatives seems in principle available in case of a rising declarative, as it can plausibly be considered a marked alternative to a falling declarative and to a rising interrogative. This is, however, implausible when considering alternatives to be activated depending on the speaker's communicative intentions, and when considering the combined implicature that would arise in such a case.

The following information would be available to the addressee with regard to the speaker beliefs in a situation where *both* the question and the assertion are alternatives to the rising declarative.

(3.62) **Information available to the addressee:**

- a. $B_A B_S B_A \varphi$ (from RD commitment)
- b. $\neg B_A \neg B_S \varphi$ (from RI alternative)
- c. $\neg B_A B_S \varphi$ (from FD alternative)

The two higher-order beliefs negated in (3.62b) and (3.62c) covers the entire partition of second-order addressee commitments over speaker belief. This is because $B_A B_S \varphi$ represents a second-order belief committed to $B_S \varphi$, and $B_A \neg B_S \varphi$ a second-order belief which excludes all but first-order states committed to φ , ruling out all second-order doxastic states that have an intersection with $B_S \varphi$. When the complement of these beliefs on the higher-order

level is formed, this leaves only the intersection of (3.62b) and (3.62c), *i.e.* only ignorant second-order doxastic states and those biased towards $B_S\varphi$, which is a peculiarly specific implicature which does not seem to reflect any type of bias that readily comes to mind, providing further support for the assumption that Q-implicatures arise from single alternatives.

As the availability of alternatives can be predicted by communicative intention, I predict that the implicatures arising from forgoing each alternative brings out a different interpretation corresponding to a different use of the utterance. I demonstrate this by example of rising declaratives in section 3.4.6.

Availability of alternatives At this point, it is useful to recall the connection between communicative intentions and available alternatives. The availability of an alternative means that the speaker is (i) in a doxastic state compatible with the belief conditions of the alternative, and (ii) the communicative intentions of the speaker are compatible with the alternative. The availability of both alternatives is rather implausible in the case of the rising declarative: either the speaker intends to find out about the addressee's doxastic state, or the speaker wants to convey information about her own doxastic state. The rising declarative is in principle compatible with both communicative intentions, as it conveys the speaker's stance with regard to the doxastic state of the addressee.

When the communicative intention is primarily to find out about the addressee's doxastic state, the interrogative alternative will be available. When it is forgone, this means that the speaker, wanting to find out about the addressee's doxastic state with regard to φ , is already rather certain that the addressee believes φ to be true. In this case, the forgone alternative tells the addressee *not* to assume that the speaker is in a doxastic states committed to $\neg\varphi$.²¹

When the communicative intention is primarily to convey the speaker's doxastic state to the addressee, the declarative alternative will be available.

²¹In terms of consensus-seeking, this means that the speaker is likely to accept an eventual commitment of the addressee to φ into the common ground.

Forgoing this alternative conveys to the addressee not to assume that the speaker is in a doxastic state committed to φ , leaving all other possibilities in terms of first- and second order doxastic states open. In addition to this, commitment is forgone to the availability of evidence in favor of φ , making an incredulity reading, which is excluded by the forgone question alternative, possible.

3.4 Alternatives with *no* and bias patterns

This section derives the bias patterns observed in chapter 1, as captured in the form of utterance felicity conditions in chapter 2, within the CCP-framework from chapter 3. With the main focus on the role of the particle *no*, I defend the hypothesis that *no* is a marker of mutually accessible evidence on the speech-act level. In addition to the evidence condition added by *no*, I account for Q-implicatures, as well as effects of polarity mismatch in polar questions and the lowering of the quality threshold by *daroo*.

3.4.1 The meaning of *no*

As mentioned a number of times already, I propose that *no* is a marker of mutually accessible evidence that adds a corresponding condition to the preparatory conditions of the utterances it occurs in. In terms of the CCP model introduced in this chapter, this means that a *no*-utterance can be represented as follows.

(3.63) **Contribution of *no* to utterance meaning:**

$$\llbracket \mathcal{U}(no(\varphi)) \rrbracket = \{ \langle c, c' \rangle \mid \mathcal{B}^{\mathcal{U}} \subseteq c \wedge [\mathcal{E}^{\mathcal{U}} \cup EV_{\mathcal{X}}\varphi] \subseteq c \wedge c' = c \cup \mathcal{P}\mathcal{B}^{\mathcal{U}} \}$$

This means that *no* is an operator effective on the utterance level, taking an utterance and returning an utterance with an additional evidence condition on input contexts. Alternatively, *no* can be represented as an operator directly modifying the set of preparatory evidence conditions $\mathcal{E}^{\mathcal{U}}$ of an utterance $\mathcal{U}(\varphi)$ by adding an evidence condition.

(3.64) **Evidence conditions of *no*-utterances:**

$$\mathcal{E}^{\mathcal{U}}(no(\varphi)) = \mathcal{E}^{\mathcal{U}}(\varphi) \cup EV_{\mathcal{X}}\varphi$$

The remainder of this thesis shows how the felicity conditions and bias patterns of the utterances that are the empirical focus of the thesis, can be derived from the meaning of *no* assumed here within the framework developed so far, implementing the analysis sketched in (3.1.2) in formal terms. The discussion starts with rising and falling interrogatives, then moving on to utterances with *daroo* expressing results of inference and closing with *no*-assertions.

Comparison to Davis (2011) Davis’s account for what *no* does in the examples for falling *ka*-interrogatives he provides (which are discussed in 3.4.4 below) is that *no* requires that “there be evidence for the proposition denoted by *no*’s complement” Davis (2011, 214). He suggests that this might be satisfied by “certain propositions in the common ground, perhaps filtered through some evidential modal base” (*ibid*). This is rather close to the current proposal, which requires that there be mutually accessible evidence in the input context, which by positive introspection w.r.t. evidence is equivalent to a shared belief that there is evidence supporting the prejacent. The present proposal differs from Davis’s, however, in that evidence as marked by *no* is defined in terms of utterance felicity, and thus its reflection within restrictions on contexts is already built into the formal framework, requiring no additional stipulation of a semantics of *no* beyond modification of the CCP-conditions already in place. Within the CCP-framework of utterance felicity conditions, the present proposal differentiates between private evidence and mutually accessible evidence, and accounts for the function of *no* within the role utterances play in belief revision and formation processes.

No as an evidential This is not to say that I assume that all Japanese evidential expressions (or any other than *no*) can be captured in this way — rather, I defend that *no* is a very specific kind of evidential that does not differentiate between source of evidence and thus does not require the

kind of analysis that is necessary for “core” evidentials, as for instance proposed by McCready and Ogata (2007). Conversely, analyses which take *no* to be a “conventional” evidential expression will not be able to capture its communicative effects and its connection with communicative intentions as straightforwardly as accomplished in the present proposal via utterance felicity conditions. Interactions between evidentials and *no*, which can be readily captured in the present proposal for evidentials operating on the propositional level, and would potentially require some modifications for utterance- or speech-act level evidentials, however, are beyond the scope of this paper and need to be left as a perspective for further research.

***No* as a marker of compelling contextual evidence**

Before continuing to implement the analysis of *no* as previewed above, consider one kind of mutually accessible, perceptual, evidence for illustration, defined as *Compelling Contextual Evidence* by Büring and Gunlogson (2000, 7) in their discussion of bias in polar questions. Regarding the notion of contextual evidence, they write:

Contextual Evidence: Evidence that has just become mutually available to the participants in the current discourse situation.

This kind of evidence is what *no* marks in many cases which in the literature are taken as representative of its contribution to polar questions, falling interrogatives, and in the mirative use of *no* in assertions. In other cases of *no* in assertions such as the examples Noda provides cited on page 21 in section 21, I argue that *no* can mark *verifiable evidence*, which is not contextual (usually perceptual) evidence, but still sufficient grounds to justify a belief that the prejacent be true (as evidence is defined in this thesis) from speaker’s perspective, which in principle can be obtained by all participants and is thus verifiable. However, as the intuitions on such cases are more elusive and possibly confounding factors like world knowledge or (joint) experience as the source of verifiable evidence would have to be taken into account, contextual evidence will here, too, be the empirical basis for expansion of the framework

to account for the contribution of *no*.²²

Büring and Gunlogson (2000) label the relevant²³ kind of evidence *compelling contextual evidence*, defining describe the property of being “compelling” as follows:

Evidence *for* p is compelling if, considered in isolation, it would allow the participants to assume p (i.e. the evidence could reasonably be considered to justify the inference that p).

The intuition that evidence is compelling if it allows the inference that the proposition it supports holds, but only when considered *in isolation*, is reflected in simplified form in the evidence rule I propose in section 2.2.1, making explicit under which conditions such an inference does not go through in form of the blocking condition. How the combination of *no* and different utterance types, along with the relative polarity of an utterance compared to the salient preajacent polarity in the utterance situation allows for conjecture on the current stage at which the speaker is in a belief formation or -revision process, is a central theme of this chapter, going beyond the mere (perceptual-)evidence-marking function of *no*.

3.4.2 Rising interrogatives and *no*: bias in PPQs

The utterance type which allows the arguably clearest view on the function of *no* as a marker of evidence are polar questions. This is because polar questions are rising interrogatives, and as interrogatives lacking positive preparatory belief conditions questions do not impose evidence conditions on the input context, except when *no* is added. The exposition of how this effect is captured within the framework developed so far is the focus of this section, by example of positive polar questions in a positive-salient context, followed by a discussion of the effects that arise with and without *no* in cases of polarity mismatch to account for bias patterns of negative polar questions.

²²I return to non-mirative uses of *no*-assertions briefly in 3.4.5.

²³They use utterance situations which are constructed to provide this kind of evidence to determine the bias patterns of polar questions, which is taken up by Sudo (2013), whose examples of polar questions to determine bias patterns of (*no*-)PQs I use here as well.

Classifying contexts by accessible evidence

The classification of contexts which form the background for the discussion of bias patterns in Buring and Gunlogson (2000) and Sudo (2013) is based on the availability of evidence. In section 3.2.4 a notation for the extralinguistic context, or utterance situation, has been introduced, which is used in (3.65) to represent the contexts on the background of which bias arising from positive polar questions with and without *no* is discussed here.

(3.65) Classifying contexts by evidence:

	Polarity and evidence	Label
a.	$C_\varphi^0 \quad \{\varphi\}$	neutral context
b.	$C_\varphi^+ \quad \{\varphi, EV_X\varphi\}$	positive context
c.	$C_\varphi^- \quad \{\varphi, EV_X\neg\varphi\}$	negative context

The three positive-salient utterance situations shown above are given labels in accordance with those used in previous research: the utterance situation C_φ^0 without mutually available evidence supporting either alternative is labeled the *neutral context*, C_φ^+ where there is mutually accessible evidence supporting the positive prejacent *positive context*, and C_φ^- where evidence supports the negative prejacent *negative context*.

The gist of the analysis below is that the badness of the plain PPQ in the positive context is not due to the preparatory conditions of the plain PPQ disallowing contextual evidence, but due to the availability of the alternative with *no*, which is a better match for the context.

Predicting the bias patterns of (*no*-)PPQs

In order to predict which alternative utterance is the best match for a given context, it is first necessary to determine the active alternatives from which to choose. As for question alternatives, it is safe to assume that the communicative intention of the speakers in the relevant examples is information-seeking rather than -conveying, as outlined in section 3.3.1 and represented as a bold line in the diagram repeated from (3.52) (as 3.66) below. In the information-seeking case, only rising interrogative alternatives (questions) are active.

An alternative way to reach this conclusion, is to consider the communicative intention of the speaker addressee-oriented, thus inviting commitment from the addressee and restricting the active alternatives to rising utterance types, and additionally consider the communicative intention forgoing rather than committing, which excludes rising declaratives from the active alternatives. Note, however, that rising alternatives may be active if we consider cases where the choice is, for instance, between a bare polar question and what Sudo takes to be a *daroo*- or *desho*-question, but I take to be a rising declarative.

(3.66) **Utterance types and communicative intentions:**

utterance		information	belief	commitment
INT	↑	seeking	addressee	forgoing
DEC	↑	conveying	addressee	committing
INT	↓	conveying	speaker	forgoing
DEC	↓	conveying	speaker	committing

For the discussion of the bias patterns of *no*-PPQs, the alternatives to be taken into account are thus bare PPQs and *no*-PPQs, assuming that the NPQ alternative is not active in a positive-salient context.

Predicting bias: *no*-PPQs without evidence The task of determining which utterance is optimal in a given utterance situation is by no means trivial and depends on many potentially confounding factors. The question of which utterances a context *excludes*, on the other hand, is less difficult to answer, when only regarding positive polar questions with and without *no* as alternatives, and the contribution of *no* to utterance meaning as stipulated in this thesis, repeated below.

(3.67) **Evidence conditions of *no*-utterances:**

$$\mathcal{E}^u(no(\varphi)) = \mathcal{E}^u(\varphi) \cup EV_{\mathcal{X}}^c \varphi$$

Sudo's findings on positive polar questions are summarized below, using the labels for neutral, positive, and negative contexts just introduced.

(3.68) Sudo’s findings on felicity of (*no*)PPQs by context:

	C_φ^0	C_φ^+	C_φ^-
INT(φ) $\uparrow$	✓	#	#
INT(<i>no</i> (φ)) $\uparrow$	#	✓	#

Applied to positive polar questions, which do not have a preparatory evidence condition, the meaning stipulated for *no* in (3.67) means that the alternative with *no* differs from that without *no* in that it has a felicity condition that there be evidence supporting the prejacent available to both participants, in the input context. Clearly, the utterance will not be felicitous if there is no such evidence, and, in line with Sudo’s observations, positive polar questions with *no* are predicted to be degraded in neutral contexts. The example provided by Sudo (2013) for positive polar questions with and without *no* in a neutral context (that is, an utterance situation of type C_φ^0) is repeated below.

Scenario: We’re looking for a left-handed person. I’m wondering about John, who is not around. [Neutral context, utterance situation C_φ^0]

(3.69) *John-wa hidarikiki?*
 John-TOP left_handed
 “Is John left-handed?”

(3.70) #*John-wa hidarikiki na no?*
 John-TOP left_handed COP.ADN *no*
 “Is John left-handed?”

The badness of *no* in (3.70) is predicted, as there is no mutually accessible evidence supporting the positive prejacent “John is left-handed” in the utterance situation. Note that the infelicity can be verified by the addressee in this case, as the evidence needs to be *mutually* accessible, so that even if there is evidence supporting the prejacent available to the speaker only, the version with *no* is predicted to be infelicitous. The intuitions observed in the case of this example are comparably sharp.

Predicting bias: *no*-PPQs with evidence When there is evidence supporting the prejacent, that is in positive contexts, *no*-PPQs are predicted to be felicitous. Sudo’s example for the bias pattern of bare and *no*-PPQs in positive contexts (C_φ^+ in the notation introduced above) is repeated below.

Scenario: My friend has just entered our windowless office wearing a dripping wet raincoat. [positive context, utterance situation C_φ^+]

(3.71) *#ima ame fut-teru?*
 now rain fall-PROG.NPST
 “Is it raining now?”

(3.72) *ima ame fut-teru no?*
 now rain fall-PROG.NPST *no*
 “Is it raining now?”

In order to predict that *no*-PPQs are not only felicitous, but preferred in contexts of type C_φ^+ , which means that bare PPQs are dispreferred in such utterance situations as observed by Sudo, an additional assumption requiring that speakers mark evidence when available is necessary. The badness of a plain alternative in such a case is different from that of a *no*-PPQ when there is no evidence for φ available, as it comes from *failure to mark* something that *is* available, rather than *false marking* of something that is *not* available. The case of using a plain PPQ when there is evidence is thus either a case of failure to “maximize presupposition”, or a violation of Gricean quantity. This is a contentious question in the literature, thorough discussion of which is beyond the scope of this thesis — see Schlenker (2012) for a recent discussion arguing for an analysis of maximize presupposition as (scalar) quantity implicature. I propose that for a given utterance situation, *i.e.* extralinguistic context, the utterance whose felicity conditions including Q-implicatures are closest to this context is the best match, *i.e.* the linguistic context set is matched to the extralinguistic context set.

Matching contexts: *no* and evidence

All of the points above apply to the speaker’s perspective when choosing one of the alternatives. Taking the addressee’s perspective, which is the default

in discussions of Q-implicatures, predicts both observations w.r.t PPQ felicity straightforwardly, as long as the addressee considers both the utterance alternative with *no* and that without to be active. Recall that the preparatory conditions of utterances, when carried over to the output under assumption of speaker cooperativity, give rise to secondary commitments. The CCP of a positive polar question with *no* with secondary commitments is shown in (3.73) below.²⁴

(3.73) CCPs of plain and *no*-PPQ:

- a. $\llbracket \text{INT}(\varphi) \uparrow \rrbracket =$
 $= \{ \langle c, c' \rangle \mid \neg B_S^c \varphi \wedge PB_S^{c'} \neg B_S \varphi \wedge \neg PB_S^{c'} B_A \varphi \}$
- b. $\llbracket \text{INT}(\text{no}(\varphi)) \uparrow \rrbracket =$
 $= \{ \langle c, c' \rangle \mid \neg B_S^c \varphi \wedge EV_{\mathcal{X}}^c \varphi \wedge PB_S^{c'} [\neg B_S \varphi \wedge EV_{\mathcal{X}}^c \varphi] \wedge \neg PB_S^{c'} B_A \varphi \}$

Applying the meaning I propose for *no* to the CCP of a falling interrogative yields this result, where the only difference that sets apart a *no*-PPQ from a plain PPQ is the input condition and corresponding secondary commitment of the *no*-PPQ that there be evidence supporting the prejacent available to both participants. The differences between the two alternative utterances can thus be captured as follows.

(3.74) Differences in public commitment, plain and *no*-PPQs:

- a. $\Delta \text{INT}(\text{no}(\varphi)) \uparrow = \{ PB_S EV_{\mathcal{X}} \varphi \}$ (w.r.t. $\text{INT}(\varphi) \uparrow$)
- b. $\Delta^{\text{ALT}} \text{INT}(\varphi) \uparrow = \{ \neg PB_S EV_{\mathcal{X}} \varphi \}$ (w.r.t. $\text{INT}(\text{no}(\varphi)) \uparrow$)

Thus, the stronger public commitments of the *no*-PPQ from the carried-over evidence condition give rise to a Q-implicature in the weaker plain PPQ that the speaker forgoes commitment to a belief that there is such evidence. This makes it straightforward to match utterance alternatives with neutral and positive contexts, respectively, as shown in the schema in (3.75).²⁵

(3.75) Matching PPQ-alternatives and neutral / positive contexts:

²⁴As the difference between output conditions from forgone commitment and such from carried over input conditions is irrelevant here, the weaker forgone commitment has been overwritten by secondary commitment.

²⁵Negative contexts are discussed on the background of relative polarity and polarity mismatch below.

- $$\begin{array}{ll}
\text{a. } C^0 = \{\varphi\} & \longleftrightarrow \text{b. } \Delta^{\text{ALT}}\text{INT}(\varphi) \uparrow = \{\neg PB_S EV_X \varphi\} \\
\text{c. } C^+ = \{\varphi, EV_X \varphi\} & \longleftrightarrow \text{d. } \Delta\text{INT}(no(\varphi)) \uparrow = \{PB_S EV_X \varphi\}
\end{array}$$

This schema is meant to reflect the following line of reasoning: when a speaker chooses to utter a plain PPQ, and a *no*-PPQ is considered an active alternative, this gives rise to the Q-implicature represented by $\Delta^{\text{ALT}}\text{INT}(\varphi) \uparrow$, the additional commitment arising from the forgone *no*-PPQ alternative. Clearly, this is a bad match for the context in which there is evidence supporting φ , but is felicitous in the context without evidence. Thus, the assumption of Q-implicatures arising from forgone alternatives predicts that bare PPQs are degraded in contexts of type C_{φ}^{+} , provided that the *no*-PPQ is indeed an active alternative — in spirit, this is a Gricean account of maximize presupposition.

The badness of *no*-PPQs in neutral contexts of type C_{φ}^0 , on the other hand, does not depend on the availability of alternatives as the *no*-PPQ requires evidence to be felicitous. As represented by $\Delta\text{INT}(\text{no}(\varphi)) \uparrow$, this can also be considered an instance of matching the alternative that marks the evidence available in the context, which the other alternative fails to do. This could be argued to be an instance of maximize presupposition without needing to resort to Q-implicatures. However, Q-implicatures will play a crucial role in the remaining discussion, and it is preferable to have an explicit mechanism to account for the badness of plain PPQs in contexts of type C_{φ}^+ , which arguably activate the *no*-PPQ as an alternative.

As a segue into the following discussion of relative polarity and to complete the discussion of the bias patterns of PPQs, consider the following example of a PPQ “Is it sunny now?” in the same scenario as (3.71) above, that is a context where there is evidence supporting the proposition “it is raining”. Such a context, according to the classification in (3.35), is a positive-salient, negative context, that is the set characterizing this context is $\{\neg\varphi, EV_{\mathcal{X}}\varphi\}$.

Scenario: My friend has just entered our windowless office wearing a dripping wet raincoat. [positive-salient, negative context]

- (3.76) *#ima hare-teru (no)?*
 now be sunny-PROG.NPST *no*

“Is it sunny now?”

This example shows that PPQs, with or without *no*, are bad in negative contexts, which is expected as alternative utterances marking that there is negative evidence are available in the form of an NPQ. Essentially, when salient polarity and evidence polarity are reversed in the utterance situation, that is, there is polarity mismatch *within* the extralinguistic context set, the best choice is the NPQ, that is, the alternative with polarity mismatch.

It also illustrates an important point about saliency: it is not sufficient to have negative evidence in the context to make it a negative-salient context — in spite of the evidence for “It is raining”, *i.e.* for the negation of the prejacent “It is not sunny”,²⁶ this is not a negative-salient context with regard to “It is sunny”.

3.4.3 Polarity mismatch and *no*: bias in NPQs

The empirical finding with regard to cases of polarity mismatch, where salient and actual prejacent polarity are reversed, is that questions with and without *no* are both felicitous, and that an implicature that the speaker is biased towards the salient prejacent polarity arises from the version with *no*. First, I account for the bias patterns of NPQs in positive-salient contexts as observed by Sudo and summarized below.

(3.77) **Sudo’s findings on felicity of (*no*)NPQs by context:**

	C_φ^0	C_φ^+	C_φ^-	epistemic bias
INT($\neg\varphi$) ↓	#	#	✓	—
INT(<i>no</i> ($\neg\varphi$)) ↓	#	#	✓	$B_S\varphi$

A possible conclusion from this bias pattern in terms of the present proposal would be that introducing a negative proposition into a positive-salient context has a function equivalent to evidence-marking by *no*, and that the addition of *no* somehow adds an implicature that the speaker believe φ to be true to utterance meaning in this case. I will argue in line with the proposed

²⁶Under the somewhat simplified assumption that the worlds in which it is not raining are the worlds in which it is sunny and *vv.*, or that the question under discussion is partitioned in this way.

meaning of *no* that the bias patterns can be explained by assuming that the *no*-NPQ is not an active alternative in a positive salient context, unless the speaker considers the evidence strong enough (relative to the evidence that backs up a previous belief to the contrary) to initiate belief revision. This connects NPQs (that is, to be precise, PQs with polarity mismatch) to the two readings of falling *ka*-interrogatives — the doubt reading and the incredulity reading — to be discussed in the next section.

To illustrate the analysis, consider again Sudo's example for a negative polar question in a negative context. The context is, by default, positive-salient with regard to the proposition "Someone else is coming" or "Anyone else is coming", and A's utterance serves as evidence that this proposition is false (assuming that A has sufficient epistemic authority as the scenario suggests).

Scenario: At a student meeting. A is the student representative and knows who will be present today. S is another student.

[positive-salient, negative context C_{φ}^{-}]

A: We are all here now. Shall we begin the meeting?

(3.78) *S: Daremo hokani konai (no)?*
 nobody else come.NEG *no*
 "Isn't anyone else coming?"

It is important to note here that while epistemic bias arises from the question with *no* strongly and obligatorily, this is not to say that it can not arise from plain NPQs in similar utterance situations. This kind of bias can also arise from simple polarity mismatch, which will be discussed shortly, especially when there is a readily available positive alternative that inquires about the same worlds as the negated alternative. For illustration, consider the following example of an NPQ corresponding to the PPQ in (3.76) in the same scenario as the one used there, which is a negative context with regard to the prejacent proposition "it is sunny", and again by default positive-salient.

Scenario: My friend has just entered our windowless office wearing a dripping wet raincoat. [positive-salient, negative context C_{φ}^{-}]

- (3.79) *Ima hare-tenai (no)?*
 now be_sunny-PROG.NEG no
 “{Is it not / isn’t it} sunny now?”

In this example, both the version with and without *no* convey a positive expectation of the speaker, that is epistemic bias. A parallel observation can be made regarding the English translation: the question “Is it not sunny now?” also gives rise to such kind of bias. It is important to note that the same cannot be said in the case of Sudo’s example. The reason for this is that in (3.79), there is a salient PPQ alternative “Is it raining?” based on a non-negated proposition, which is not the case with Sudo’s example in (3.78), as any version of “Isn’t anybody else coming?” in Japanese requires negation of the predicate.²⁷

Clearly, however, the bias is stronger with *no* in the Japanese example, and when negation is fronted in the English translation. As for the addition of *no*, I explain this as a belief revision reading as mentioned above, on which the utterance conveys that the speaker is revising a previously held belief in light of new evidence. I discuss this *incredulity reading* in more detail in connection with a similar reading of falling *ka*-interrogatives that differs in that it is not information-seeking in section 3.4.4, p.228.

Implicatures from polarity mismatch: second-order bias

In this section, I discuss the effect that arises from polarity mismatch, which is primarily that of giving rise to evidential bias (regardless of whether *no* is added). Polarity mismatch can be seen from two perspectives. First, there is the perspective of the addressee — comparing the polarity of the utterance made to the salient polarity of the context. Second, there is the perspective of the speaker — choosing between an utterance with a non-negated and a

²⁷In Japanese, negation on existential quantifiers always occurs on the verb, *i.e.* there is no direct equivalent to the English “Nobody else is coming”.

negated prejacent, or, more generally speaking, choosing the salient prejacent polarity or shifting to the non-salient alternative.

From the perspective of the addressee, implicatures which arise from assumptions regarding active, but forgone alternatives, based on the utterance situation. The cases discussed in the literature are such that the utterance situation is positive-salient, but there is negative evidence. That is, there is a mismatch between salient prejacent polarity and the polarity of evidence, as defined in (3.80) below, repeated from (3.36). Not only prejacent propositions can be polarity mismatched w.r.t. utterance situations, but also evidence w.r.t. salient polarity can be mismatched *within* the context. The positive-salient context with negative evidence (3.81a) as in the examples so far, and the negative-salient context with positive evidence in (3.81b) have this property.

(3.80) **Relative utterance polarity:**

- The relative polarity of $\mathcal{U}(\varphi)$ where $\varphi \vee \neg\varphi$ is under discussion...
- ...is matching the utterance situation if $\varphi \in C$.
- ...is reversed w.r.t. the utterance situation if $\neg\varphi \in C$

(3.81) **Contexts with evidence/salient polarity mismatch:**

- a. $C_{\varphi}^{-} = \{\varphi, EV_{\mathcal{X}}\neg\varphi\}$ (positive-salient, negative)
- b. $C_{\neg\varphi}^{+} = \{\neg\varphi, EV_{\mathcal{X}}\varphi\}$ (negative-salient, positive)

Addressee reasoning on mismatch Assuming that the addressee believes the context to be of type C_{φ}^{-} as shown in (3.81a), the following reasoning takes place. For a speaker whose communicative intention is information-seeking, the active alternatives other than the plain NPQ are a PPQ and a *no*-NPQ. I assume that the PPQ is an active alternative since the context is positive-salient (and, conversely the NPQ is an active alternative in all negative-salient contexts). The *no*-NPQ, on the other hand, is a potential alternative if its preparatory condition is satisfied and the evidence available is sufficient to support a belief that φ holds, that is sufficient to serve as grounds for assertion of φ . I argue below that this is only the case when the evidence is strong enough to trigger belief revision, else the *no*-NPQ is not an active alternative.

In order to derive the implicatures arising from the choice of an NPQ in a positive-salient context, the plain alternatives are discussed first. The CCPs of a positive and a negative polar question are shown below.

(3.82) **Alternatives: PPQ vs NPQ:**

- a. $\llbracket \text{INT}(\varphi) \uparrow \rrbracket = \{ \langle c, c' \rangle \mid \neg B_S^c \varphi \wedge \neg PB_S^{c'} B_A \varphi \wedge PB_S^{c'} \neg B_S \varphi \}$
- b. $\llbracket \text{INT}(\neg \varphi) \uparrow \rrbracket = \{ \langle c, c' \rangle \mid \neg B_S^c \neg \varphi \wedge \neg PB_S^{c'} B_A \neg \varphi \wedge PB_S^{c'} \neg B_S \neg \varphi \}$

As neither of the alternatives has an evidence condition on the input context, they are both in principle felicitous in a negatively biased utterance situation C^- of either salient polarity. The differences in public commitments between the NPQ and the PPQ w.r.t each other are given below. Note that the forgone commitments in the denotation above are negated public beliefs and thus do not enter the calculation of Q-implicatures (as forgone commitments in questions are obligatory Q-implicatures themselves).

(3.83) **Differences in public commitment, PPQs and NPQs:**

- a. $\Delta \text{INT}(\varphi) \uparrow = \{ PB_S \neg B_S \varphi \}$
- b. $\Delta \text{INT}(\neg \varphi) \uparrow = \{ PB_S \neg B_S \neg \varphi \}$

When the speaker forgoes the positive alternative, as in the case of an NPQ being uttered in a positive-salient context, the effect is that an implicature leading to the enriched CCP below arises.

(3.84) **Enriched CCP for NPQ in positive-salient context:**

$$\llbracket \text{INT}(\neg \varphi) \uparrow \rrbracket^{\text{ALT}} = \{ \langle c, c' \rangle \mid \neg B_S^c \varphi \wedge \neg PB_S^{c'} [B_A \neg \varphi \wedge \neg B_S \varphi] \wedge PB_S^{c'} \neg B_S \neg \varphi \}$$

Commitment and forgone commitment together give rise to two conditions on addressee belief in the output context.

(3.85) **Higher-order bias from NPQs:**

- a. $PB_S^{c'} \neg B_S \neg \varphi \rightarrow B_A \neg B_S \neg \varphi \in c'$
- b. $\neg PB_S^{c'} \neg B_S \varphi \rightarrow \neg B_A \neg B_S \varphi \in c'$

The first condition (3.85a) states that the addressee believes that the speaker is not committed to $\neg \varphi$, and arises as forgone commitment inherent to interrogatives. The second condition (3.85b), on the other hand, arises from

forgoing the PPQ as an alternative that is activated by the positive-salient context, and states a requirement that the addressee *not* believe that the speaker is *not* committed to φ .²⁸ This explains the tendency of negative questions with forgone positive alternatives (active in a positive salient context) to give rise to epistemic bias.

It is important to note here that the additional implicature adds to the information about the speaker's beliefs that is conveyed by the utterance, hence giving rise to higher-order bias. In the case of contexts with matching polarity, for instance PPQs in positive-salient contexts, where the biased interpretation is not excluded as no information is conveyed about speaker beliefs w.r.t. the negation of the prejacent, which means that there is no condition in the output context that prevents the addressee from assuming, for instance, that the speaker believes $\neg\varphi$ to be true. The crucial point here is that the additional implicature creates an asymmetry with regard to the assumptions that the addressee can make with regard to speaker beliefs, thus giving rise to bias. Below, I discuss this in terms of doxastic states.

Higher-order bias from NPQs The denotations of the additional conditions on the output context from the Q-implicature are shown below in terms of doxastic states.

(3.86) **Output context belief propositions in higher-order bias:**

- a. $\llbracket B_A \neg B_S \neg \varphi \rrbracket = \{w \mid \forall w' \in \text{Dox}_y^w : \text{Dox}_x^{w'} \not\subseteq W^{\neg\varphi}\}$
- b. $\llbracket \neg B_A \neg B_S \varphi \rrbracket = \{w \mid \exists w' \in \text{Dox}_y^w : \text{Dox}_x^{w'} \subseteq W^\varphi\}$

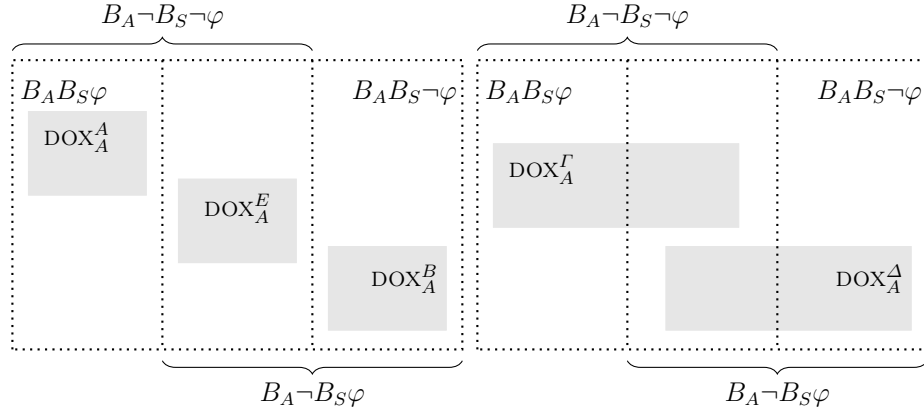
This shows that the condition in (3.85a) and (3.86a) requires the addressee to exclude that the speaker is in a state committed to $\neg\varphi$, and the condition in (3.85b) and (3.86b) requires the addressee to consider it possible that the addressee is in a doxastic state committed to φ . Effectively, this means that the speaker commits the addressee to a higher order belief that biased towards the speaker believing φ to be true.

To illustrate, consider again the sandbox model of higher-order belief introduced in the previous chapter, repeated in (3.87). First, (3.85a) excludes

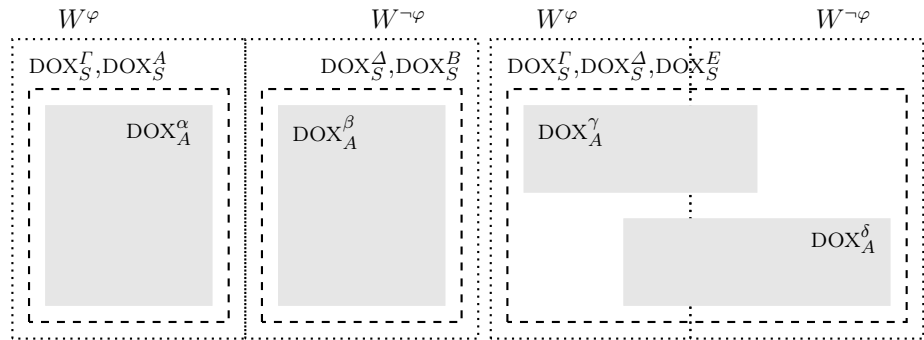
²⁸Or, from the speaker's perspective, that the speaker believes the addressee to not believe that the speaker does not believe φ to be true.

DOX_A^B and DOX_A^Δ as they have intersections with $B_S \neg \varphi$. This is the usual forgone commitment arising from interrogatives, requiring that the addressee exclude that the speaker is committed to the prejacent (in this case, $\neg \varphi$). Adding the Q-implicature (3.85b), which is weaker, excludes only DOX_A^A , the doxastic state on which the addressee is certain that the speaker believes φ to be true. The result is that states DOX_A^Γ and DOX_A^E are left — this leaves open all options except for a speaker belief that φ be false, and a higher order addressee belief that the speaker believe φ to be true, as can be confirmed in the representation of first-order beliefs and their accessibility from second order doxastic states repeated in (3.87).

(3.87) **Second-order doxastic states and supported beliefs:**



(3.88) **Accessibility of first-order doxastic states:**



This accounts for the observation that in some cases like that of the negative polar question in (3.79) polarity mismatch gives rise to epistemic bias, if not

obligatorily and of a weaker variety than when *no* is added to an NPQ in a positive-salient context.

Evidential bias from NPQs

Having derived the implicatures regarding speaker belief that arise from uttering an NPQ in a mismatching context sets the stage for accounting for evidential bias from NPQs.

Communicative intention and evidential bias A possible explanation could go as follows. A rising interrogative is information-seeking communicative behavior, and invites commitment from the addressee. Assuming that the salient alternative is the null-hypothesis to be for deciding which of the alternatives is true, which in the most simple case amounts to finding out which cell of the partition, W^φ or $W^{\neg\varphi}$, the actual world is in, an observer of a question as information-seeking behavior can expect the speaker to invite commitment to the more salient alternative, unless there is a reason to deviate from the null hypothesis. Evidence supporting the other alternative, such as negative evidence in a positive-salient context, is such a reason.

There is a problem with this reasoning, however — it does not explain why the speaker forgoes the alternative with *no* which would explicitly mark negative evidence. It cannot simply be argued that *no*-NPQs are reserved for negative-salient utterance situations with evidence supporting the negated prejacent (as the mirror image of *no*-PPQs in positive-salient utterance situations), as *no*-NPQs are felicitous in positive-salient contexts, thus they must be an active alternative. I suggest a solution within the present framework as follows.

Shifting salience The information that there is evidence in the utterance situation is available to both speaker and addressee in the relevant context (this is one of the conditions that for instance Büring and Gunlogson (2000) impose on contextual evidence, see the introduction). The speaker's choice to utter an NPQ without *no* would give rise to the implicature that there is no evidence for $\neg\varphi$, provided that the *no*-NPQ is an alternative. However, in all

utterance situations that have been used in the examples of NPQs discussed here, it is not the case that there is no such evidence, which the addressee is aware of. This leaves as a possible interpretation that the speaker assumes the evidence to be strong enough to cause a shift in salience, such that $\neg\varphi$ becomes the null hypothesis for seeking information from the addressee, but not strong enough to be a basis for forming a belief of the speaker that $\neg\varphi$ holds (as is the case when *no* is added).²⁹

From the speaker's perspective, this can be framed as using the best match for a negative-salient, neutral context $C_{\neg\varphi}^0$ in a positive-salient, negative context C_{φ}^- , thus indicating that evidence has caused a salience shift in terms of the null-hypothesis, if not in terms of the extralinguistic context set. In this way, the mismatch *within* the extralinguistic context set is reflected by the mismatch between preadjacent polarity and salient polarity, which is a sufficient indicator of negative evidence, thus the addition of *no* is not mandatory. While the notion of saliency and the mechanisms by which it changes are not worked out in detail here (and formalization of these points is beyond the powers of the framework as it stands), this explanation must suffice as a background to account for the contribution of the particle *no* to utterance meaning and its connection to belief revision.³⁰

An example which fits with an analysis on this lines is that of an NPQ from Sudo (2013), in which no obligatory epistemic bias arises. It is repeated below as (3.89).

Scenario: as above [negative context, utterance situation $C(\varphi)^-$]

A: We are all here now. Shall we begin the meeting?

(3.89) *S: Daremo hokani konai?*
 nobody else come.NEG
 ‘‘Is nobody else coming?’’

²⁹It could be argued that the *no*-NPQ is an active alternative, in which case it would arise as an implicature that there is no adequate evidence in the Gricean sense to support φ . I keep this possibility open for further research.

³⁰A detailed discussion of the differences between NPQs and PPQs, which has received a lot of attention in research on question meaning, as well as of theories of questions under discussion closely linked to the notion of saliency are well beyond the scope of this thesis. In principle, any account that can capture saliency and changes in saliency should be compatible with the placeholder notion in the present framework.

I contend that it is at least a salient interpretation of this example that the speaker is merely confirming whether or not actually no one else is coming, without having any particular prior expectations with regard to the answer. If the proposal is on the right track, the utterance simply indicates a shift in salience, namely from a context where “Someone else is coming” is the salient cell of the partition under discussion to one where “Nobody else is coming” is the salient cell. While such a reading is arguably more plausible when the evidence is less strong than in the constructed scenario, it is at least a possible reading of NPQs in positive-salient contexts, in addition to those giving rise to (at least some) epistemic bias like the example in (3.79).

Epistemic bias from NPQs with *no*

The main result of the previous section besides the function of saliency shift is that forgoing the positive alternative in a positive-salient context gives rise to an implicature in form of public addressee bias towards a speaker belief that φ holds. That the addressee is biased towards a speaker belief that φ holds in the output context does, however, not necessarily mean that the speaker believes φ to be true, or that the addressee should assume so. This is where in Japanese, the evidence-marking function of *no* comes into play.

Two readings of NPQs The two possibilities that $\neg PB_S \neg B_S \varphi$ leaves from the perspective of the addressee are that the speaker is in non-committed doxastic state w.r.t. $\varphi \vee \neg \varphi$, or that the speaker entertains a previous belief that φ holds, *i.e.* the speaker is in a doxastic state committed to, or at least biased towards φ prior to the utterance. I argue that the *no*-NPQ singles out the latter interpretation, based on the enriched CCP-meaning of an NPQ with a forgone PPQ alternative to which *no* is added in a step-wise derivation of enriched utterance meaning. The derivation is shown below.

The CCP for a *no*-NPQ in (3.90b) is derived from CCP of an NPQ in a positive-salient utterance situation repeated from (3.84) in (3.90a), which is enriched with the Q-implicature arising from a forgone PPQ, by addition of the evidence condition that *no* introduces.

(3.90) CCPs of *no*-/plain NPQs in positive-salient context:

$$\begin{aligned}
 \text{a. } \llbracket \text{INT}(\neg\varphi) \uparrow \rrbracket^{\text{ALT}} &= \\
 &= \{ \langle c, c' \rangle \mid \neg B_S^c \neg\varphi \wedge \neg PB_S^{c'} [\neg B_S \varphi \wedge B_A \neg\varphi] \wedge PB_S^{c'} \neg B_S \neg\varphi \} \\
 \text{b. } \llbracket \text{INT}(no(\neg\varphi)) \uparrow \rrbracket^{\text{ALT}} &= \\
 &= \{ \langle c, c' \rangle \mid \neg B_S^c \neg\varphi \wedge EV_{\mathcal{X}}^c \varphi \wedge \neg PB_S^{c'} [\neg B_S \varphi \wedge B_A \neg\varphi] \wedge \\
 &\quad \wedge PB_S^{c'} [\neg B_S \neg\varphi \wedge EV_{\mathcal{X}} \neg\varphi] \}
 \end{aligned}$$

The step of taking the enriched CCP for an NPQ with polarity mismatch as the basis for deriving the CCP of the *no*-NPQ under polarity mismatch is crucial as it differentiates this case from the “regular” evidence-marking case under matching polarity. It is also in line with the observation that, all things being equal, *no* adds additional (epistemic) bias to the already (evidentially) biased NPQ in positive-salient contexts.

Adding *no* to an utterance which already reflects an effect of evidence by way of conveying either saliency shift or speaker bias, as outlined above, indicates that the evidence has become basis for belief formation. Within the framework, this is a consequence of the definition of evidence within utterance felicity conditions as being subject to the evidence rule.³¹ While marking evidence in a question in the case of matching polarity indicates that the speaker is about to form a belief that φ holds, requesting any relevant information that the addressee might have regarding this, this is different in the case of polarity mismatch due to the shift in salience and thus expectations that has occurred. One salient interpretation of the *no*-NPQ is thus one on which the speaker is committed to φ , and the new evidence is initiating a process of belief revision, or has initiated such a process that is currently underway.

Consider again the example in which epistemic bias arises from the plain NPQ as well, but it is considerably strengthened by the addition of *no*, here repeated as (3.91) from (3.79):

Scenario: My friend has just entered our windowless office wearing a dripping wet raincoat. [positive-salient, negative context]

³¹Which in turn is based on the same intuition that leads Buring and Gunlogson (2000) to define the contextual evidence relevant for bias in negative polar questions as “compelling”.

- (3.91) *Ima hare-tenai no?*
 now be_sunny-PROG.NEG no
 “{Is it not / isn’t it} sunny now?”

When *no* is added to this utterance, the following output conditions arise, where (3.92b) shows the effect of the carried-over evidence condition introduced by *no* relevant to speaker beliefs.

(3.92) **Implicatures from *no*-NPQs in positive context:**

- a. $PB'_S \neg B_S \neg \varphi \wedge \neg PB'_S \neg B_S \varphi \rightarrow \{B_A \neg B_S \neg \varphi \wedge \neg B_A \neg B_S \varphi\} \in c'$
 b. $PB'_S EV_X \neg \varphi \rightarrow EV_S \neg \varphi \in c'$

Second-order bias towards a speaker belief that φ , *i.e.* that “it is sunny” as shown in (3.92a), and the usual evidence condition that is introduced by *no*, represented from the speaker’s perspective in (3.92b) taken together make a belief-revision reading plausible — the speaker indicates that there is in principle sufficient evidence to assert $\neg \varphi$, and at the same time conveys bias towards φ . From the addressee’s perspective, the speaker is either committed to φ , or in an agnostic state. If the speaker were in a non-committed state, the salience-shifting plain NPQ would be the preferred utterance, as outlined above. If, on the other hand, the speaker is committed to φ , reasoning on the speaker’s belief state based on the evidence rule is blocked, as shown in (3.93) below, adapted for the current example from (2.36) in chapter two.

(3.93) **Blocked inference on the strong construal:**

$$[(EV_S \neg \varphi > B_S \neg \varphi) \wedge EV_S \neg \varphi] \wedge B_S \varphi \not\vdash B_S \neg \varphi$$

The connection to belief formation is rather obvious, as the speaker is most likely indicating that a process of belief revision is underway, and is seeking information from the addressee as input for this process. Belief revision will be discussed in more detail below connection with falling interrogatives.

On a final note, this section has shown how a number of factors is involved in giving rise to the belief-revision interpretation of *no*-NPQs. This poses two questions: first, how come that in falling interrogatives, a similar reading arises by mere addition of *no*, without polarity mismatch, and second, how

come that the same reading does not arise in *no*-PPQs in positive-salient contexts. The answer to these questions lies in part outside the capabilities of the current framework, as it needs to be considered that rising, but not falling interrogatives are information- and commitment-seeking speech acts. Falling interrogatives *convey* doubt, *i.e.* that the speaker does not believe the prejacent to be true, while rising interrogatives require this as a preparatory condition, but, all else being equal, do not convey it. In the case of polarity mismatch, however, a tendency of the speaker is conveyed in form of a Q-implicature, in which case the addition of *no* has a similar effect as in falling interrogatives, which are the focus of the next section.

Interim summary

Summing up, the communicative effects of NPQs can be explained by polarity mismatch and the Q-implicatures that arise from the alternatives it activates, by saliency shifting, *i.e.* changing of the null hypothesis, and by the contribution of *no* as an indicator of a belief revision process, which can also be observed in falling interrogatives. To close this section, the schematic table below shows matching speaker doxastic states, as well as the crucial properties of matching utterance types for different kinds of contexts.

(3.94) Matching interrogatives and input contexts:

- | | | | | | |
|----|---------------------------------|-----------------------|--|-----|--|
| a. | C_φ^0 | $\longleftrightarrow$ | $\Delta^{\text{ALT}}\text{INT}(\varphi)\uparrow$ | $=$ | $\neg PB_S EV_{\mathcal{X}}\varphi$ |
| b. | C_φ^+ | $\longleftrightarrow$ | $\Delta\text{INT}(no(\varphi))\uparrow$ | $=$ | $EV_{\mathcal{X}}\varphi$ |
| c. | $C_\varphi^-/C_{\neg\varphi}^0$ | $\longleftrightarrow$ | $\text{INT}(\neg\varphi)\uparrow$ | | |
| d. | C_φ^- | $\longleftrightarrow$ | $\Delta^{\text{ALT}}\text{INT}(\neg\varphi)\uparrow$ | $=$ | $\neg PB_S \neg B_S \varphi \rightarrow \neg B_A \neg B_S \varphi$ |
| e. | C_φ^- | $\longleftrightarrow$ | $\Delta\text{INT}(no(\neg\varphi))\uparrow$ | $=$ | $EV_{\mathcal{X}}\neg\varphi$ |

The case discussed first was that of positive polar questions in positive-salient neutral and positive contexts, shown here in (3.94a) and (3.94b). The matching alternative for C_φ^0 in (3.94a) is the bare PPQ, as there is no evidence in the context thus the *no*-PPQ is dispreferred. The matching alternative for C_φ^+ is the *no*-PPQ, either because the contextual evidence should be marked if such marking is possible, or because of the implicature $\neg EV_{\mathcal{X}}\varphi$ arising for the bare PPQ in this context, as indicated in the Δ^{ALT} -set in (3.94a).

Next, I discussed the bias patterns arising from NPQs, arguing that salience shift can be an indicator of contextual evidence, and that polarity mismatch gives rise to an implicature of addressee bias towards a speaker belief that the salient proposition holds. First, (3.94c) shows the case of salience shift, where the NPQ is used *as if* the actually positive-salient, negative context were a negative-salient context, indicating a shift in the null-hypothesis. In this case, rather than *indicating* that there is (negative) evidence in the context, the polarity choice is *motivated* by such evidence.

The core polarity-mismatched use of NPQs is shown in (3.94d), where forgoing the PPQ alternative gives rise to an implicature that leads to bias towards $B_S\varphi$ from the addressee perspective, that is non-obligatory epistemic bias, in addition to evidential bias arising from salience shifting. The crucial implicature is shown as $\neg PB_S\neg B_S\varphi$, that is the negation of the carried-over preparatory belief condition of the PPQ, which, in combination with the stricter restrictions on addressee assumptions with regard to $B_S\neg\varphi$ carried over from the input contexts, gives rise to higher-order bias, *i.e.* bias towards $B_S\varphi$.

Finally, when *no*, and thus a preparatory condition $EV_X\neg\varphi$, is added to the polarity-mismatched NPQ, this conveys that the speaker is in a process of belief revision as blocking of the evidence rule has occurred, from the combination of the aforementioned bias towards $B_S\varphi$ and the explicitly *no*-marked evidence in support of $\neg\varphi$. Such evidence is, in principle, sufficient to support a belief $B_S\neg\varphi$, which is blocked by a pre-existing belief $B_S\varphi$ here.

3.4.4 Falling interrogatives: doubt and incredulity

This section expands on the belief-revision readings proposed above for rising interrogatives with polarity mismatch and *no*, proposing that falling interrogatives receive *no* receive *incredulity readings* similar to those of *no*-NPQs, and that plain falling interrogatives receive *doubt readings*, which correspond to a different stage in the belief revision process. The crucial difference between rising and falling interrogatives in terms of communicative intention is that falling interrogatives are neither information-seeking nor do they neces-

sarily invite commitment, but rather convey information about the speaker's belief states, specifically about which stage in a process of belief revision or formation the speaker is in.

Evidential bias and falling *ka*-interrogatives

While falling interrogatives differ from rising interrogatives in that they do not invite addressee commitment, as reflected in the lack of reference to addressee belief in the forgone commitments that arise from them, they share their preparatory conditions with rising interrogatives. The effect that *no* has in falling interrogatives has in terms of matching utterances and contexts is thus parallel to *no* in rising interrogatives in terms of conditions on the input context, when the plain version and that with *no* are both active alternatives. The CCPs of a plain falling interrogative and one with *no* is shown in (3.95)

(3.95) **CCP of plain/*no*-FI:**

- a. $\llbracket \text{INT}(\varphi) \downarrow \rrbracket = \{ \langle c, c' \rangle \mid \neg B_S^c \varphi \wedge PB_S^{c'} \neg B_S \varphi \}$
- b. $\llbracket \text{INT}(\text{no}(\varphi)) \downarrow \rrbracket = \{ \langle c, c' \rangle \mid EV_{\mathcal{X}}^c \varphi \wedge \neg B_S^c \varphi \wedge PB_S^{c'} [EV_{\mathcal{X}} \varphi \wedge \neg B_S \varphi] \}$

The differences in commitments between (3.95a) and (3.95) w.r.t. each other are parallel to those between plain and *no*-PPQs, as shown in (3.96).

(3.96) **Differences in commitment between plain and *no*-FIs:**

$$\begin{aligned} \Delta_{\text{INT}}(\text{no}(\varphi)) \downarrow &= \{ PB_S EV_{\mathcal{X}} \varphi \} \\ \Delta^{\text{ALT}}_{\text{INT}}(\varphi) \downarrow &= \{ \neg PB_S EV_{\mathcal{X}} \varphi \} \end{aligned}$$

Thus, the resulting matching of positive and neutral contexts with plain and *no*-FIs is in principle parallel to the case of PPQs, as shown in (3.97).

(3.97) **Matching FI-alternatives and neutral / positive contexts:**

- a. $C_{\varphi}^0 = \{ \varphi \}$ $\longleftrightarrow$ b. $\Delta_{\text{INT}}(\varphi) \downarrow = \{ \neg PB_S EV_{\mathcal{X}} \varphi \}$
- c. $C_{\varphi}^+ = \{ \varphi, EV_{\mathcal{X}} \}$ $\longleftrightarrow$ d. $\Delta_{\text{INT}}(\text{no}(\varphi)) \downarrow = \{ PB_S EV_{\mathcal{X}} \varphi \}$

In this way, falling interrogatives are parallel to rising interrogatives, which extends to cases of polarity mismatch. The (crucial) difference is that falling interrogatives are not information-seeking speech-acts and that they are

speaker- rather than addressee-belief oriented, as highlighted in the diagram of communicative intentions in (3.98), repeated again from (3.52).

(3.98) **Utterance types and communicative intentions:**

utterance		information	belief	commitment
INT	↑	seeking	addressee	forgoing
DEC	↑	conveying	addressee	committing
INT	↓	conveying	speaker	forgoing
DEC	↓	conveying	speaker	committing

This configuration of communicative intentions makes falling *ka*-interrogatives the unmarked choice for conveying that the speaker does not believe the pre-jacent proposition to be true, *i.e.* to forgo commitment without requesting commitment from the addressee.

Thus, by not being addressee-belief oriented in the way rising interrogatives are, falling interrogatives allow a clearer view on the contribution of *no* to utterances conveying information about the belief state of the speaker and the (potential) changes it undergoes. This also has an effect on the active alternatives, which are not only assertions, but also rising declaratives. After discussing the bias patterns of falling interrogatives on the two readings introduced with the representative example above, I propose that each reading marks a distinct stage in a belief revision process.

Two readings of falling interrogatives

Davis's (2011) example for two readings of falling interrogatives is repeated below, starting with the scenarios.

- (3.99) a. Scenario 1: The speaker is biased towards it being the case that birds cannot live here, but looking out the window is surprised to discover that in fact they do. He utters [the falling *ka*-interrogative] to indicate his surprise.
- b. Scenario 2: The speaker believes that birds cannot live here. His friend says something that suggests they do. He utters [the falling *ka*-interrogative], thereby indicating that his friend is mistaken, and that it should be obvious birds cannot live here.

The doubt reading The first example is that of a plain *ka*-interrogative with final falling intonation. This example is better in Scenario 2, but also passable, if somewhat degraded, in Scenario 1. As its conveyed meaning is that the speaker doubts the prejacent, *i.e.* as it gives rise to a public belief that the speaker does not believe the prejacent to be true, I label this the *doubt reading* of falling interrogatives.

- (3.100) *Tori-ga konna tokoro-ni sum-eru ka.*
 bird-NOM such_a place-in live-POT.NPST *ka*
 “Can birds live in a place like this?”

That (3.100) can be used in both scenarios, *i.e.* is just somewhat degraded when there is evidence, can be explained by the assumption that the *no*-alternative is not necessarily active in all cases, as also discussed with regard to the bias patterns of PPQs above. It should also be noted here that there is a soliloquous variant of examples like (3.100) which can be accompanied by vowel lengthening in *ka*, and conveys that the speaker is adding the prejacent to her beliefs, either as a result of belief revision or overriding a previous belief, paraphraseable in English as “Huh! Can birds live here...”. While such cases have no apparent connection to *no* and are thus not of primary interest for the analysis here, they underline the point made earlier that the felicity of utterances (such as PPQs and, in the case at hand, FIs) without *no* is only degraded when the version with *no* is an active alternative from which a Q-implicature with an effect resembling maximize presupposition arises.

That the function of examples like (3.100) is to convey speaker doubt, and hence the label *doubt reading* is on the right track, is also corroborated by Davis (2011, 199) noting that the use associated with Scenario 2 is similar to English rhetorical polar questions. Rhetorical questions are essentially questions that do not require answers, *i.e.* speech acts that are not information seeking, but are also forgoing commitment. This is in line with the properties of Japanese falling interrogatives as described above. Davis further notes that the use of falling interrogatives associated with Scenario 1, which I label the *incredulity reading* below is “not found in English” (*ibid*).

The incredulity reading Moving on to the falling *no*-interrogative shown in (3.101), *i.e.* the incredulity reading, Davis observes that it is only good in Scenario 1, but rules out Scenario 2 — this amounts to an observation that it requires contextual evidence to be felicitous.

- (3.101) *Tori-ga konna tokoro-ni sum-eru no ka.*
 bird-NOM such_a place-in live-POT.NPST *no ka*
 “Ah, so birds can live here after all.”

As the analysis proposed in this thesis makes a difference between falling *noka*-interrogatives and *noda*-declaratives which can be used in similar scenarios, Davis’s translation is somewhat misleading as it is essentially a direct translation of a *no*-declarative in soliloquous use, such as “*Tori-ga konna tokoro-ni sum-eru n da!*” (this example will be discussed in the section on *no*-assertions below). A translation reflecting this difference could be a sentence exclamation such as “Birds can live here!?”

It should be noted that falling *noka*-interrogatives are not necessarily always bad in situations without perceptual evidence, but can be used to “confirm with the interlocutor whether [their] judgment is correct or not”, according to Masuoka and Takubo (1992, 136–137). I take this to be a case in which *no* marks that the judgment in question is accessible, as evidence for the prejacent, to all participants, but the speaker is still in a process of (considering) belief revision, in line with the analysis proposed below.

Accounting for the two readings

As mentioned, I label the two readings of falling interrogatives corresponding to the two scenarios in (3.99) the doubt reading (associated with the *ka*-FI and Scenario 2) and the incredulity reading (associated with the *noka*-FI and Scenario 1). Below, an overview of how the felicity conditions of each utterance can account for the two readings is provided. In the next section, I propose that the two interpretations propose that they correspond to distinct stages in a belief revision process.

The doubt reading As mentioned, the utterance type which imposes the least restrictions on contexts are bare falling interrogatives: they neither involve speaker commitment nor reference to addressee beliefs. It is instructive to consider the doubt reading of the falling interrogative in cases where the utterance is made in reaction to the addressee asserting the prejacent in the context of consensus-seeking linguistic behavior. The goal of consensus-seeking is to increase the propositions in the common ground, which I assume to be defined as the intersection of public beliefs, *i.e.* following Definition 2 in (3.51) repeated below as (3.102).

(3.102) **The common ground: Definition 2:**

$$\mathcal{CG}(c, w) = \{\varphi \mid \forall x \in \mathcal{X} : PB_x \varphi \in c\}$$

Recall that as of Scenario 2 in (3.99b), the utterance by the speaker S of a plain falling *ka*-interrogative in (3.100) is a reaction to an utterance by the addressee A which presumably results in addressee commitment to φ “birds can live here”. For simplicity, let’s assume that the addressee has publicly committed to φ by asserting it, as illustrated below.

(3.103) **Commitment of A to φ :**

- a. $\llbracket \text{DEC}_A(\varphi) \downarrow \rrbracket = \{\langle c, c' \rangle \mid \neg B_A^c \neg \varphi \wedge EV_A^c \varphi \wedge PB_A^{c'}[B_A \varphi \wedge EV_A \varphi]\}$
- b. $PB_A[\varphi \wedge EV_A \varphi] \in c'$

After assertion of φ by A , represented as the CCP in (3.103a), the context set shown as c' (the context set at a world w' after A ’s, but before S ’s utterance), will contain a public belief by A that φ is true, and that A has evidence supporting this belief. When the speaker next utters a falling interrogative with the same propositional context, this has the following effect on the $\mathcal{CG}$ as defined in (3.102) above.

(3.104) **Forgone commitment of S to φ :**

- a. $\llbracket \text{INT}_S(\varphi) \downarrow \rrbracket = \{\langle c, c' \rangle \mid \neg B_S^c \varphi \wedge PB_S^{c'} \neg B_S \varphi\}$
- b. $\varphi \notin \mathcal{CG}$

Thus, the basic contribution of a falling interrogative is enough to predict the communicative effect of the doubt-reading in examples as preventing

the prejacent from entering the common ground. What the doubt-reading conveys that the speaker does not necessarily believe the prejacent to be false, but does also not believe the prejacent to be true — thus, a reading where the speaker is in the process of adding φ to her beliefs is also possible.

In this way, the doubt reading is not restricted to cases where the speaker signals that a proposition will not be added to the common ground as is the case in Davis's example, but can also indicate the speaker is acknowledging the apparent truth of the prejacent without abandoning the possibility that it is false entirely. Such a reading conveys a biased first-order doxastic state as discussed in the analysis of *daroo* as lowering the quality threshold above, as discussed in the in section 3.4.7 on *no-daroo* utterances.

The incredulity reading The incredulity reading differs from the doubt reading in that it necessarily involves a previous belief, or at least strong expectation, on part of the speaker that the prejacent is false. With the addition of *no* to falling interrogatives, it comes about as follows.

When there is mutually accessible evidence, in Scenario 1 as extralinguistic perceptual evidence, and this evidence is marked by the addition of *no*, this changes the preparatory evidence conditions of the utterance and thus the secondary commitments arising from it, as seen with other utterance types. The CCP of a falling interrogative with *no* is repeated here for illustration.

(3.105) **CCP of *no*-FI:**

$$\llbracket \text{INT}(\text{no}(\varphi)) \rrbracket = \{ \langle c, c' \rangle \mid EV_X^c \varphi \wedge \neg B_S^c \varphi \wedge PB_S^{c'}[EV_X \varphi \wedge \neg B_S \varphi] \}$$

The crucial point here is that the speaker acknowledges that there is mutually accessible supporting φ by public commitment to $EV_X \varphi$, which, by the evidence rule, gives rise to a belief $B_S \varphi$ holds unless the speaker believes φ to be false. The blocking condition for the evidence rule on the strong construal is repeated below to illustrate this.

(3.106) **Blocked inference on the strong construal:**

$$[(EV_S \neg \varphi > B_S \neg \varphi) \wedge EV_S \neg \varphi] \wedge B_S \varphi \not\vdash B_S \neg \varphi$$

As public commitment to $\neg B_S\varphi$ in (3.105) shows, a public belief that $B_S\varphi$ does not arise from the falling interrogative with *no*, which is grounds for the assumption that belief revision is blocked. I argue that this is precisely what the incredulity reading conveys, in both the case of a *no*-NPQ in a polarity-mismatched context discussed in section 3.4.3, and that of the falling *noka*-interrogative discussed here. The difference between the two utterance types is that as information-seeking speech-act, the NPQ only gives rise to an incredulity reading under polarity mismatch, but indicates that the speaker is in a process of belief formation, *i.e.* finding out whether φ or $\neg\varphi$, in utterance situations with matching polarity, while the falling interrogative give rise to an incredulity reading without polarity mismatch.

It should be noted that this is by no means to say that falling *noka*-interrogatives always indicate that belief revision is not taking place. The speaker in Davis’s Scenario, for example, is “biased towards” $\neg\varphi$, but upon finding evidence “is surprised to discover that”, in fact, φ . This is clearly a case of belief revision, and is compatible with the current proposal. This is because the public commitment to $\neg B_S\varphi$, which in the case of the falling interrogative without *no* can be observed as part of the utterance’s conveyed meaning, is a *secondary* commitment arising from an *input* condition, and the falling *noka*-interrogative can be used to “narrate” the speaker’s evidence-based belief revision process. This function of utterances with and without *no* is the focus of the next section.

It should finally be noted that when there is no previous belief or expectation that needs to be revised, a declarative version of the falling interrogative with *no* is preferred, a point that I return to shortly with a declarative variant of Davis’s example.

Belief revision and the incredulity reading

I suggest that by uttering the falling interrogative with *no*, instead of, for instance, asserting either φ , possibly with *no* (this would give rise to a mirative reading closely related to the incredulity reading, see 3.4.5), or $\neg\varphi$, the speaker can thus convey that she is in a process of belief revision, where

the derivation of a belief that φ holds is backed by evidence, but blocked by a previous belief that φ is false. Thus, the incredulity reading and the doubt reading can mark different stages within a belief revision process.

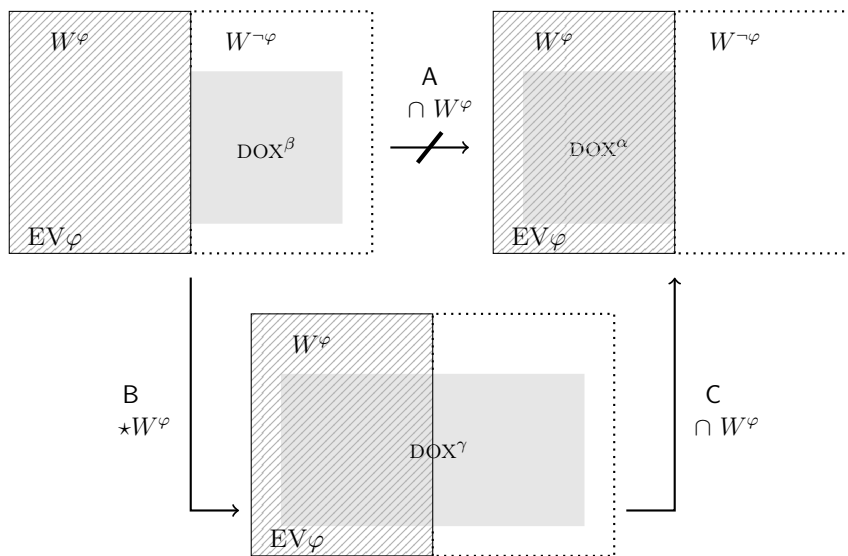
Recall the steps of belief revision, repeated below, where the doxastic states correspond to those in the belief revision schema.

(3.107) **Steps of belief revision:**

- A $\text{DOX}^\beta \cap W^\varphi$ (Narrowing of non-committed state under evidence.)
- B $\text{DOX}^\beta \star W^\varphi$ (Widening of committed to non-committed state.)
- C $\text{DOX}^\gamma \cap W^\varphi$ (Narrowing after widening.)

This rule states that when the speaker faces contradictory evidence (in the sense of conflicting with the speaker's own beliefs thus leading to blocked defeasible inference by the evidence rule), the speaker can choose to expand her doxastic state from one committed to $\neg\varphi$ to one in which both φ and $\neg\varphi$ are possible. Note that this process is not mandatory, and occurs only if the speaker deems the evidence strong enough to warrant such a move (if not strong enough for immediate belief revision). The falling interrogative with *no* on the incredulity reading conveys that a process of belief formation has been blocked. To illustrate the steps above, the schema for belief revision under evidence is repeated below.

(3.108) **Schema of belief revision under evidence**



The top left part of the illustration represents an utterance context in which there is evidence supporting φ available to the speaker but the speaker entertains a belief that φ is false. In such a context, belief formation based on the evidence rule is blocked, as indicated by the arrow labeled A. One possible reaction to this is belief revision, the first step of which is widening of the doxastic state supporting the belief that φ is false, as indicated by the arrow labeled B. I suggest that an utterance can be used as an indicator for which stage of a belief revision process the speaker is in. The combination of the preparatory belief condition of an interrogative $\neg B_S \varphi$ along with the evidence condition from *no* ($EV_{\mathcal{X}} \varphi$) indicates that the input context of the utterance must be that illustrated in the top left, *i.e.* the speaker's doxastic state has the relevant properties of DOX_{β} , and there is (mutually accessible) evidence supporting φ in the context, which initiates belief revision represented by the arrow labeled B. A non-committed doxastic state is not an option for the input context as, all else being equal, it would allow the assumption that doxastic state of the speaker has been narrowed to DOX_{α} in accordance with the evidence rule (the arrow labeled C). Finally, pure doubt readings, like that in Davis's example, are best represented as A, where there is either no sufficient evidence, or a previous belief keeps the speaker from entering belief revision.

I suggest that speakers can “narrate” a belief revision or formation process, where readings of different utterance types indicate different stages in the belief revision process as labeled above. The correspondences are roughly as summarized in the table below.

(3.109) **Utterance types and readings indicating belief revision**

step	reading	orientation		
		speaker	addressee	
A	doubt	$INT(\varphi) \downarrow$	$INT(\varphi) \uparrow / DEC(\varphi) \uparrow$	
B	incredulity	$INT(no(\varphi)) \downarrow$	$INT(no(\neg\varphi)) \uparrow$	in C_{φ}^{-}
C	mirative	$DEC(no(\varphi)) \downarrow$	$DEC(no(\varphi)) \uparrow$	

So far, I have shown that falling interrogatives receive doubt readings in their plain form, incredulity readings with *no*, and have mentioned that declara-

tive counterparts of the latter have a mirative reading, covering the speaker-oriented column of the table. I have first discussed incredulity readings in terms of rising *no*-interrogatives with polarity mismatch (*no*-NPQs), as indicated by the negated preadjacent and the positive-salient, negative context C_{φ}^{-} in the table above.

Addressee-oriented doubt readings are predicted to arise from plain questions as they share the same preparatory conditions as falling interrogatives. However, such a nuance would be hard to detect in an information-seeking speech act — the speaker would be expected to choose another utterance to express doubt. I assume that bare utterances with final rise which get a reading on these lines are best analyzed as rising declaratives, which I argue for in section 3.4.6, where I also briefly discuss the addition of *no* to RDs, which I suggest can give rise to an addressee-oriented mirative reading.

It should be noted that the table is not supposed to give an exhaustive description of which utterance type can receive which reading, but rather provide an overview of the utterances discussed in the examples here and the salient readings associated with them.

In the following section, I turn to assertions with *no*, arguing that an informative interpretation of *no*-assertions is that corresponding to stage C in the belief revision process, giving rise to an exclamative-like reading labeled mirative reading in the table above.

3.4.5 *No* in assertions: incredulity and mirativity

In this section, I turn to *no* in declaratives, starting with rising declaratives. The common thread here is that *no* in declaratives marks evidence, which is at first sight superfluous as declaratives have an evidence requirement.

Mirative *no*-assertions

As discussed in the introductory chapter, the line between the complementizer and the particle *no* can be fuzzy in the case of assertions, in particular copular assertions. The most clear cases are arguably mirative utterances, and are consequently the focus of the discussion in this section. In a nutshell,

the mirative reading of *no-da* assertions will be derived in parallel to the incredulity reading of *no-ka* utterances, before discussing rising *no*-declaratives and moving on to the interaction of *daroo* and *no*.

The preparatory conditions of plain assertions and such with *no*, as shown below, differ only in one point: whether evidence supporting φ may be private, or must be public.

(3.110) **CCPs of plain and *no*-assertion:**

- a. $\llbracket \text{DEC}(\varphi) \downarrow \rrbracket = \{ \langle c, c' \rangle \mid \neg B_S^c \neg \varphi \wedge EV_S^c \varphi \wedge PB_S^{c'} \varphi \}$
- b. $\llbracket \text{DEC}(no(\varphi)) \downarrow \rrbracket = \{ \langle c, c' \rangle \mid \neg B_S^c \neg \varphi \wedge EV_X^c \varphi \wedge PB_S^{c'} \varphi \}$

The addition of a mutually accessibility requirement, or indirectly a publicity requirement for the evidence supporting the asserted proposition, can explain the mirative nuance which is observed in utterances where evidence supporting φ has just become available.

To make the connection to falling interrogatives transparent, consider the declarative version of Davis’s example (3.101)

- (3.111) *Tori-ga konna tokoro-ni sum-eru n da.*
 bird-NOM such_a place-in live-POT.NPST no COP
 “Birds can live in such a place!”

Recall the scenario that the falling interrogative singles out:

- (3.112) Scenario 1: The speaker is biased towards it being the case that birds cannot live here, but looking out the window is surprised to discover that in fact they do. He utters [the falling *ka*-interrogative] to indicate his surprise.

The same reading is available for (3.111), with the subtle difference that the nuance of incredulity is stronger in the falling interrogative — the declarative conveys milder surprise over the preajacent. This can be readily explained by assuming that the *no*-assertion marks stage C in the belief revision schema, which in the example at hand means that the belief that “birds can live in such a place” is backed up by mutually accessible evidence in the utterance situation. In this sense, the input and output contexts the assertion connects

correspond to a non-committed state in which there is evidence supporting φ for the input context, and the committed state resulting from application of the evidence rule on this constellation of evidence and belief for the output context.

Belief formation without narrowing On a side note, the basic idea that *no* in mirative examples indicates that a non-committed doxastic state has been narrowed can also potentially explain why certain instances of *no*-assertions are degraded, for instance the example from Noda (1997) below.

- (3.113) *A! Gokiburi-ga shin-deru (#n-da)*
 oh cockroach-NOM die-RES.NPST *no*-COP
 ‘Oh! There’s a dead cockroach!’ (Noda 1997, 66)

Noda proposes that the badness of *no* in this example is due to the lack of time the speaker has to decide whether or not the state of affairs had already been settled,³² while Najima (2002), using a similar example, explains the badness by the lack of an expectation that the prejacent would not hold.

Both of the explanations point towards an issue with resolving a question under discussion represented by a non-committed doxastic state. In examples where the state-of-affairs the prejacent denotes is an entirely new addition to the speaker’s beliefs, there is not likely a partition corresponding to a question which perceptual evidence supporting the resolves, thus there is no partition with regard to which the speaker’s doxastic state is non-committed in the utterance situation. An additional source for the badness of *no* in the example above is that it is not necessary to mark that the speaker is asserting the prejacent based on mutually accessible, rather than private, evidence, as the utterance is clearly describing an observed situation. This is a contrast to the generic statement in (3.111), which loses its mirative nuance when uttered without *no*.

In sum, I maintain that the badness of *no* in examples like (3.113) above is best explained by answering the question whether or not marking the presence of mutually accessible evidence is part of the speaker’s communicative

³²This links to Noda’s proposal that “givenness” or “settledness” (*kiteisei*) is at the core of the meaning of *no*.

intention or not. For instance, if the addressee expresses doubt over the truth of the proposition, (3.113) can be uttered with *no* felicitously in reply to this. Such uses of *no*-assertions are discussed below.

Non-mirative interpretations of *no*-assertions

The difference between the mirative and non-mirative readings of *no*-assertion comes down to what Noda (1997) proposes as the split between “factual” and “personal” *noda*. The former case is that of the example in (3.111), where the utterance is made to indicate that evidence has lead to belief revision, which can be soliloquous in the sense of not necessarily involving a (direct) addressee. In “personal” cases of *no*-assertions, the preparatory condition added by *no* can be used by the speaker to present the truth of the prejacent as following from mutually accessible, rather than just private belief.

Verifiable evidence I maintain, however, that the “factual” and “personal” uses of *noda*, are secondary to the underlying distinction between cases where the speaker’s intention is to convey that belief revision or -formation has taken place, and cases in which a previously held belief is presented as following from mutually accessible evidence. The following example from Noda (2002) illustrates this as it is neither necessarily mirative and “factual”, nor necessarily “personal”.

Scenario: *S* is Drinking beer after work.

- (3.114) *Soo, kore-ga umai n da.*
 right this-NOM delicious *no* COP
 “Yeah, this is delicious.”

According to the current proposal, what *no* adds to the meaning of (3.114) is the preparatory condition, and hence secondary commitment, that there is not only private, but also mutually accessible evidence for the goodness of the beer. It is important to note, however, that this is not necessarily evidence that has just come to the speaker’s (or all participants’) attention in the utterance situations and that no process of belief revision must have taken place. I label evidence that is not necessarily perceptual and only available

immediately prior to the utterance *verifiable evidence*, the existence of which can be conveyed through secondary commitment by *no*-assertions, which is a particularly salient interpretation in cases where it is obvious that the speaker believes the prejacent proposition to be true prior to the utterance.

Distinguishing private and public evidence At the center of the question of what *no* marks in assertions which already have an evidence condition lies the difference between “public”, or mutually accessible, evidence supporting φ as marked by *no*, and grounds for a speaker to commit to a belief that φ is true, as required in the preparatory conditions of assertions (and for the higher order belief that the addressee believe φ to be true in the case of rising declaratives). I have mentioned that the latter, even if made public, is not transparent to participants other than the speaker — other participants will know of the evidence, but not have access to the evidence, and thus not know its content. The crucial point here is that evidence which is public is a property of the context and can be verified by all participant, but when assuming cooperativity, the speaker has to trust that the evidence condition is satisfied when the speaker makes an assertion.

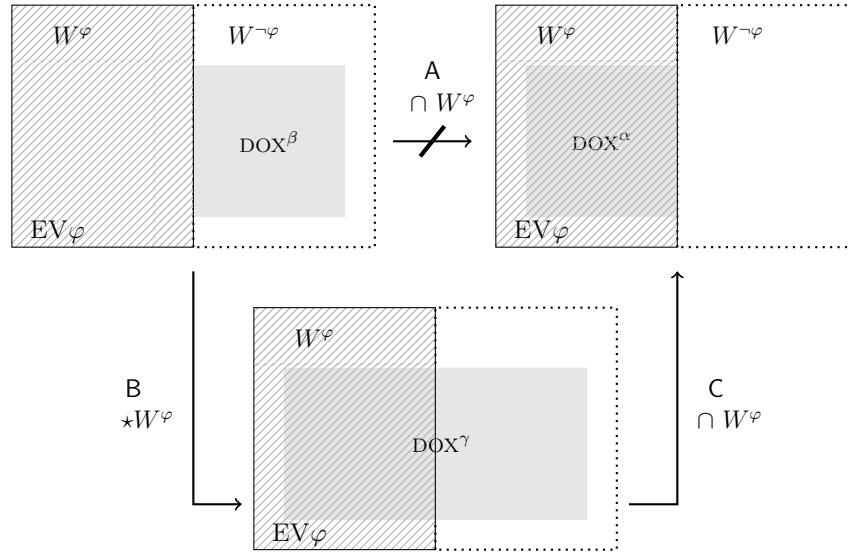
Thus, the marking of assertions with *no* has an “objectifying” function by which the evidence is, so to speak, externalized, and the speaker is not merely passing on information to the addressee, but at the same time insinuating that the addressee could also have found out about this themselves, as there is accessible evidence supporting φ . However, as in the case of assertions it is not always easy to keep the complementizer and the particle *no* apart, mirative examples remain at the center of cases which an account of the particle *no* should explain.

In rising declaratives, on the other hand, the final utterance type I discuss before moving on the combination of *no* and *daroo*, occurrences of *no* are unambiguously cases of the particle, but there is the issue of keeping rising declaratives apart from polar questions.

Belief revision and mirativity

As suggested in the discussion above, I assume that there is a connection between belief revision and mirativity in the sense of expressing an attitude of surprise w.r.t. the prejacent, and that mirativity can not only arise as a kind of illocutionary mood (*cf.* Rett and Murray 2013), but also from certain constellation of utterance felicity conditions with regard to belief and evidence, which in turn correspond to stages in a belief-revision process. A *no*-assertion on the mirative reading as defined above can indicate that belief revision has just taken place. To illustrate this, consider again the belief revision schema below.

(3.115) Schema of belief revision under evidence



The mirative reading of *no*-assertions with a non-negated prejacent φ indicates that there is a previous speaker belief, or expectation, that $\neg\varphi$ be at least more likely than φ . Mirative readings also commit the speaker to the prejacent. This is a clear different from prejacent-level or propositional (rather than speech-act) evidentials, which commit the speaker to the weaker evidence proposition, *i.e.* give rise to a public belief that there is such evidence.

In mirative *no*-assertions, on the other hand, the pre-jacent is asserted, thus the speaker is required to be in a doxastic state committed to the pre-jacent proposition. How does this go together with the previous belief or expectation $\neg B_S \varphi$? The answer I suggest is that *no* in the mirative case marks that there is evidence for φ , and that this evidence is the basis for a process of belief revision from either a non-committed state which was biased towards $\neg\varphi$, or even a state committed to $\neg\varphi$, but this has been revised to a doxastic state committed to φ , such as DOX_S^α in the illustration above. That is, the stage at which the utterance is made is at the transition towards a committed first-order doxastic state which is compatible with contextual evidence, which is marked with C, the stage associated with mirative readings, as proposed in the table in (3.109) above.

A link to rising declaratives Rising declaratives are conceivably belief revision markers are well, namely when the addressee is the source of the newly available evidence. When the addressee, for example, commits to φ , but the speaker has a previous belief, or a tendency to believe $\neg\varphi$, a rising declarative with *no* and an incredulity contour is an option that is available in Japanese as well. This, however, is not directly related to belief revision, but encodes the kind of discrepancy that exists between speaker and addressee beliefs. This is because if the speaker merely wanted to point out that the information provided by the addressee is contradicting a previous belief of the speaker, an utterance making no reference to the addressee's utterance would suffice. This is providing that the source of contradictory evidence is the addressee's utterance.

There is, however, a tendency to not mark evidence that comes from an addressee assertion in that way, but rather for the speaker to commit to the resulting belief that the addressee believes φ , while not committing to a first-order belief that φ is true. In order to understand what is going on in such a case, it is necessary to address why such discrepancy is a source of tension that would be pointed out by the speaker of an utterance in the first place.

3.4.6 Rising declaratives

As rising declaratives already have a preparatory evidence conditions, the question is what *no*-marking adds. In addition to this, there is the independent question of how to differentiate rising declaratives from questions. Answering the first question will link to the second — I defend that in rising declaratives, *no* marks evidence for a different kind of belief from what it marks in rising interrogatives and other utterances, from which predictions regarding the distinction between RDs and RIs can be derived.

Distinguishing questions from RDs I propose that the preparatory conditions and commitments of RDs and RIs, in particular when combining with utterance modifiers like *no* and *daroo*, can be used to distinguish them, predicting which uses are possible and which are not. As a distinction within the theory, this does not have a direct empirical basis in Japanese, but can be motivated in evidence from languages where rising declaratives and questions are differentiated syntactically.³³

Some arguments for the existence of a distinction between rising declaratives and rising interrogatives in Japanese are as follows:

1. The paradigm of commitments relies on rising declaratives, as for instance forgone commitment from rising interrogatives is derived from the commitment rising declaratives make.
2. Final rising utterances with an incredulity reading, which are a typical use of rising interrogatives in English, also exists in Japanese, and appear to have the same felicity conditions.
3. The properties of final rising *daroo*- (or *desho*-) utterances cannot be readily explained under the assumption that they are polar questions, but follow from their status as rising declaratives, which is further corroborated by the marginal status of rising *daroo-ka* utterances.

³³There are prosodic differences between rising interrogatives and questions in Japanese, as well, but I will not discuss them here in detail, leaving the analysis from within the framework to be tested against prosodic evidence in future research.

Rising declaratives and the addition of *no*

There are some issues with regard to *no* in rising declaratives. First, the possibility of the rising *no*-declarative actually being a *no*-PPQ is deceptive. Reasons to assume that rising declaratives indeed exist in Japanese have been mentioned above, but the line may not be entirely clear even when *no* is added. Next, it is not immediately clear whether *no* in rising declaratives marks evidence supporting the proposition φ , or evidence supporting an addressee belief that φ holds. Finally, in parallel to the case of assertion, it needs to be explained what difference the addition of *no* contributes to rising declaratives in the sense of marking evidence as mutually accessible rather than private. In this section, I provide an answer to the second issue and discuss what the present proposal predicts with regard to the other two points. Support for the existence of rising declaratives in Japanese and for the predictions made about them in the current proposal comes from *daroo* in rising declaratives which is discussed in the next section.

Evidence for addressee belief If the analysis of *no* in questions is on the right track, then the kind of evidence *no* marks is linked to preparatory belief conditions and their relation to the evidence rule, that is, in the case of rising declaratives, *no* marks evidence for an addressee belief that φ is true. This would mean that *no* marks a context in which $EV_{\mathcal{X}}B_A\varphi$ holds, *i.e.* that there is evidence in the context which would lead any participant to the belief that the addressee believes φ — but this should include the addressee, which raises questions with regard to epistemic privilege. Essentially, this interpretation makes the rising declarative with *no* a variant of a biased polar question, which is about the addressee’s beliefs rather than general facts about the world.

For illustration, consider a version of the example for an NPQ from Ito and Oshima (2014) with *no* added.

Scenario: A eats a piece of orange and makes a grimace.

(3.116) *Amaku-nai no?*

sweet-NEG *no*

“Is it not sweet?”

The predicate *amai* ‘sweet’ is one of personal taste, thus it can in principle hold from the perspective of the addressee, but still be false from the perspective of the speaker. Such predicates interact with *no*, as, for instance a speaker cannot attribute predicates of feelings or sensation, such as *ureshii* ‘happy’ or *samui* ‘cold’ to others without adding *no* (or other modifiers such as propositional level evidentials). I assume that the addition of *no* in such cases indicates that there is mutually accessible evidence for the truth of a proposition that cannot be directly verified by the speaker. Thus, if interpreting the example above in this way, the grimace is evidence for A’s sensation of sweetness, rather than for any objectively verifiable sweetness of the orange. This is the polar-question like reading of the rising declarative utterance.

Consider now a scenario for the same example in which the addressee has committed to a belief that the orange is not sweet, *i.e.* to $\neg\varphi$, but *S* has a different perception, as shown below.

Scenario: upon eating a piece of an orange that *A* has declared is not sweet, *S* finds it very sweet.

- (3.117) *Amaku-nai no?*
 sweet-NEG *no*
 ‘Is it not sweet?’

When interpreting this as a rising declarative, the utterance does not invite commitment from the addressee, but commits the addressee to the prejacent from the speakers perspective, giving rise to a mutually introspective common belief $B_S B_A \varphi$ in the output context. The preparatory condition that the speaker have evidence to support this belief is satisfied not by evidence which has just become available in the utterance situation, but by verifiable evidence, namely prior commitment of the addressee to φ .

Needless to say, a polar-question reading can be assumed here under the assumption that the interpretation is on the lines of “You don’t find it sweet?”. However, I suggest that in this case, the rising-declarative reading paraphraseable as “This is not sweet!” in English is at least also available if not preferred in this scenario.³⁴

³⁴There are possibly prosodic differences between the RD and the RI in such cases, but

Alternatives for rising declaratives

The two different readings of rising declaratives outlined above can be predicted by the Q-implicatures arising from different alternatives. Consider again the table of utterance types and communicative intentions repeated as (3.118) below.

(3.118) **Utterance types and communicative intentions:**

utterance	information	belief	commitment
INT	↑ seeking	addressee	forgoing
DEC	↑ conveying	addressee	committing
INT	↓ conveying	speaker	forgoing
DEC	↓ conveying	speaker	committing

The two minimal alternatives for the rising declaratives are the rising interrogative, which is also addressee-oriented, but forgoing, and the falling declarative, which is also committing, but speaker oriented.³⁵

Forgoing to say Starting with the second reading of the rising declarative discussed above, it is compatible with the implicatures arising from forgoing the falling alternative. When a falling declarative is the active alternative, this derives completely different implicatures. The enriched CCP of a rising declarative with a falling alternative is repeated below as (3.119) from (3.61b), along with the (secondary) public commitment distinguishing an RI from an RD in (3.119b).

(3.119) **Enriched CCP of RD with forgone FD alternative:**

- a. $\Delta^{\text{ALT}}\text{DEC}(\varphi)\uparrow = \{\neg PB_S\varphi, \neg PB_S EV_S\varphi\}$ (w.r.t. $\text{DEC}(\varphi)\downarrow$)
- b. $\llbracket \text{DEC}(\varphi)\uparrow \rrbracket^{\text{ALT}} = \{\langle c, c' \rangle \mid B_S^c \neg B_A \neg \varphi \wedge EV_S^c B_A \varphi \wedge \wedge PB_S^{c'}[B_A \varphi \wedge EV B_A \varphi] \wedge \neg PB_S^{c'}[B_S \varphi \wedge EV_S^c \varphi]\}$

This is to say the implicatures which arise from forgoing the falling declarative alternative in case an assertion is an active alternative are the same

there is a number of confounding factors such as incredulity or surprise intonation, lexical accent, and rather complex intonational contours related to the availability of evidence like those discussed by Hara et al. (2014).

³⁵That these are available underlines the assumption made above that information-seeking properties are a result of addressee-orientation and forgoing commitment.

as those which arise for a falling interrogative, with the difference that forgone commitment to $B_S\varphi$ is informative as there is no stronger secondary commitment like that to $\neg B_S\varphi$ arising from interrogatives.

(3.120) **Implicatures from RDs with FD alternative:**

- a. $PB_S^c[B_A\varphi \wedge EV_S B_A\varphi] \rightarrow B_A B_S B_A\varphi \wedge B_A EV_S B_A\varphi \in c'$
- b. $\neg PB_S^c[B_S\varphi \wedge EV_S\varphi] \rightarrow \neg B_A B_S\varphi \wedge \neg B_A EV_S\varphi \in c'$

The implicatures arising from an RD with an FD alternative lead to a strong implicature of incredulity: the speaker not only indicates not believing the prejacent which she assumes, backed by evidence, the addressee to believe, but also indicates that she does not have evidence (at least not sufficient evidence) to believe the prejacent to be true.

The role of *no*-addition in this case has an “objectifying” function similar to that in assertions mentioned in section 3.4.5, p235: the evidence is marked as mutually accessible, that is, verifiable by the addressee. This plays an especially important role when evidence supports speaker assumptions about addressee belief — as strong as privately available evidence may be, the best source of evidence on the addressee’s beliefs remains the addressee. Thus, in the example in (3.117), the addition of *no* marks that the evidence for the speaker assumption over addressee belief is the addressee themselves (as the utterance situation is such that the addressee has committed to the prejacent).

Forgoing to ask In the case that the speaker’s communicative intention is addressee-oriented, *i.e.* the speaker is either trying to convey their assumptions about or elicit information about the addressee’s beliefs, the forgone alternative is a rising interrogative. The enriched CCP of a rising declarative when a question alternative is forgone is shown in (3.121b) below, repeated from (3.59), along with the (secondary) public commitment distinguishing an RI from an RD in (3.121a).

(3.121) **Enriched CCP of RD with forgone RI alternative:**

- a. $\Delta^{\text{ALT}}\text{DEC}(\varphi) \uparrow = \{\neg PB_S \neg B_S\varphi\}$

$$\text{b. } \llbracket \text{DEC}(\varphi)\uparrow \rrbracket^{\text{ALT}} = \{ \langle c, c' \rangle \mid B_S^c \neg B_A \neg \varphi \wedge PB_S^{c'}[B_A \varphi \wedge EV_S B_A \varphi] \wedge \neg PB_S^{c'} \neg B_S \varphi \}$$

This means that in cases where the rising interrogative is an active alternative to the rising declarative, the speaker *forgoes* commitment to *not* believing φ . In this case, the following implicatures arise:

(3.122) **Implicatures from RDs with RI alternative:**

- a. $PB_S^{c'}[B_A \varphi \wedge EV_S B_A \varphi] \rightarrow B_A B_S B_A \varphi \wedge B_A EV_S B_A \varphi \in c'$
- b. $\neg PB_S^{c'} \neg B_S \varphi \rightarrow \neg B_A \neg B_S \varphi$

The Q-implicature in (3.122b) is familiar from negative polar questions with polarity mismatch, and signals to the addressee that the speaker could potentially be committed to φ . This is the reading that the first example above brings out, where the speaker is basically neutral with regard to the prejacent but has (as marked by *no*, perceptual) evidence that the addressee believes the prejacent to be true — a reading much closer to that of polar questions than the reading arising when the speaker's communicative intention is committing.

It is obvious that the implicatures for a rising declarative point in different directions depending on which alternatives are active: when the falling alternative is active, the addressee must assume that the speaker does not believe φ to be true, but when the rising alternative is active, the addressee, on the contrary, is biased towards the speaker believing φ to be true, if anything.

Rising *daroo*-declaratives

Before turning to the interaction of *no* and *daroo* in different utterance types, I demonstrate that *daroo*-utterances with final rising intonation are best accounted for as rising declaratives in the present framework. This is supported by the empirical observation that questions with *daroo* are marginal.

The CCP for a rising *daroo*-declarative is given below, under the assumption that *daroo* lowers the quality threshold w.r.t. public speaker commitment, *i.e.* more speaker doxastic states satisfy $B_S^{\text{daroo}} \varphi$ than $B_S \varphi$, based on

the discussion in sections 2.3.4 and 2.5. The felicity conditions on *daroo*-declaratives are repeated here as (3.123a) for a falling, (3.123b) for a rising declarative.

(3.123) **Belief and evidence conditions on *daroo* declaratives:**

	belief	evidence	commitment
a. $\text{DEC}_S(\text{daroo}(\varphi)) \downarrow$	$\neg B_S \neg \varphi$	$EV_S \varphi$	$B_S^{\text{daroo}} \varphi$
b. $\text{DEC}_S(\text{daroo}(\varphi)) \uparrow$	$B_S \neg B_A \neg \varphi$	$EV B_A \varphi$	$B_S^{\text{daroo}} B_A \varphi$

The CCP of the rising *daroo*-declarative in accordance with the conditions stipulated in (3.123b) is given in (3.124) below, including secondary commitments from the carried-over input belief condition.

(3.124) **CCP of rising *daroo*-declarative:**

$$\begin{aligned} & \llbracket \text{DEC}(\text{daroo}(\varphi)) \uparrow \rrbracket = \\ & \{ \langle c, c' \rangle \mid B_S^c \neg B_A \neg \varphi \wedge PB_S^{c'} [B_S^{\text{daroo}} B_A \varphi \wedge EV_S B_A \varphi \wedge B_S \neg B_A \neg \varphi] \} \end{aligned}$$

The empirical observation on *daroo*-utterances with final rising intonation is that they convey speaker bias towards φ , and are independent of evidence in the context. If they were polar questions, this would be entirely unexpected, as *daroo*-interrogatives have a preparatory condition that the speaker not believe the prejacent, and furthermore exclude a bias towards speaker commitment in the output context (see the discussion of negation of *daroo*-beliefs in 2.5.1). To illustrate the interpretation of a rising *daroo*-utterance, consider the variant of the proposed rising declarative above with *daroo* instead of *no*.

Scenario: eating a piece of an orange that *A* has also tasted but not commented, *S* finds it not sweet at all.

- (3.125) *Amaku-nai daroo?*
 sweet-NEG *daroo*
 “It’s not sweet, right?”

The English paraphrase here is chosen in want of a better rendition of the Japanese example, which is consensus-seeking in a similar way that an English polar question with both inner and outer negation is. I claim that the salient interpretation is that the speaker believes the prejacent to be true

and is seeking the addressee to commit to it, *i.e.* the speech-act is consensus-seeking. This reading arises as the speaker tentatively commits the addressee to “It’s not sweet”, signaling that there is no (mutually accessible, verifiable) evidence for the addressee believing this.

Clearly, this reading is compatible with a forgone question alternative, as the utterance conveys that the speaker is biased towards φ . The utterance is furthermore consensus-seeking, and in this sense addressee-oriented, which also points towards the question-alternative. I have no simple answer to the question of why there does not appear to be a reading with *daroo* that forgoes an assertion (or whether or not such a reading would make sense), but assume it is to some degree a matter of convention which kind of utterance is used to realize a given communicative strategy. In Japanese, it appears that *daroo* is the utterance modifier of choice to communicate about matters that are not yet settled in the sense of pending addition to the common-ground.

On a final note, the addition of *no* to form a rising *no-daroo*-declarative in such cases is predicted to indicate something on the lines of indirect evidence for an assumption that the addressee believes the prejacent to be true. As this is difficult to test empirically (and the contrast is subtle at best), I limit the discussion of how *no* and *daroo* to the case of final falling utterances, where empirical contrasts are sharper.

3.4.7 *no* and *daroo* — evidence for weak belief

In this section, I focus on *daroo*-assertions expressing results of speaker inference as they are the best-studied case of the effect on utterance meaning of the addition of both *no* and *daroo*, also predicting the contribution of *no* to falling *daroo*-interrogatives.

Assertions with *daroo* and *no*

The addition of *no* to *daroo*-assertions has the straightforward effect of adding the familiar felicity condition requiring mutually accessible evidence. Crucially, this does not change the lowering of the evidence threshold, but leads to a different interpretation — namely that the speaker’s “hunch” that the pre-

jacent is true is based on perceptual or otherwise verifiable evidence, rather than just a guess. The CCP of a *daroo*-assertion without *no* is repeated below, without secondary commitments for ease of exposition.

(3.126) **CCP of *daroo*-assertion:**

$$\llbracket \text{DEC}(\text{daroo}(\varphi)) \rrbracket \downarrow = \{ \langle c, c' \rangle \mid \neg B_S^c \neg \varphi \wedge EV_S^c \varphi \wedge PB_S^{c'} B_S^{\text{daroo}} \varphi \}$$

The addition of *no* makes the evidence condition mutually accessible:

(3.127) **CCP of *daroo*-assertion with *no*:**

$$\llbracket \text{DEC}(\text{no}(\text{daroo}(\varphi))) \rrbracket \downarrow = \{ \langle c, c' \rangle \mid \neg B_S^c \neg \varphi \wedge EV_{\mathcal{X}}^c \varphi \wedge PB_S^{c'} B_S^{\text{daroo}} \varphi \}$$

Note that this representation assumes that the evidence condition from *no* is added *after* the lowering of the evidence threshold. This has two reasons. First, I assume that the kind of evidence that *no* marks should be determined by the utterance it “finds”, that is the quality, and thus evidence, threshold is lowered by *daroo*, then *no* adds a mutual accessibility requirement for the kind of evidence thus required for commitment. Second, it seems plausible that a plain *daroo*-utterance is formed first, and then *no* is added, as these are more plausible alternatives to each other than a possibly mirative *no*-assertion and a *no-daroo* assertion would be.

The example for the evidence-marking function of *no* in *daroo*-assertions repeated here as (3.128), where the alternatives are a *daroo*-assertion and a *no-daroo*-assertion.

(3.128) *Kanojo-wa moo kekkon_shi-ta (no) daroo.*
 she-TOP already marry-PST no daroo
 “She is married already I guess.”

The scenarios bringing out the evidence condition on this utterance are repeated below.

(3.129) **Scenarios for *daroo*-assertion:**

- a. Scenario 1: The speaker is wondering about the marital states of an ex-girlfriend from his time in college.
- b. Scenario 2: The speaker sees that the surname of an ex-girlfriend from his time in college has changed and wonders about her marital status.

The observation regarding the felicity of (3.128) is that *no* is mandatory in Scenario 2 in (3.129b), and the version with *no* is bad in Scenario 1 in (3.129a), all else being equal.³⁶

This is an observation parallel to those on the bias patterns of positive polar questions with and without *no*, which show a similar split with regard to the availability of evidence in the utterance situation. Polar questions differ from assertions in that no commitment arises from them, which arguably makes information regarding evidence less crucial than in case of an assertion. In the polar question the difference between the versions with and without *no* is whether the speaker is merely interested in the pronounced alternative or whether there is evidence suggesting it might hold, while in case of the *daroo*-assertion the difference between the two version is whether the speaker is merely conveying her biased epistemic state or the result of an inference based on mutually accessible, or verifiable, evidence.

Another parallel to polar questions is that the badness of plain *daroo*-assertions in context where evidence is available can be derived as a Q-implicature instantiating maximize presupposition here as well. Assuming that the availability of evidence stronger than required by the lowered quality threshold activates the alternative with *no*, this gives rise to the Q-implicature that there is no such evidence in the utterance situation. Such a misrepresentation of the facts is arguably more serious than in the case of an (information-seeking) PPQ for the reasons mentioned above.

What makes the contrast between versions with and without *no* sharper in *daroo*-assertions than in plain assertions is that in the former, *no* signals that there is evidence stronger than required by the lowered quality threshold for assertion, which is not the case with plain assertions. This is another argument in favor of assuming that *no* enters the derivation after *daroo* as a modifier of utterance meaning.

³⁶In the latter case, the availability of an “obviousness”, or verifiable-evidence reading of the *no-daroo* assertion parallel to that of a plain assertion with *no* is a confounding factor which I gloss over here.

Falling *daroo*-interrogatives and *no*

While rising interrogatives with *daroo* are degraded, falling *ka*-utterances with *daroo* make a connection between the contribution of *no* and interrogative force. I have shown that the felicity conditions of falling *daroo*-interrogatives differ from those of plain falling interrogatives in that they forgo *daroo*-commitment, *i.e.* commitment under the lowered quality threshold. Thus, the addressee's options are limited to assume that the speaker is neutral or biased against φ . The CCP of a falling *daroo*-interrogative is shown below.

(3.130) **Enriched CCP of falling *daroo*-interrogative:**

- a. $\Delta^{\text{ALT}}\text{INT}(\text{daroo}(\varphi))\downarrow = \{\neg PB_S^{\text{daroo}}\varphi\}$ (w.r.t. $\text{DEC}(\text{daroo}(\varphi))\downarrow$)
- a. $\llbracket \text{INT}(\text{daroo}(\varphi))\downarrow \rrbracket^{\text{ALT}} = \{\langle c, c' \rangle \mid \neg B_S^c\varphi \wedge \neg PB_S^{c'}[B_S^{\text{daroo}}\varphi]\}$

The negated higher order belief $\neg B_A B_S^{\text{daroo}}\varphi$ means that in the output context, the addressee must assume that the speaker is either biased towards or committed to $\neg\varphi$, or ignorant with regard the question of φ is true or false (see illustration in section 2.5.1). Note that this is stronger than the carried over belief condition, as $B_A \neg B_S\varphi$ allows for the addressee to consider doxastic states of the speaker possible which are biased towards φ .

When adding *no*, an evidence condition is introduced as shown below.

(3.131) **CCP of falling *daroo*-interrogative with *no*:**

$$\llbracket \text{INT}(\text{no}(\text{daroo}(\varphi)))\downarrow \rrbracket = \{\langle c, c' \rangle \mid \neg B_S^c\varphi \wedge EV_{\mathcal{X}}^c\varphi \wedge \neg PB_S^{c'}[B_S^{\text{daroo}}\varphi]\}$$

This indicates that in spite of the available evidence supporting φ , the speaker is not even biased towards φ in the output context. This is essentially a doubt-reading, as discussed above for plain falling declaratives, under evidence. From the perspective of belief revision, the falling interrogative with *no* and *daroo-ka* can also indicate that the doxastic state of the speaker has undergone widening from a state biased towards $\neg\varphi$ to a neutral state, or possibly a state *less biased* towards $\neg\varphi$ (such fine-grained change in belief states cannot be modeled in the present framework, however). To illustrate this, consider the contrast between a falling declarative (the example for *daroo*-assertions above) and a falling interrogative, both with *no* and *daroo*.

Scenario: The speaker sees that the surname of an ex-girlfriend from his time in college has changes and wonders about her marital status.

- (3.132) *Kanojo-wa moo kekkon_shi-ta no daroo.*
 she-TOP already marry-PST no daroo
 “She is married already *daroo*.”

- (3.133) *Kanojo-wa moo kekkon_shi-ta no daroo-ka.*
 she-TOP already marry-PST no daroo-Q
 “[I wonder if] she is married already *daroo*.”

The contrast between these two examples is rather sharp. The former example expresses speaker bias towards φ as the result of evidence in the scenario given here, while the latter expresses doubt in spite of evidence, making a doubt-reading under evidence regarding a question not settled at utterance time (for instance, because the speaker deems it highly unlikely that the person in question has gotten married).

3.5 Conclusion

This chapter has provided the explanation for bias patterns introduced as the empirical focus of the thesis in the initial discussion of *no* as an epistemic particle. I have shown that bias patterns follow from a rather complex interaction of different contextual, speech-act internal, and speaker-related factors. When all of these are taken together, the meaning of utterances in terms of belief, evidence and commitment emerge, and the effects that the addition of *no* has by introducing an evidence condition to utterance meaning comes out clearly. This not only accounts for the contribution of the particle *no*, which so far has remained mostly elusive, but also provides a window into a level of utterance meaning which is often difficult to grasp theoretically, such as what utterances convey about belief revision, consensus-orientation, and the grounds for making commitments.

Summary of the account of bias patterns and *no*

On the premise that *no* contributes to utterance meaning as a marker of mutually accessible evidence on the speech-act level, I have explained its interaction with conveyed meaning and bias patterns in the following cases in this chapter.

Polar questions (rising interrogatives)

PPQs When added to polar questions, the contribution of *no* differs depending on whether the salient polarity in the utterance situation matches that of the prejacent or not. This has been discussed in terms of positive-salient contexts, which is the default case, by example of positive polar questions (PPQs) and negative polar questions (NPQs). In the case of PPQs, that is in the case of matching polarity, the addition of *no* is simply evidence-marking. That *no* appears to be *required* for felicity when there is evidence can be explained by a version of maximize presupposition as a Q-implicature, and the infelicity of *no*-PPQs in utterance situations with evidence supporting the prejacent is straightforwardly predicted.

NPQs In case of NPQs, the picture is more complicated and required to first account for the effects of polarity mismatch. I have shown that this leads to evidential bias as a result of salience shifting, that is as a result of shifting the null-hypothesis for an information-seeking question to non-salient polarity, and to non-obligatory epistemic bias in form of addressee bias towards a speaker belief that the prejacent is true as a result of a Q-implicature arising from the forgone PPQ-alternative. When this bias pattern is combined with *no* marking mutually accessible evidence in support of the negated prejacent, this gives rise to a belief-revision interpretation on which the formation of a belief that the prejacent is false based on the available evidence is blocked by a pre-existing belief that the prejacent is true, similar to the incredulity reading of falling interrogatives with *no*.

Falling interrogatives

As falling interrogatives are an utterance type conveying rather than seeking information and do not have preparatory evidence conditions in their plain form, they allow to observe the effect of *no* with regard to information conveyed about the speaker's beliefs and their formation and revision. Within the present framework, I have accounted for two readings of falling interrogatives: the incredulity reading and the doubt reading. Bare falling interrogatives receive the latter reading, on which the speaker conveys that she does not believe the prejacent to be true. When *no* is added, this gives rise to the incredulity reading which, similar to that observed in polar questions with *no* under polarity mismatch, indicates that the speaker is in a process of belief revision, with the difference that the sense of belief formation being blocked, and belief revision underway, is stronger in the falling interrogative case, which is expected as only rising interrogatives are information-seeking.

Assertions (falling declaratives)

While the line between complementizer and particle is often blurred in assertions, mirative assertions bring out the contribution of *no* clearly and were thus the focus of the analysis. The meaning of *no* stipulated in this thesis predicts that it changes the pre-existing evidence condition of assertions from a condition on which private evidence is sufficient to a condition requiring mutually accessible evidence, or at least verifiable evidence. In the latter case, *no* can be used by the speaker to “objectivize” grounds for assertion and present the truth of the prejacent as easily verifiable. Furthermore, I have made a connection between the belief revision readings of falling declaratives and *no*-assertions, proposing that the doubt reading marks blocked belief formation without revision, the incredulity reading marks belief revision underway, and the mirative reading of *no*-assertions marks completed belief revision.

Rising declaratives

Rising declaratives in Japanese are hard to distinguish from rising interrogatives as Japanese lacks a distinct syntax for questions and does not require question particles when the interrogative is marked by final rising intonation. I argued that rising declaratives in Japanese do exist and have two different readings, one of them closer to polar questions, the other unique to rising declaratives, which differ in the alternatives they forgo and thus the Q-implicatures that enrich their meanings. The question-like reading *forgoes* the rising declarative alternative, allowing for a reading on which the speaker is biased towards or believes the prejacent to be true and seeks to commit the addressee. This reading also allows for the addition of *daroo*, and the effect of the addition of *no* is weakened as compared to polar questions due to the preexisting evidence condition of rising declaratives. The reading which is unique to rising declaratives, on the other hand, forgoes assertion and thus carries the implicature that the speaker does *not* believe the prejacent to be true and does not have sufficient evidence for its assertion while conveying that the speaker assumes that the addressee believes so. Addition of *no* in this case has a strengthening effect as it rules out that the speaker assumption that the addressee believes the prejacent to be true conveyed by the rising declarative is mere conjecture.

Daroo-utterances

Finally, the contribution of *no* to the meaning of *daroo*-utterances was discussed by example of *daroo*-assertions and falling *daroo*-interrogatives. In the case of assertion, I argued for assuming that in the composition of utterance meaning, *no* enters the derivation after *daroo* lowers the evidence threshold, introducing the same evidence condition as in plain assertions. Thus, *no* in *daroo*-assertions marks that there is mutually accessible evidence which is stronger than required for assertion under the lowered quality threshold, indicating that the belief expressed by the utterance is conjecture based on tangible evidence. The infelicity of plain *daroo*-assertions when such evidence is available is explained on similar lines as parallel observations on

polar questions: the availability of evidence activates the alternative with *no*, and forgoing it would give rise to the implicature that there is no such evidence. As for falling *daroo*-interrogatives, the addition of *no* was shown to give rise to a strong doubt reading, as it conveys that in spite of the evidence, the speaker is not even biased towards the prejacent proposition.

Outlook

I conclude that the present analysis has successfully accounted for the interaction of *no* with the bias patterns of the representative examples discussed. There is much work to be done in terms of expanding the framework to a wider variety of data, such as “pragmatically charged” uses of utterances with *no*, where its main contribution is presenting the prejacent as “obvious”, and, more generally, uses of *no* in which perceptual evidence in the utterance situation does not play a role. Other interesting issues for future research include the interaction of *no* with evidentials and modals in Japanese, as well as with the “core” sentence-final particles such as *yo* and *ne*, with the long-term goal of integrating the present proposal into a full picture of modality and utterance-level meaning in Japanese (*i.e.* of all things not prejacent). As this thesis is an account of a lexical item that has a function which is not well-researched cross-linguistically — direct modification of speech-act level felicity conditions — it would furthermore be of interest to expand the proposal to languages other than Japanese, for which for instance the relatively well-studied German modal particles could provide a starting point.

List of abbreviations for glosses

ACC	accusative case particle
ADN	adnominal form
COP	copula
EXCL	exclamative
GEN	genitive
GER	gerundive
HON	honorific
NEG	negation
NOM	nominative case particle
NPST	nonpast
PASS	passive
POL	polite
POT	potential
PROG	progressive
PST	past
RES	resultative
SFP	sentence final particle
TOP	topic particle
VOL	volitional

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