

# Modal flavour/modal force interactions in German: *soll, sollte, muss and müsste*\*

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## Abstract

This paper documents an unexpected interaction between modal flavour and modal force in the domain of the German necessity modals *muss* ( $\approx$  ‘must’) and *soll* ( $\approx$  ‘be supposed to’) and their Konjunktiv II-inflected versions *müsste* and *sollte*. We argue for the following three proposals. First, *muss* and *soll* have largely disjoint modal flavours, in both the root and epistemic domains. The root modal flavours of *muss* are deontic, teleological, and a restricted bouletic use, while root *soll* is lexically bouletic, allowing deontic inferences; epistemic *muss* is inferential, while epistemic *soll* is reportative. Second, the addition of Konjunktiv II counterfactual morphology can create weak necessity modals, as expected on the cross-linguistic account of von Stechow and Iatridou (2008). However, an unanticipated effect on modal flavour occurs. When *soll* turns into its Konjunktiv II form *sollte*, it not only becomes a weak necessity modal, it also changes its modal flavours to those of *muss*. *Sollte* is thus semantically a weak necessity form of *muss*, not of *soll*. Third, the Konjunktiv II form of *muss*, namely *müsste*, also shows an unexpected quirk. We analyze this as the interference of polite Konjunktiv II, analyzed as free factive subjunctive (Csipak 2015), with the weak necessity reading. The paper also includes a comparison of the German modals with English *have to*, *should* and *be supposed to*.

## Keywords

modals, modal flavour, modal force, weak necessity, German

## 1 Introduction

The distinction between strong and weak necessity modality is illustrated in (1). According to this sentence, everybody is under a weak obligation to wash their hands, but employees are more strongly obliged to do so.

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- (1) Everybody *ought to* wash their hands; employees *must*.  
(von Fintel and Iatridou 2008:116)

In English, the strong vs. weak necessity distinction is lexicalized (*must/have to* vs. *should/ought to*), but in many languages, it is encoded morphologically. As shown by von Fintel and Iatridou (2008), in languages such as Dutch, French or Greek, the addition of counterfactual morphology to a strong necessity modal derives a weak necessity interpretation. This is illustrated for French in (2), in which the strong necessity modal *devoir* contains conditional morphology and is interpreted as a weak necessity modal. Languages in which this happens are called ‘transparent OUGHT’ languages by von Fintel and Iatridou.<sup>1</sup>

- (2) Tout le monde **devrait** se laver les mains mais les serveurs sont obligés.  
everybody **must.COND REFL** wash the hands but the waiters are obliged  
‘Everybody **ought to** wash their hands but the waiters have to.’  
(von Fintel and Iatridou 2008:121)

The available literature on weak necessity concentrates mainly on root modal flavours (such as deontic or teleological), while observing that epistemic modals also show a strong/weak necessity contrast. So far, interactions between the strength of a modal and its flavour have not been the focus of discussion.

In this paper we investigate strong and weak necessity modality in German, concentrating on the necessity modals *muss* ( $\approx$  ‘must’) and *soll* ( $\approx$  ‘be supposed to’), and their Konjunktiv II-inflected versions *müsste* and *sollte*.<sup>2</sup> Konjunktiv II (glossed ‘KII’) is the standard German way of expressing a counterfactual or non-factual conditional as in (3b);<sup>3</sup> this is the criterion for counterfactual morphology assumed by von Fintel and Iatridou (2008):<sup>4</sup>

- (3) a. Wenn Maria angekommen **ist**, **hat** sie uns eine Nachricht hinterlassen.  
if Maria arrived is.IND has.IND she us a message left  
‘If Maria has arrived, she will have left us a message.’  
b. Wenn Maria angekommen **wäre**, **hätte** sie uns eine Nachricht hinterlassen.  
if Maria arrived is.KII has.KII she us a message left  
‘If Maria had arrived, she would have left us a message.’

The forms of the two modals we investigate in indicative and Konjunktiv II mood are shown in (4). We investigate both root and epistemic interpretations of these modals, in their matrix-

<sup>1</sup> Throughout the paper, our morpheme glosses abstract away from inflectional details such as case and gender information.

<sup>2</sup> We cite *muss* and *soll* in their third person indicative present forms, rather than their standard citation forms, the infinitives *müssen* and *sollen*. This enables a unified form of reference which extends to the Konjunktiv II versions *müsste* and *sollte*.

<sup>3</sup> Fabricius-Hansen (2016) distinguishes two uses of Konjunktiv II: an ‘irrealis’ use relevant here, and a reportative use. She subsumes a polite use of Konjunktiv II, to which we will return, under the irrealis use.

<sup>4</sup> There is a terminological issue, since the relevant morphology does not strictly require counterfactuality. In recent work, von Fintel and Iatridou call the relevant type of conditionals ‘X-conditionals’ (‘X’ for ‘extra’) (von Fintel and Iatridou 2017; see also Schulz 2017). Here, we usually sidestep the issue by using the traditional term for the German inflection, Konjunktiv II.

clause uses (see Schenner 2008, among others, on embedded uses).

(4)

necessity modal (indicative)	necessity modal + Konjunktiv II
<i>muss</i>	<i>müsste</i>
<i>soll</i>	<i>sollte</i>

We argue that this set of German modals fits partially with the accounts of weak necessity provided by von Fintel and Iatridou (2008) and Rubinstein (2012). In a general way, the mini-system in (4) will be seen to support the morphological correlation postulated by von Fintel and Iatridou (2008), in that a weak necessity interpretation only arises with the addition of Konjunktiv II morphology. German thus appears in this respect to be a ‘transparent OUGHT’ language. However, we will show that the initial expectations one might have of a transparent OUGHT language are considerably obscured on the surface by two irregularities. We will also argue that once these are taken into account, the morphological correlation postulated by von Fintel and Iatridou (2008) still governs this mini-system of modals. The two peculiarities of the German modal system are as follows.

First, while the Konjunktiv II form *sollte* of *soll* is a weak necessity modal, it surprisingly takes on the modal flavours of *muss*, giving up the original modal flavours of *soll*. To show this, we will first argue that *muss* and *soll* are restricted to expressing largely distinct lexical modal flavours in the root domain, and entirely distinct flavours in the epistemic domain. In the root domain, we argue that *muss* is primarily deontic or teleological, allowing bouletic readings only in a restricted way, while *soll* is lexically bouletic, allowing deontic readings only by inference. In the epistemic domain, we support existing proposals that *soll* is reportative, and we argue that *muss* always conveys inferential meaning. In both root and epistemic use, *sollte* switches sides, obeying the flavour restrictions of *muss* and not those of *soll*.

The second quirk of the German strong/weak necessity system is that while epistemic *müsste* is a well-behaved weak necessity version of its strong counterpart *muss*, root *müsste* shows interference from a use of Konjunktiv II which has been described as conveying politeness. We analyze this use in terms of the *free factive subjunctive* of Csipak (2015).

Our analysis supports the following suggestions from the literature. First, our results strengthen the contention of von Fintel and Iatridou (2008) that counterfactual-type morphology can play a systematic role in deriving weak necessity. We argue that this is true of the German Konjunktiv II morphology for the modals discussed here, despite the unexpected complexities that these modals also show.

Second, our analysis of the German modals supports a growing body of evidence that individual modals can lexicalize quite specific modal flavour information (see Kratzer 1991, Rullmann, Matthewson, and Davis 2008, von Fintel and Gillies 2010, among many others).

Third, our analysis of German *soll* also strengthens a line of research according to which categories that used to be thought of as primarily deontic may actually be bouletic instead, and lead to deontic inferences. This is argued to be the case for the meaning of the imperative by Condoravdi and Lauer (2012) and is continued in the analysis of the imperative by Oikonomou (2016).

Fourth, we think that our extension of the analysis of free factive subjunctive to the specifics of *müsste* supports the analysis of free factive subjunctive of Csipak (2015).

A core set of the data in this paper is based on the judgments of 20 native speakers of German.

The paper is structured as follows. In section 2 we provide general background on modal force and modal flavour, and outline our methodology. Section 3 is devoted to the modal flavours of *muss* and *soll*. In section 4 we provide evidence for the modal flavour

switch of *sollte*. Section 5 discusses *müsste*. A brief comparison with English is given in section 6, and the results are summed up in section 7.

## 2 Theoretical and methodological background

We introduce relevant modal flavour distinctions in section 2.1. Modal force distinctions are discussed in section 2.2. Section 2.3 outlines our data collection methodology.

### 2.1 Modal flavour

A well-known modal flavour distinction is made in many languages between the root and epistemic uses of a modal.<sup>5</sup> Some sub-varieties of root use that are particularly relevant here are shown in (5).<sup>6</sup> Examples are given in (6).

(5)	<i>deontic</i>	related to how the world ought to be, e.g. according to <b>rules and obligations</b>
	<i>teleological</i>	related to purposes or <b>goals</b>
	<i>bouletic</i>	related to desires or wishes, or more generally <b>preferences</b>

- (6) a. You **have to** return your library books soon. DEONTIC
- b. A: I want to get to Harlem in an hour. TELEOLOGICAL  
 B: You **have to** take the A-train.
- c. A: What is the purpose of this crazy arrangement you made here? BOULETIC  
 B: It **is supposed to** attract birds.  
 ≈ I want the arrangement to attract birds.

Epistemic (roughly, knowledge- or evidence-related) uses are illustrated in (7). Following von Fintel and Gillies (2010), Rett (2016), and Matthewson (2015a), the inferential reading of *must* as in (7a) requires indirect evidence for the prejacent, and an inference process on the part of the speaker.<sup>7</sup> The reading in (7b) is reportative.

<sup>5</sup> See Hacquard (2006, 2010), among others, for arguments that this distinction is syntactically based.

<sup>6</sup> Portner (2009:135ff) argues against a two-way epistemic/root split, and in favour of a three-way division between epistemic, priority, and dynamic modality (where priority modality includes deontic, teleological, and bouletic modals and dynamic modality includes, for example, ability readings). We are not dealing with dynamic modals here so we set this aside.

<sup>7</sup> Following von Fintel (1997), von Fintel and Iatridou (2008), and much other generative literature, we use the term *prejacent* for ‘proposition in the immediate scope of the modal’. This is more specific than the notion of proposition and more handy than repeating the definition.

- (7) a. [I observe John driving an expensive new car.]<sup>8</sup> INFERENTIAL  
 John **must** have come into some money.
- b. [I listened to the weather report and am telling my friend what I heard.]  
 REPORTATIVE  
 It is **supposed to** rain.  
 ≈ Someone said that it will rain.

In the approach developed by Kratzer (1977, 1981, 1991), a given modal can be compatible with several different modal flavours. For example, Kratzer (1991:650) classifies German *muss* as having no restrictions on its modal flavour. Its particular modal flavour is then narrowed down by the context of utterance (through conversational background functions). For an example of modal flavour ambiguity with English *have to*, see (6a) vs. (6b).

Kratzer (1981, 1991, 2012) also provides discussion of German and English modals which do place restrictions on modal flavour. For example, English *may* allows epistemic and deontic interpretations, but *might* is epistemic and cannot be deontic. English affirmative *can* cannot be interpreted epistemically (see Portner 2009:55,185 for discussion). And German *dürfen* ‘be allowed to’ and *können* ‘can’ allow partially distinct modal flavours (Kratzer 1981:59ff).

In other languages we find this even more clearly instantiated. Lexical distinctions between modal flavours are pervasive in languages such as St’át’imcets (Lillooet Salish; Matthewson, Davis and Rullmann 2007, Rullmann, Matthewson and Davis 2008, Davis, Matthewson and Rullmann 2009), Javanese (Austronesian; Vander Klok 2012), Blackfoot (Algonquian; Reis Silva 2009), Kwak’wala (Wakashan; Menzies 2010), Nez Perce (Penutian; Deal 2011), Nsyilxcen (Okanagan Salish; Menzies 2012) and Gitksan (Tsimshianic; Peterson 2010, Matthewson 2013).

We will argue below that the German modals are also even more clearly defined for individual modal flavours than has so far been assumed in the formal literature.

## 2.2 Modal force

The basic modal force distinction is between necessity (e.g. *must*, *have to*) and possibility (e.g. *may*, *can*).

An additional distinction relevant here is that between strong and weak necessity. In English, where the distinction is lexicalized, *must* and *have to* are strong necessity modals, while *should* and *ought to* are weak necessity modals. Horn (1972) described deontic strong necessity as *strong obligation* and deontic weak necessity as *weak obligation* or *suggestion*. The distinction allows contrasts like the ones in (1) and (8).

- (8) You **ought to** do the dishes but you don’t **have to**. (von Fintel and Iatridou 2008:117)

In their teleological use, strong necessity modals give the sense of presenting the only available option for achieving the goal, as in (9a). As shown by Sloman (1970) and further worked out in von Fintel and Iatridou (2008), weak necessity modals seem to present the best (but not only) available option for achieving the goal. The sense in which they are ‘best’ is in regard to some additional consideration, as shown in (9b).

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<sup>8</sup> Discourse contexts for example sentences are given in square brackets.

(9) [I plan to go to Ashfield.]

TELEOLOGICAL

- a. You **have to** take Route 2. (All other roads to Ashfield are closed.)
  - b. You **ought to** take Route 2. (It's the best option given an additional criterion, like seeing nice scenery on the way.)
- (von Fintel and Iatridou 2008:118)

It is argued by von Fintel and Iatridou (2008) that in a number of languages including Dutch, French, and Greek, the addition of counterfactual-type morphology to a strong necessity modal derives a weak necessity modal, as in the French example (2) above. This is schematized in (10).

(10) strong necessity modal + counterfactual morphology → weak necessity modal

As shown by von Fintel and Iatridou (2008), weak necessity interpretations ('ought' readings) have a meaning distinct from strong necessity interpretations in a non-factual scenario ('would have to' readings), and it is not obvious how to account for the regularity in (10) in a compositional way. A formal analysis of weak necessity teleological modals is developed by Rubinstein (2012). Other recent formal suggestions for the analysis of weak necessity are presented by Howell (2015) and Silk (to appear).

### 2.3 Data collection methodology

For a core set of examples in this paper, we elicited judgments from 20 native speakers of German who were raised monolingually. Where we have such judgments, the average results across all participants are shown by superscripts following a ✓ or # sign. The best mark is ✓<sup>1.0</sup>, the worst is #<sup>4.0</sup>. For concreteness, we write ✓ for 'better than 2.5' and # for '2.5 or worse', but the conclusions drawn from judgments in the intermediate range will be based on numerical acceptability relative to other examples, not on this division. All averages are based on a full set of 20 judgments.

The participants in our study were students, in a range of fields, at different universities in Berlin. They were reimbursed for their time. After a set of initial instructions, they each worked through a set of written sentences paired with discourse contexts on their own. Most speakers finished the task in 15 – 30 minutes.

The design of the elicitation was arrived at after some piloting. The instructions asked the speakers to rate how well each sentence fit its context according to their feeling for the language ('Sprachgefühl'). The standard categories were "ok", for "the sentence fits relatively well to its context" (here numerically calculated as 1) and "\*" for "the sentence does not properly fit its context or does not fit its context at all" (here numerically 4). Participants were encouraged to use these two categories, but for cases where they found it difficult to decide between "ok" and "\*", the intermediate categories "ok?" (2) and "\*?" (3) were offered. More than 92% of the judgments employed one of the standard responses "ok" (1) or "\*" (4). The subjects were told that we were interested in the conditions under which the forms *soll*, *muss*, *sollte* and *müsste* can be used.

The sentences were arranged in the form of minimal quadruplets (or in some cases minimal triplets), where a quadruplet (or triplet) involved the same context and a minimally different sentence, mostly differing by the replacement of one modal by another. Each quadruplet (or triplet) was shown as a block on the same page, with the context repeated for each sentence (context + sentence1; context + sentence2; ...). The instructions included the information that the context was the same in each block, and asked the subjects to closely look at the context anew each time before judging the next sentence. (In one case, presented

below as (82), the context was minimally varying, while the following sentence remained the same.)

The appendix includes all contexts and sentences in their German original form. All examples we elicited are either discussed in the text or pointed to in footnotes. The discussion in the text employs English translations of the contexts. In the discussion, we give names to some of the contexts that occur in several places.

For the English examples presented in section 6.1, we conducted an informal survey, presenting the contexts and sentences to eight speakers, all of whom were linguistics students. The same rating scale was used.

We add a methodological note concerning the relation of a modal to its context. It is often assumed that a modal *M* can be attributed modal flavour *F* if *M* is acceptable in a context that supports modal flavour *F*. Here we are concerned with cases of possible overlap of modal flavour. We seek to apply a stricter standard: modal flavour *F* can be attributed to *M* if *M* can occur in a context that supports *F* *and* excludes other conceivable modal flavours. For many core cases discussed in this paper, we made an effort to construct such contexts.

### 3 The modal flavours of *soll* and *muss*

In this section, we demonstrate restrictions on the lexical modal flavours of *soll* and *muss*, which are also restrictions on the overlapping uses of these two modals. Root *soll* and *muss* are addressed in section 3.1, and epistemic *soll* and *muss* are addressed in section 3.2.

#### 3.1 The root flavours of *soll* and *muss*

##### 3.1.1 The root flavours of *soll*

In the literature, root *soll* is variably characterized as bouletic (Kratzer 1991, Sode and Schenner 2013, Öhlschläger 1989), deontic (Diewald 1999; see also Bochnak and Csipak 2017), or both (Bech 1949, the reference grammar Zifonun, Hoffmann and Strecker 1997b:1890, Ehrich 2001:161,166, and the chapter in the Duden reference grammar by Fabricius-Hansen 2016:572).

In this section, we argue that *soll* is lexically only bouletic, but allows deontic inferences in appropriate discourse contexts.

As our starting point, we draw on Bech (1949), who characterized the modal flavour of *soll* as including two uses. We render the content of his prose with the schematic formulas in (11). We classify (11a) as a bouletic meaning<sup>9</sup> and (11b) as a deontic meaning.

- (11) Two meaning-options postulated for *soll* by Bech (1949)
- a. *soll p*: *x* wants *p*, for *x* ≠ the subject of the clause or
  - b. *soll p*: a principle requires *p*

The bouletic use of (11a) is illustrated in (12). The example is from the German TV-series ‘In aller Freundschaft’ (‘Amicably’; April 4, 2017). The subtitles do not always render the exact words spoken, but they render the meaning faithfully in this case. The relation between

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<sup>9</sup> *Want* can give rise to obligations, as we will discuss. The classic representatives of bouletics, namely wishes and desires, do not have this property in an obvious way. In Truckenbrodt (2006), the meaning of the imperative was analyzed in terms of *want* and called ‘deontic’. Here we classify the literal meaning of *want* as bouletic. We separate this bouletic meaning below from the deontic inferences that it can give rise to in certain contexts.

spoken text and subtitles illustrates the equivalence in (11a).

- (12) Dr. Globisch: Ich will nicht, dass Alexander nach München geht.  
I want not that Alexander to Munich goes  
'I don't want Alexander to go to Munich.'

Subtitles: Alexander **soll** nicht nach München gehen.  
Alexander SOLL not to Munich go  
'I don't want Alexander to go to Munich.'

Root *soll* in a deontic context is illustrated in (13).

- (13) [I just got a letter from the car registry. My inspection report expires next week.]

Ich **soll** mein Auto abmelden. DEONTIC  
I SOLL my car deregister  
'I am supposed to deregister my car.'

In spite of the apparent deontic usage of *soll* in such cases, we pursue an analysis in which the modal flavour of root *soll* is restricted. We draw on the observation of Glas (1984) that root *soll* shows close parallels in its meaning to the imperative, and on the analysis of the imperative in Condoravdi and Lauer (2012), who build on Schwager (2005)/Kaufmann (2012). Condoravdi and Lauer argue that the imperative can be construed as only *bouletic* in its primary semantic interpretation, and they distinguish this primary interpretation from inferences that depend on the context. We here argue that *soll* is likewise only bouletic in its lexical meaning (following, in essence, Öhlschläger 1989, Kratzer 1991, and Sode and Schenner 2013).

We pursue this in the form of a reduction to the bouletic meaning (11a), excluding the deontic one in (11b) – and we distinguish *soll*'s lexical meaning from a “surface” meaning that incorporates additional inferences, in particular inferences of obligation. The inference we have in mind is described, with some variation, in Glas (1984:19ff), Öhlschläger (1989:174), and Fritz (1991:287) for *soll* and in Condoravdi and Lauer (2012) for the imperative. We render schematically the version that we employ in (14).

- (14) *Bouletic-to-deontic-inference*  
*x* lets *y* know that *x* wants *p* and  
*p* is under the immediate control of *y* and  
*x* has authority over *y* in regard to *p*  
⇒ *y* is obliged towards *x* to bring about *p*

This inference can easily be verified in cases of explicit use of the bouletic attitude verb *want*. First, (15) shows that wanting does not entail an obligation as a matter of its wired-in lexical meaning.

- (15) Professor P: A representative of a small company came into my office today. She **wants** me to advertise her company's pencils in my seminar. I don't think I'm going to.
- ⇒ Professor P **has to** advertise the company's pencils in his seminar.
  - ⇒ Professor P is under an obligation to advertise the company's pencils in his seminar.

Second, (16) shows that wanting will entail an obligation under the conditions described in

(14). From the *want*-statement in (16a), an obligation follows that makes the deontic use of *have to* in (16b) true and that also makes the sentence in (16c) true.

(16) [A is the boss of B at a company.]

- a. A: I **want** you write this report by noon tomorrow.
- b. ⇒ B **has to** write the report by noon tomorrow.
- c. ⇒ B is under an obligation to write the report by noon tomorrow.

Like *want*, *soll* also does not lexically entail obligation, as previous authors have pointed out (see, for example, Öhlschläger 1989:173). We demonstrate this with the examples in (17) and (18). They are evidence for the presence of the bouletic meaning option in (11a) without an obligation-related component. They are thus also evidence against an unambiguously deontic meaning of root *soll*.<sup>10</sup>

(17) [PENCILS: Professor P is in his office with Professor M. Professor P opens a letter he just received. It's from a company. Professor P has no obligations to companies. Professor M asks Professor P why the company is writing to him. When Professor P is done reading, he answers:]

BOULETIC

✓<sup>1.1</sup> Ich **soll** in meinem Seminar Werbung für die Bleistifte der Firma  
I **SOLL** in my seminar advertising for the pencils of the company  
machen.  
make

‘They want me to advertise the company’s pencils in my seminar.’

- a. ≠ Professor P **has to** advertise the company’s pencils in his seminar.
- b. ≠ Professor P is under an obligation to advertise the company’s pencils in his seminar.

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<sup>10</sup> Bochnak and Csipak (2017) suggest a meaning for *soll* that is intended to generalize across root and epistemic uses. They describe the generalized meaning as reportative, reducing deontic meaning aspects to reportative ones. In their formalization, there are only reportative meaning components, i.e. no bouletic or deontic ordering source of the kind suggested in Kratzer (1981). If a purely reportative meaning were applied to our examples, (17) would seem to amount to ‘Someone says(/said) that I am advertising(/will advertise) the company’s pencils in my seminar,’ and (18) to ‘Someone says(/said) that I am getting(/will get) her morphine.’ However, these do not seem to render what is expressed, and they would not be expected to be felicitous in the given contexts.

Bochnak and Csipak (2017)’s analysis does correctly capture the fact that *soll* cannot be used performatively; see also Glas (1984), Hinterwimmer (2013). The restriction against performative use is an aspect of the meaning or use of *soll* that we are putting aside here; we address it separately in Matthewson, Hinterwimmer and Truckenbrodt (2018).

(18) [MORPHINE: Maria, a doctor who works in a hospital, is drinking coffee with Lisa. Maria gets a text message (“SMS”) from her daughter. Surprisingly, in the text Maria’s daughter requests that Maria gets her morphine from the hospital. Of course, Maria won’t do that. Maria shows Lisa the text and says: Look, ...] BOULETIC

✓<sup>1.0</sup> ich **soll** ihr Morphium besorgen.  
 I SOLL her morphine get  
 ‘I am supposed to get her morphine.’

- a. ⇒ I **have to** get her morphine.
- b. ⇒ I am under an obligation to get her morphine.

Under circumstances involving authority, *soll* can – as predicted by the bouletic-to-deontic inference in (14) – take on the deontic surface reading, as in example (19).

(19) [A is the boss of B at a company. A sends C to tell B on behalf of A:]<sup>11</sup>

- a. C: Du **sollst** diesen Bericht bis morgen um 12 Uhr schreiben.  
 you SOLL this report by tomorrow at 12 o’clock write  
 ‘You are supposed to write this report by tomorrow at noon.’
- b. ⇒ B **has to** write the report by noon tomorrow.
- c. ⇒ B is under an obligation to write the report by noon tomorrow.

Additional examples are shown in (20)-(22). They illustrate that we allow for abstract attitude-holders *x* in (11a) and (14). We think this is plausible given that overt German *will* (like its English counterpart *want*) also allows such abstract subjects.

(20) [There is a sign to keep one’s dog on a leash. M says to P:]

Du **sollst** deinen Hund an der Leine halten.  
 you SOLL your dog on the leash hold  
 ‘You’re supposed to keep your dog on a leash.’  
 cf. They/the authorities want you to keep your dog on a leash.

(21) Du **sollst** nicht töten.  
 you SOLL not kill  
 ‘Thou shalt not kill.’  
 cf. God/the universe wants you not to kill.

(22) Ein Katholik **soll** regelmäßig zur Beichte gehen.  
 a Catholic SOLL regularly to.the confession go  
 ‘A Catholic is supposed to go to confession regularly.’  
 cf. The Catholic church wants its members to go to confession regularly.

However, in a “deontic-only” context, where there is no concrete or abstract authority that could serve as a bouletic attitude-holder, *soll* is not possible, while *muss* is allowed:<sup>12</sup>

<sup>11</sup> As mentioned in footnote 10, there is a restriction against directly performative uses of *soll*. This prevents us from using a simpler example in which A tells B what to do directly.

<sup>12</sup> Bochnak and Csipak (2017) present *soll* as felicitous in a similar context to that in (24). The difference may partly derive from the fact that our contexts explicitly exclude that there were previous requests to follow the relevant rule, since such requests could make the bouletic

(23) [Maria and Lisa are playing chess. Neither of them has been playing the game for a long time. Maria sometimes makes moves that don't follow the rules. Lisa explains each rule when this happens. They are playing against each other for the first time, and castling ("die Rochade") has not come up so far. Now Maria is castling and places the pieces in the wrong way. Lisa says:] DEONTIC

a. #<sup>3.1</sup> Du **sollst** den König neben den Turm stellen.  
 you SOLL the king next.to the rook put  
 'X wants you to put the king next to the rook.'

b. ✓<sup>1.2</sup> Du **musst** den König neben den Turm stellen.  
 you MUST the king next.to the rook put  
 'You have to put the king next to the rook.'

(24) [MONOPOLY: Maria and Peter are playing monopoly. Peter doesn't know the rules so well. So far nobody has landed on a chance square. Now Peter lands on a chance square. He looks questioningly at Maria. Maria says:] DEONTIC

a. #<sup>2.7</sup> Du **sollst** eine Ereigniskarte ziehen.  
 you soll a chance.card draw  
 'X wants you to draw a chance card.'

b. ✓<sup>1.0</sup> Du **musst** eine Ereigniskarte ziehen.  
 you must a chance.card draw  
 'You have to draw a chance card.'

If *soll* had a deontic reading like (11b), it should be fully acceptable in these contexts. The fact that it is not supports our claim that *soll* only has the lexical meaning in (11a), which the contexts in (23) and (24) do not allow. Our account is summed up in (25).

(25) Our account:

Lexically, *soll* only has the bouletic meaning option in (11a), not the deontic one in (11b). A deontic impact may in addition result from applying to (11a) the bouletic-to-deontic inference (14). We call the result of the inference a "deontic surface meaning".

We think that the indirect way of deriving deontic surface meanings of *soll* can also be supported in another way. Consider (26). The context serves for both (26a) and (26b). It sets up, simultaneously, a preference of Maria's boss towards Maria and an obligation on Maria. These are both cast in general terms. The circumstances of the target examples are more specific, with specifics not known to Maria's boss: two specific e-mails, a specific time for answering them. In this situation, (26a) is possible: deontic *musst* can describe an obligation relating to these specifics that derives from the more general obligation in the context. On the other hand, bouletic *will* 'want' is somewhat degraded, as shown in (26b).

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interpretation of *soll* true. We submit that, for the time being, the evidence supports treating purely deontic uses of *soll* as infelicitous.

(26) [BOSS AND EMAILS: Maria’s boss told her at the beginning of her employment that she wants her to answer important emails right away. Maria just received two important emails. Her boss is not there. Maria says to Peter on the phone:] DEONTIC

- a. ✓<sup>1.0</sup> Ich **muss** noch zwei E-Mails beantworten, bevor ich nach Hause  
I must still two emails answer before I to home  
komme.  
come  
‘I still have to answer two emails before I come home.’
- b. ✓<sup>2.3</sup> Meine Chefin **will**, dass ich noch zwei E-Mails beantworte,  
my boss wants that I still two emails answer  
bevor ich nach Hause komme.  
before I to home come  
‘My boss wants me to still answer two emails before I come home.’

We call sentences with *will* ‘want’ *preference-ascriptions*, and we formulate the restriction in (27), which we think separates cases in which moving to particulars is possible from cases in which it is somewhat deviant.

(27) *Restriction on preference-ascriptions*

*x*’s expression of [x wants p] at *t* makes a later preference-ascription [x wants q] true only if *x* can be said to have believed at *t* that *p* entails *q*.

The restriction in (27) is violated in (26b), since Maria’s boss in (26) did not know about the two specific mails and the specific time that is mentioned as instances to which her preference applied.

Importantly, German *soll* acts like a preference-ascription in patterning with *will* ‘want’, rather than with *muss*. This is shown in (28).<sup>13</sup>

(28) [Context BOSS AND EMAILS, see (26)]

DEONTIC

- #<sup>2.6</sup> Ich **soll** noch zwei E-Mails beantworten, bevor ich nach Hause komme.  
I SOLL still two emails answer before I to home come  
‘My boss wants me to still answer two emails before I come home.’

If *soll* had a deontic meaning option in the lexicon (like (11b)), we would expect *soll* to pattern with deontic *muss* in not needing to obey the restriction on preference-ascriptions, contrary to what we see in (28). The correct account seems to be that *soll* only has a bouletic meaning option in the lexicon (the one in (11a)), from which the bouletic-to-deontic inference can derive deontic surface readings. Since this requires a literal bouletic meaning, it correctly captures that *soll* obeys the restriction on preference-ascriptions.<sup>14</sup>

<sup>13</sup> We thank Uli Sauerland (personal communication) for drawing our attention to this type of example and the contrast to *muss* ‘must’ in (26a). This contrast, and the discussion in Bochnak and Csipak (2017), examples (30)–(30’), set us on the path to hypothesizing the restriction on preference-ascriptions.

<sup>14</sup> We elicited the preference-ascription contrast also with another example, shown in the appendix as [7]. The contrast is weaker there: ✓<sup>2.2</sup>*Mein Chef will* (‘My boss wants’) and ✓<sup>1.8</sup>*soll*, vs. ✓<sup>1.2</sup>*muss*. The restriction on preference-ascriptions seems to be more subtle than

Notice that *soll* does not allow teleological readings. This is uncontroversial. It is here illustrated with the example in (29). The example shows a minimal contrast with *muss*, which allows teleological readings like its English counterparts.<sup>15</sup>

- (29) [GOAL OF ANSWERING EMAILS: Maria just received two important emails. She has the goal of answering important emails right away. Nobody asked her to answer her emails right away. Maria calls Peter and says:] TELEOLOGICAL

Ich #<sup>3.7</sup>**soll**/ ✓<sup>1.3</sup>**muss** noch zwei E-Mails beantworten, bevor ich nach Hause  
 I SOLL/ must still two emails answer before I to home  
 komme.  
 come

‘Someone wants me to/ I have to still answer two emails before I come home.’

If a teleological reading were available for *soll* (like it is for *muss*), *soll* should be acceptable in this context. (Note that a bouletic reading of *soll* with *ich* ‘I’ as the attitude holder is blocked by the condition on *soll* in (11a) that the attitude holder must be different from the sentence subject.)

Summarizing, we have argued that root *soll* is lexically only bouletic. It does not allow teleological interpretations, and it is compatible with deontic contexts only due to a bouletic-to-deontic inference.<sup>16</sup>

other contrasts relevant here. It is perhaps best investigated without encouragement to the speakers to use the extremes of the scale.

<sup>15</sup> We also elicited *soll* with another teleological example in our study, which can be seen as [13] in the appendix. *Soll* was rated #<sup>3.9</sup> in that context.

<sup>16</sup> Bochnak and Csipak (2017) suggest that *soll* is reportative in both epistemic and root readings. We have already addressed in footnote 10 why a purely reportative analysis is not sufficient for the root reading. Let us, however, briefly address the issue whether our bouletic meaning component is *in addition* in the scope of a reportative requirement. Hinterwimmer (2013) has an example that convinced us (but not Bochnak and Csipak 2017) of the absence of a reportative component in root *soll*. We give a similar but elaborated example in (i) that we think makes Hinterwimmer’s point even more forcefully.

- (i) [P has the idea that if he puts a *smiling* scarecrow in his garden, it will attract birds rather than scare them away. P secretly built such a scarecrow in his basement. P has not talked to anyone about his idea or about the scarecrow he built. As he is putting it into his garden, his sister approaches him, asking him what the purpose of the scarecrow is. P replies:]

- a. Sonst **sollen** Vogelscheuchen ja Vögel vertreiben ...  
 otherwise SOLL scarecrows MODAL.PARTICLE birds scare.away  
 ‘Usually scarecrows are supposed to scare birds away, as you know, ...’
- b. ... aber meine Vogelscheuche **soll** Vögel anziehen.  
 ... but my scarecrow SOLL birds attract  
 ‘... but my scarecrow is supposed to attract birds.’

The sentence in (a) is ambiguous between a reportative reading (people say that scarecrows scare birds away) and a bouletic reading (people (generally) want scarecrows to scare birds away). The continuation in (b), however, cannot have a reportative reading (someone says/people say that my scarecrow attracts birds) because of the context. It only has a bouletic

### 3.1.2 The root flavours of *muss*

Kratzer (1991) classified German *muss* ‘must’ as unrestricted in its modal base and ordering source. According to this, the root modal flavours of *muss* are predicted to include (at least) deontic, teleological, and bouletic (the same as English *have to* and *must*). In this section we argue that this prediction is partially correct.

The typical deontic use of *muss* was illustrated in (23b), (24b), and (26a). The teleological use of *muss* was illustrated in (29).

We now show a restriction on the bouletic use of strong necessity modals that we think holds for German *muss* as well as English *have to*, and that results in a restriction on the overlap between the bouletic uses of *muss* and of *soll*. Consider the examples in (30) in their untypical bouletic use, which can be enhanced by stressing the modal. We provide broad paraphrases for the bouletic readings on the right.

- (30) a. Ich **muss** diesen Film sehen.      ≈ I want to see this movie.  
 I must this movie see  
 ‘I have to see this movie.’
- b. Du **musst** diesen Film sehen.      ≈ I want you to see this movie.  
 you must this movie see  
 ‘You have to see this movie.’
- c. Sie **muss** diesen Film sehen.      ≈ I want her to see this movie.  
 she must this movie see  
 ‘She has to see this movie.’
- d. Wir **müssen** diesen Film sehen.      ≈ I want us to see this movie.  
 we must this movie see  
 ‘We have to see this movie.’

A generalization that can be seen in the paraphrases is that the bouletic attitude holder is always the speaker. Other meanings are not allowed. For example, (31) and (32) show that *muss* cannot express the will of a third person or entity (the company in (31) and the daughter in (32)). The examples with *muss* are infelicitous because the context is not compatible with a deontic reading, and, importantly, in a bouletic reading, *muss* cannot simply express that the prejacent is the preference of a third person. If *muss* expresses just a preference, it has to be the speaker’s preference.

- (31) [Context PENCILS, see (17)] BOULETIC  
 #<sup>3.8</sup> Ich **muss** in meinem Seminar Werbung für die Bleistifte der Firma  
 I must in my seminar advertising for the pencils of the company  
 machen.  
 make  
 ‘I have to advertise the company’s pencils in my seminar.’

---

reading (I want my scarecrow to attract birds). In (b), P just states what he wants to happen, and he does so for the first time. Thus, we think that there is no requirement that the preference described by *soll* needs to be based on a prior report.

(32) [Context MORPHINE, see (18)]

BOULETIC

#<sup>3.6</sup> ich **muss** ihr Morphium besorgen.  
I must her morphine get  
'I have to get her morphine.'

In contrast to *muss*, the bouletic modal *soll can* express a third person's preference, as was seen in (17) and (18). The restriction we argue for is given in (33).

(33) Only the speaker can be the attitude holder of bouletic *muss*.<sup>17</sup>

We sum up our results from this section, concerning the limited overlap in the meanings of *muss* 'must' and *soll* 'be supposed to'. First, the only lexical meaning of root *soll* is bouletic. A deontic surface meaning of *soll* is derived via the bouletic-to-deontic inference. It is still a preference-ascription insofar as it obeys restrictions on what can be ascribed to the preference-holder. Second, the meaning overlap due to bouletic *muss* is limited. Bouletic *muss* requires that the speaker is the attitude holder of the bouletic attitude. Bouletic *soll* does not obey this restriction.

### 3.2 Modal flavours of epistemic *soll* vs. *muss*

There is similarly a distinction between the modal flavours of *soll* and *muss* in their epistemic uses, as we show in this section.

Within the epistemic domain, we distinguish two sub-types of modal reasoning: *inferential* and *reportative*. These concepts are prevalent in the evidentials literature (Willett 1988, among many others), and are applied to epistemic modals by various authors (Faller 2007, among many others).

In *inferential* interpretations, the speaker infers from some evidence (facts about the world) that the prejacent must or may be true. This is illustrated for the St'át'imcets (Lillooet Salish) inferential evidential *k'a* in (34). Matthewson, Davis, and Rullmann (2007) argue that the evidential marker *k'a* is semantically an epistemic modal, which presupposes that there is inferential evidence for its prejacent, and which is unspecified for modal force. The sentence in (34) therefore truth-conditionally asserts that in some or all accessible worlds, Lenny is eating the cake, and presupposes that the speaker has inferential evidence for this modal commitment.

(34) [You saw cake in the fridge five minutes ago, and now it's gone. You know Lenny is in his room.]

INFERENCEAL

Wá7=k'a      ts'áqw-an'-as k=Lenny      ti=kíks=a  
IPFV=INFER eat-DIR-3ERG DET=Lenny      DET=cake=EXIS  
'Lenny **must/might** be eating the cake.'

(St'át'imcets; adapted from Matthewson, Rullmann and Davis 2007:214)

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<sup>17</sup> This changes in embedded clauses and in free indirect discourse. In 'Mary said that Bill has to see this movie,' Mary is the attitude holder of bouletic *have to*. In a construal of (31) as free indirect discourse, 'I simply *have to* advertise their pencils, they say (because they're so good, they say),' the attitude holder of bouletic *have to* is "they", the company. We think the restrictions on the silent attitude holder of bouletic *muss/have to* are parallel to the restrictions on the epistemic attitude holder in epistemic readings of *must* shown by Hacquard (2006) and Anand and Hacquard (2013).



conclusions about *muss* are similar to Rett’s (2016) about English *must*, although as we will see, German *muss* and English *must* also show some interesting differences.

Example (37) illustrates a context in which the speaker has strong inferential evidence for the prejacent, and there has been no prior report. In such purely inferential contexts, *muss* is fine while *soll* is disallowed.

- (37) [KITCHEN (STRONG): I saw Maria going into the kitchen. The back door of the kitchen is obstructed from the outside. Nobody has said anything about Maria. I say:] INFERENTIAL
- Maria ✓<sup>1.2</sup>**muss**/ #<sup>4.0</sup>**soll** in der Küche sein.  
 Maria must/ SOLL in the kitchen be  
 ‘Maria must be in the kitchen.’

Example (38) further supports the claim that *soll* is infelicitous in inferential contexts. The context this time favours a weak necessity interpretation, so *muss* is predictably somewhat degraded.

- (38) [KITCHEN (WEAK): I saw Maria going into the kitchen. The back door of the kitchen is rarely used. Nobody has said anything about Maria. I say:] INFERENTIAL
- Maria #<sup>2.7</sup>**muss**/ #<sup>4.0</sup>**soll** in der Küche sein.  
 Maria must/ SOLL in the kitchen be  
 Lit.: ‘Maria must/ is supposed to be in the kitchen.’

The unacceptability of *soll* in (37) and (38) is not a surprise; as noted above, a long tradition of literature classifies epistemic *soll* as purely reportative. Bochnak and Csipak (2017) explicitly argue that *soll* lacks an inferential interpretation, and our examples confirm this.

In (39) and (40) we present contexts in which the utterances *are* based on a prior report heard by the speaker. Here we see that both *muss* and *soll* are acceptable. (The facts are slightly different for English, as we show shortly below.)<sup>21</sup>

- (39) [M tells me that when P proposed to her, he even went down on his knee. Later, I tell K:] REPORTATIVE
- a. P **muss** sogar vor ihr auf die Knie gegangen sein.  
 P must even before her on the knee gone be  
 # ‘P must have even gone down on his knee in front of her.’
- b. P **soll** sogar vor ihr auf die Knie gegangen sein.  
 P SOLL even before her on the knee gone be  
 ‘P is supposed to have even gone down on his knee in front of her.’
- (40) [Detective P asks K what their assistant L found out from the cellphone location data about M’s whereabouts. K answers:] REPORTATIVE
- a. M **muss** schon in Berlin sein.  
 M must already in Berlin be  
 # ‘M must already be in Berlin.’
- b. M **soll** schon in Berlin sein.  
 M SOLL already in Berlin be  
 ‘M is supposed to already be in Berlin.’

<sup>21</sup> Thanks to an anonymous reviewer for suggesting the examples in (39) and (40).

Based on these examples, it appears that *muss* is compatible with either inferential or reportative interpretations. This would be consistent with Ehrich's (2001:167) proposal that *muss* allows reportative readings.

However, we argue that epistemic *muss* has a purely inferential lexical meaning. The reason that *muss* is felicitous in (39a) and (40a) is that prior reports can form the basis for inferential reasoning. For example, the meaning of (40a) can be roughly paraphrased as 'I infer from what L said that M is necessarily already in Berlin.' The speaker has taken L's report as evidence for M's whereabouts, and drawn an inference that M must be in Berlin. If this is correct, the speaker of (40a) has some level of commitment to the truth of the prejacent due to the inference process. Because *muss* is a strong necessity modal, the speaker in fact has a very high level of commitment to the prejacent. If we are on the right track, this is different in (40b) with *soll*: its meaning can be paraphrased as 'According to L, M is already in Berlin.' No inference process is required and the utterance does not entail any speaker commitment to the prejacent.

This prediction about *soll* is easily confirmed by the well-known fact that *soll* is compatible with speaker denial of the truth of the prejacent, as illustrated in (41a). (See Fallner 2007, among many others, for more examples.) Our proposal that *muss* is only inferential predicts that it will be deviant in such denial contexts, since inferentials require some level (for necessity modals, even a high level) of speaker commitment to the truth of the prejacent (cf. e.g., von Stechow and Gillies 2010). This prediction is also correct, as shown in (41b).<sup>22</sup>

- (41) [TELEPHONE: The man from customer service says that our telephone is broken, but I'm a bit of an expert, and I know that we only need a new modem without a loose connection. I say:] REPORTATIVE
- a. ✓<sup>1.0</sup> Unser Telefon **soll** kaputt sein, aber das stimmt nicht.  
 our telephone SOLL broken be but that is.true not  
 'Our telephone is supposed to be broken, but that's not true.'
- b. #<sup>3.8</sup> Unser Telefon **muss** kaputt sein, aber das stimmt nicht.  
 our telephone must broken be but that is.true not  
 'Our telephone must be broken, but that's not true.'

Summarizing so far, we propose that epistemic *muss* and *soll* differ in the type of epistemic reasoning they allow. *Muss* is inferential; *soll* is reportative. This conclusion is in line with proposals in prior literature for *soll* (see the references above), and partly also for *muss* (see e.g., Zaefferer 2001, who argues that *muss* is inferential). However, our claim that *muss* lacks pure reportative readings is not generally accepted. According to our analysis, all cases in which *muss* appears to rely on reports must be contexts in which the speaker has also undergone an inference process and is committed to the necessity of the prejacent being true.

We conclude this section by briefly noting a difference between German *muss* and English *must* which we find interesting. In recent literature, various proposals have been made

<sup>22</sup> Importantly, the distinction between *muss* and *soll* with respect to the denial case in (41) is a modal flavour distinction, not merely a modal force distinction. The relevant distinction is that *muss*, but not *soll*, involves speaker inference, and asserts some level of speaker commitment to the prejacent. This way of viewing things correctly predicts that even weak inferential modals (like *könnte* 'can') will be bad with a continuation as in (41). We further show in section 4 that *sollte* – clearly not a strong necessity modal – patterns like *muss* in these denial contexts (because it adopts the modal flavours of *muss* rather than of *soll*).

about the types of epistemic reasoning involved with *must* (see, for example, von Fintel and Gillies 2010, Matthewson 2015a, Rett 2016). Available proposals suggest that *must* is subject to a requirement that the speaker’s evidence for the prejacent be either indirect (von Fintel and Gillies), not the most reliable (Matthewson), or inferential (Rett). All of these ideas are in principle compatible with our inferential analysis of German *muss*. Where the languages differ is with respect to the extent to which reportative evidence for the prejacent can support inference (and thus allow *muss* or *must*).

According to Fintel and Gillies (2010) and Rett (2016), for *must*, reports *cannot* be the basis for inferences. For example, von Fintel and Gillies write (2010:354) that “epistemic modals do not cover the notion of indirect evidence derived from reports.”<sup>23</sup> The examples (42) and (43) show this for written reports and information in pictorial form. The English translations of the examples (39) and (40) showed this for oral reports.

(42) [I have read in a book that the Battle of Hastings was fought in 1066.]

# The Battle of Hastings **must** have been fought in 1066.  
(von Fintel and Gillies 2010:354, citing Frank Jackson (p.c.))

(43) [M and P are walking together, trying to find places to buy gifts. M consults google maps on his phone; it says that there is a bookstore near where they are. He says:]

# There **must** be a bookstore near here.

Interestingly, German is different. Thus, German versions of (42) and (43) with *muss* are acceptable, as shown in (44) and (45).

(44) [I have read in a book that the Battle of Hastings was fought in 1066.]

Die Schlacht von Hastings **muss** 1066 stattgefunden haben.  
the battle of Hastings must 1066 taken.place have  
# ‘The Battle of Hastings must have taken place in 1066.’

(45) [M and P are walking together, trying to find places to buy gifts. M consults google maps on his phone; it says that there is a bookstore near where they are. He says:]

Es **muss** in der Nähe ein Buchgeschäft geben.  
it must in the near a bookstore give  
# ‘There must be a bookstore near here.’

The difference between the languages is also reflected in different judgments for our cases involving oral reports in (39a) and (40a) above. While *muss* is fine in these cases, *must* is degraded, as indicated in the English translations.

We can sketch an account of the variation within the theory of von Fintel and Gillies (2010) as follows. Intuitively, what is ruled out for *muss p* or *must p* is that the speaker’s evidence is ‘too direct’ in some sense. For example, if one sees it raining, one cannot say *It must be raining* (or in German, *Es muss regnen*). In the analysis of von Fintel and Gillies, the ‘kernel’ is the set of propositions representing the direct evidence in the context. Furthermore,

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<sup>23</sup> Matthewson (2015a:147f) argues for *must* that an inference based on a report is possible, as long as the report is considered reliable. Crucially, however, the inference must be indirect; it cannot be an inference from a report of the very prejacent itself. There is thus no empirical disagreement between Matthewson’s proposal and those of von Fintel and Gillies or Rett.

there is a requirement on *must p* that the kernel is not allowed to directly settle the question whether *p*. Suppose now that in English, reliable reports enter the kernel. This means that (45) is ruled out for the same reason that the target sentence would be ruled out when the speaker is standing in front of the bookstore: the kernel directly settles the issue of whether there is a bookstore. In German, suppose that the requirements for entry into the kernel are stricter: even reliable reports do *not* count as direct evidence. A report in German has the status of indirect evidence (e.g., parallel to seeing people wearing wet raingear entering a building, as indirect evidence for it raining). Therefore, inference to the prejacent is possible and *muss* is licensed in cases like (39a), (40a), (44), and (45).

#### 4 *Sollte*

We now turn to *sollte*, the Konjunktiv II form of *soll*, and its surprising switch in modal flavour relative to *soll*. In subsection 4.1 we deal with root *sollte*, and subsection 4.2 addresses epistemic *sollte*.<sup>24</sup>

Before beginning, we set aside a separate homophonous use of *sollte*, which is the past tense version of *soll*. This use is illustrated in (46). As we expect, this past tense form shares the bouletic modal flavour of its present-tense counterpart *soll*.

- (46) L: Last year, my daughter approached me with a strange request.  
 M: What did she want? BOULETIC  
 L: Ich **sollte** ihr Morphium besorgen.  
 I SOLL.PAST her morphine get  
 ‘I was supposed to get her morphine.’

In the examples to follow, our discourse contexts are unambiguously present tense, so that we can be sure we are investigating the Konjunktiv II *sollte* rather than the past tense one.

#### 4.1 Root *sollte* is the weak necessity version of *muss*

##### 4.1.1 The modal flavour of root *sollte*

We begin with a brief summary of prior (mostly non-formal) claims in the literature about the modal flavour of *sollte*, and then present the evidence in favour of our own proposal.

Bech (1949) made the surely natural assumption that there is no modal flavour distinction between *soll* and *sollte*. This assumption is also made in much later literature, e.g. Öhlschläger (1989) and the reference grammars Zifonun, Hoffmann and Strecker (1997b:1888ff) and Fabricius-Hansen (2016:571ff).<sup>25</sup> However, there are also observations

<sup>24</sup> In this paper, we concentrate on the analytical forms of Konjunktiv II, *müsste* and *sollte*. Analytical Konjunktiv II forms generally involve inflection of the finite verb and are built from the past-tense form. German also allows a synthetic form of Konjunktiv II that employs *würde* ‘would’ plus infinitive. The synthetic forms are somewhat marked with modals to begin with (<sup>?</sup>*würde sollen*, <sup>?</sup>*würde müssen*). We think that they furthermore do not create weak necessity readings.

<sup>25</sup> Both these reference grammars discuss a special use of *sollte* that often occurs in conditionals and that we address only in this footnote:

- (i) Wenn es regnen **sollte**, kommen wir sofort zurück.  
 if it rain SOLLTE come we immediately back

about modal flavour distinctions between *soll* and *sollte*. Brünner and Redder (1983:57f) have a short description of the distinction: While *soll* expresses a request or obligation due to an implicit person, *sollte* is about goals that are brought into question by the subjunctive and standardized for recommendations or advice. Glas (1984:76ff) argues that root *sollte*, unlike root *soll*, has to express a value judgment. For example, while *Du sollst dir die Haare waschen* ‘You SOLL wash your hair’ expresses that the speaker (or someone else) wants the addressee to wash his hair, *Du solltest dir die Haare waschen* ‘You SOLLTE wash your hair’ is a value judgement about the addressee’s washing his hair. This distinction is accepted by Diewald (1999). The value judgement, in our terms, is the speaker’s judgement that the prejacent is the best available option, characteristic of weak necessity deontic or teleological modals.

As we test root *sollte* for the properties discussed in section 3.1, we are led to confirm the preceding assessments by Brünner and Redder (1983), Glas (1984) and Diewald (1999): There is a surprising modal flavour distinction between *soll* and *sollte*. We anticipate our assessment of it in (47).

- (47) Root *sollte* does not share the bouletic modal flavour of *soll*. Instead, root *sollte* is semantically a weak necessity version of root *muss*.

For one thing, *sollte* has let go of the bouletic use (with a flexible attitude holder) that we showed for *soll*. This is demonstrated in (48) and (49). Recall that deontic *muss* is excluded in these contexts since the context does not support a deontic reading, and that bouletic *muss* is excluded since it would require a third person attitude holder, which *muss* cannot have. *Sollte* here patterns with *muss* in sharing these restrictions. If *sollte* were a weak version of bouletic *soll*, we would expect it to be acceptable in these contexts, parallel to bouletic *soll*.

- (48) [Context PENCILS, see (17)] BOULETIC  
 Ich #**sollte** (/ #muss/ ✓soll) in meinem Seminar Werbung für die Bleistifte  
 I SOLLTE/ must/ SOLL in my seminar advertising for the pencils  
 der Firma machen.  
 the.GEN company make  
 Lit.: ‘I should advertise the company’s pencils in my seminar.’  
 Judgments: #<sup>3.2</sup>**sollte** (/ #<sup>3.8</sup>muss/ ✓<sup>1.1</sup>soll)

- (49) [Context MORPHINE, see (18)] BOULETIC  
 ich #**sollte** (/ #muss/ ✓soll) ihr Morphium besorgen.  
 I SOLLTE/ must/ SOLL her morphine get  
 Lit.: ‘I should get her morphine.’  
 Judgments: #<sup>3.6</sup>**sollte** (/ #<sup>3.6</sup>muss/ ✓<sup>1.0</sup>soll)

Second, we see that *sollte*, unlike *soll* (but like English *should*) can have a deontic reading. In

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‘If it should rain, we will come back right away.’

The meaning contribution as hypothetical (Zifonun, Hoffmann and Strecker 1997b:1893) might suggest that the Konjunktiv II is semantically interpreted here, while the stem of the modal is not semantically interpreted. English *should* shows the same reading. We put this special case aside here.

(50), this is with respect to a dress-code at a company.<sup>26</sup>

(50) [P is about to start working at a company in which M is also employed. P asks M for advice about the dress-code. Nobody said anything to M about what they want P to wear. M says to P: You don't have to wear a suit. However, ...] DEONTIC

du **solltest**/ #sollst ein gebügeltes Hemd tragen.  
you SOLLTE /SOLL an ironed shirt wear  
'You should wear an ironed shirt.'

Furthermore, *sollte*, unlike *soll* (and like English *should*) can have a teleological reading:

(51) [SAARBRÜCKEN: At the train information center, Lisa asks: How do I get to Saarbrücken by train? The official answers: From here to Saarbrücken, regional trains and Inter-City Express trains are almost equally fast, and the regional trains are noticeably cheaper.] TELEOLOGICAL

✓<sup>1.0</sup> Sie **sollten** einen Regionalzug nehmen.  
you SOLLTE a regional train take  
'You should take a regional train.' (best option)

(52) [Context GOAL OF ANSWERING EMAILS, see (29)]<sup>27</sup> TELEOLOGICAL

Ich ✓**sollte** (/ ✓muss/ #soll) noch zwei E-Mails beantworten, bevor ich nach  
I SOLLTE /SOLL /must still two emails answer before I to

Hause komme.  
home come

'I should answer two emails before I come home.'

Judgments: ✓<sup>2.1</sup>**sollte** (/ ✓<sup>1.3</sup>muss / #<sup>3.7</sup>soll)

In summary, the evidence shows that *sollte* does not share the bouletic meaning of *soll*. Instead, it shares the deontic and teleological modal flavours characteristic of *muss*.

#### 4.1.2 The force distinction between root *sollte* and *muss*

When we compare *sollte* and *muss*, we see that they behave in every way like a weak and strong necessity modal pair, comparable in force to English *should* vs. *have to*.

The examples in (53)-(55) show tests for contrasting the force of the two modals:

(53) Du **solltest** das Geschirr abwaschen, aber du **musst** nicht.  
you SOLLTE the dishes wash but you must not  
'You should wash the dishes, but you don't have to.'

(adapted from von Fintel and Iatridou 2008:117)

<sup>26</sup> We included deontic examples in our judgement-study, but in retrospect we did not do well in setting up an unambiguous weak necessity context and also eliciting *soll* in that context. In (50), we therefore give a simple deontic weak necessity context that disallows bouletic readings. We are confident that none of our empirical results are in conflict with the claims defended here.

<sup>27</sup> In this example, *sollte* shows some deviance on account of the context tending to favour strong necessity. There is nevertheless a clear contrast to bouletic *soll*.

(54) Gäste **sollten** ihre Hände waschen, Angestellte **müssen** ihre Hände waschen.  
 guests SOLLTE their hands wash employees must their hands wash  
 ‘Guests should wash their hands; employees have to wash their hands.’  
 (adapted from von Fintel and Iatridou 2008:116)

(55) Du **solltest** deine Hände waschen. Eigentlich **musst** du sogar deine Hände waschen.  
 you SOLLTE your hands wash in.fact must you even your hands wash  
 ‘You should wash your hands. In fact, you have to wash your hands.’  
 (adapted from Copley 2006:4; von Fintel and Iatridou 2008:117; see also Horn 1972)

And (56)-(58) show that the strong necessity modal (*mus*) presents the only option in some sense, while the weak necessity modal (*sollte*) presents the best option, which is not the only option (Sloman 1970, von Fintel and Iatridou 2008).

(56) [TÜBINGEN: Only regional trains go to Tübingen. At the train information center, Lisa asks: How do I get to Tübingen by train? The official answers:]

✓<sup>1.1</sup> Sie **müssen** einen Regionalzug nehmen.  
 you must a regional.train take  
 ‘You have to take a regional train.’ (only option)

#<sup>2.9</sup> Sie **sollten** einen Regionalzug nehmen.  
 you SOLLTE a regional.train take  
 Lit.: ‘You should take a regional train.’ (best option)

(57) [Context SAARBRÜCKEN, (regional trains cheaper than ICE trains, see (51))]

Sie #<sup>3.9</sup>**müssen** (/ ✓<sup>1.0</sup>sollten) einen Regionalzug nehmen.  
 you must /SOLLTE a regional.train take  
 ‘You have to take a regional train.’ (only option)

Example (58a) supports the claim that *sollte* presents the prejacent as the best option: The continuation cannot assert that there is yet a better option. A comparison case is shown in (58b). The possibility modal *kann* ‘can’ simply presents the prejacent as an option, not excluding that there are better ones.

(58) a. # Du **solltest** das Geschirr abwaschen, aber es wäre besser, wenn du  
 you SOLLTE the dishes wash but it would.be better if you  
 es nicht tätest.  
 it not did  
 ‘You should wash the dishes, but it would be better if you didn’t.’

b. Du **kannst** das Geschirr abwaschen, aber es wäre besser, wenn du  
 you can the dishes wash but it would.be better if you  
 es nicht tätest.  
 it not did  
 ‘You can wash the dishes, but it would be better if you didn’t.’



(60) [Context KITCHEN (STRONG) (back door obstructed, see (37)):] INFERENTIAL

Maria ✓<sup>1.9</sup>**sollte** (/ ✓<sup>1.2</sup>*muss*/ #<sup>4.0</sup>*soll*) in der Küche sein.  
 Maria SOLLTE/ must/ SOLL in the kitchen be  
 ‘Maria should be in the kitchen.’

The example in (61) further shows that *sollte* does not share the reportative (non-inferential) use of epistemic *soll*. *Sollte* clearly patterns like *muss* in requiring some level of speaker commitment, which we take to be a characteristic of the inferential reading.<sup>30</sup>

(61) [Context TELEPHONE, see (41)] REPORTATIVE

Unser Telefon #<sup>3.6</sup>**sollte** (/ #<sup>3.8</sup>*muss*/ ✓<sup>1.0</sup>*soll*) kaputt sein, aber das stimmt nicht.  
 our telephone SOLLTE/ must/ SOLL broken be but that is.true not  
 ‘Our telephone should be broken, but that’s not true.’

Thus, epistemic *sollte* is like root *sollte* in that it shares the modal flavour of *muss*, not that of *soll*. The parallel between root and epistemic domains also extends to the modal force distinction between *sollte* and *muss*, as we show in the next section.

#### 4.2.2 The force distinction between epistemic *muss* and *sollte*

As described by von Stechow and Iatridou (2008) and Rubinstein (2012), epistemic modals also show a force distinction between strong and weak necessity. We find a similar force distinction in the epistemic uses of German *muss* and *sollte*, as shown in (62) vs. (63).

(62) [Mary is doing science experiments for school. She holds a large piece of paper, the size of a poster but with thinner paper, horizontally and her friend is going to drop a can of juice from the ceiling. Is the paper going to stop the can from falling to the floor, or is it going to rip? Her mother says what she expects:]

Das Papier (#)**muss**/ ✓**sollte** den Fall der Dose aufhalten.  
 the paper must/ SOLLTE the fall the can stop  
 ‘The paper has to/ should stop the can’s fall.’

(63) [Comparison case: As in (62). Is the floor of Mary’s room going to stop the can from falling into the basement of the house? Of course:]

Der Boden in Marias Zimmer ✓**muss**/ #**sollte** den Fall der Dose aufhalten.  
 the floor in Maria’s room must/ SOLLTE the fall the can stop  
 ‘The floor in Maria’s room has to stop the can’s fall.’

The force of *muss* and *sollte* can be contrasted in the expected way for a strong/weak necessity pair, as illustrated in (64).

<sup>30</sup> We elicited another example of this kind, shown in the appendix as [12]. The results there were #<sup>2.5</sup>*sollte*/ #<sup>3.9</sup>*muss*/ ✓<sup>1.2</sup>*soll*. They are comparable to those in (60) insofar as *soll* is the only acceptable modal in the reportative context. In [12] the weak necessity inferential modal *sollte* is not quite as bad as strong necessity inferential *muss*.

(64) [L comes up to I and K, who are colleagues of M, and asks where M is.]

I: M **sollte** in seinem Büro sein. Er ist jeden Tag um diese Zeit dort.  
 M SOLLTE in his office be he is every day at this time there  
 ‘M should be in his office. He is there every day at this time.’

K: Eigentlich **muss** er sogar in seinem Büro sein. Ich hab ihn vorhin dort  
 in.fact must he even in his office be I have him earlier there  
 hingehen sehen.  
 go see  
 ‘Actually, he must be in his office. I saw him go there earlier.’

Thus, we have seen in this section that the observations about root *sollte* extend to epistemic *sollte*: It is a weak version of *muss*, different in modal flavour from *soll*.

German thus shares with English the morphologically idiosyncratic opposition of strong necessity *muss* (English *must*) to weak necessity *sollte* (English *should*), as highlighted in (65). We note the possibility that this is not a coincidence in the history of West Germanic.

(65) strong necessity          Engl. *must*                  Germ. *muss*  
 weak necessity              Engl. *should*              Germ. *sollte*

The table in (66) sums up our results about modal flavour and modal force with *muss*, *soll* and *sollte*. We indicate the modal force in brackets: strong necessity (SN) and weak necessity (WN).<sup>31</sup>

(66)

Root				Epistemic	
teleological	deontic	bouletic		inferential	reportative
		speaker	other		
<b>muss</b> (SN)				<b>muss</b> (SN)	
		<b>soll</b>			<b>soll</b>
<b>sollte</b> (WN)				<b>sollte</b> (WN)	

## 5 *Müsste*

In this section we address the modal *müsste*, which is morphologically the Konjunktiv II version of *muss*. We show in section 5.1 that epistemic *müsste* is the expected weak necessity version of epistemic *muss*. In section 5.2 we discuss the properties of root *müsste*. The modal flavour tests show that it shares its modal flavours with *muss*. The modal force tests show some unexpected twists. We will suggest that the results can be analyzed in terms of interference from what Fabricius-Hansen (2016) calls *polite Konjunktiv*. We will employ the analysis of Csipak (2015) in terms of *free factive subjunctive*.

We begin with the well-behaved epistemic case.

<sup>31</sup> We did not provide evidence that *sollte* has a speaker bouletic reading, which is not crucial for our claim about the modal flavour switch. We show the relevant cell as grey for concreteness.

## 5.1 Epistemic *müsste* is the weak necessity version of *muss*

### 5.1.1 Modal flavour: Epistemic *müsste* is inferential

Epistemic *müsste* shares the modal flavour of epistemic *muss*: it is inferential, not reportative. This is shown by our epistemic modal flavour tests in (67)-(69). We see in (67) and (68) that *müsste* is acceptable in inferential contexts (especially ones supporting weak necessity), and (69) shows that *müsste* requires speaker commitment.<sup>32</sup> As before, we repeat the judgments for the other modals for comparison.

- (67) [Context KITCHEN (STRONG) (back door obstructed, see (37)):]           INFERENCEAL  
Maria ✓<sup>1.9</sup>**müsste** (✓<sup>1.2</sup>muss/ ✓<sup>1.9</sup>sollte/ #<sup>4.0</sup>soll) in der Küche sein.  
Maria MÜSSTE/ must/ SOLLTE/ SOLL                                   in the kitchen be  
'Maria should be in the kitchen.'
- (68) [Context KITCHEN (WEAK) (back door rarely used, see (38))]           INFERENCEAL  
Maria ✓<sup>1.0</sup>**müsste** (/✓<sup>2.7</sup>muss/ ✓<sup>1.4</sup>sollte/ #<sup>4.0</sup>soll) in der Küche sein.  
Maria MÜSSTE/ must/ SOLLTE/ SOLL                                   in the kitchen be  
'Maria should be in the kitchen.'
- (69) [Context TELEPHONE, see (41)]   REPORTATIVE  
Unser Telefon #<sup>3.6</sup>**müsste** (/#<sup>3.8</sup>muss/ #<sup>3.6</sup>sollte/ ✓<sup>1.0</sup>soll) kaputt sein, aber das  
our telephone MÜSSTE/ must/ SOLLTE/ SOLL                           broken be but that  
stimmt nicht.  
is.true not  
'Our telephone should be broken, but that's not true.'

### 5.1.2 Modal force: Epistemic *müsste* is a weak necessity modal

In their reference grammar, Zifonun, Hoffmann and Strecker (1997a:1270) observe that the Konjunktiv II version of *müssen* is used, among other things, for "Abschwächung im Ausdruck von Wahrscheinlichkeiten" ('weakening in the expression of probabilities'). One of their examples is given in (70) (with glosses and translation added). The intuition is that the *müsste* version expresses a weaker claim than the *muss* version.

- (70) Sie **muss/ müsste** meiner Information nach an der Sitzung teilgenommen  
she must/ MÜSSTE my information after at the.DAT meeting take.part  
haben.  
have  
'According to my information she must have taken part/probably took part in the meeting.'  
(Zifonun, Hoffmann and Strecker 1997b:1270)

The following example that contrasts the force of *müsste* and *muss* provides support for the

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<sup>32</sup> As mentioned in footnote 30, an additional, related, set of examples is shown as [12] in the appendix. The judgments there are #<sup>2.9</sup>müsste /#<sup>3.9</sup>muss /#<sup>2.5</sup>sollte/✓<sup>1.2</sup>soll. The comments in footnote 30 can be extended to *müsste*.

claim that epistemic *müsste* is weaker than epistemic *muss* (cf. example (64) above with *sollte*).

(71) [L comes up to I and K, who are colleagues of M, and asks where M is.]

I: M **müsste** in seinem Büro sein. Er ist jeden Tag um diese Zeit dort.  
 M MÜSSTE in his office be he is every day at this time there  
 ‘M should be in his office. He is there every day at this time.’

K: Eigentlich **muss** er sogar in seinem Büro sein. Ich hab ihn vorhin dort  
 in.fact must he even in his office be I have him earlier there  
 hingehen sehen.  
 go see

‘Actually, he must be in his office. I saw him go there earlier.’

Thus, the evidence suggests that epistemic *müsste* is a weak necessity version of epistemic *muss*.

## 5.2 Root *müsste*

### 5.2.1 Modal flavour of root *müsste*

Root *müsste* shares the modal flavours of root *muss*. Like *muss*, it is not acceptable in the bouletic contexts (72) and (73), but it can occur in the teleological context (74). (For an example of *müsste* in a deontic context, see (81) below.)

(72) [Context PENCILS, see (17)]

BOULETIC

Ich #**müsste** (/ #muss/ #sollte/ ✓soll) in meinem Seminar Werbung für die  
 I MÜSSTE (/ must/ SOLLTE/ SOLL) in my seminar advertising for the  
 Bleistifte der Firma machen.  
 pencils of.the company do

‘They want me to advertise the company’s pencils in my seminar.’

Judgments: #<sup>3.7</sup>**müsste** (/ #<sup>3.8</sup>muss/ #<sup>3.2</sup>sollte/ ✓<sup>1.1</sup>soll)

(73) [Context MORPHINE, see (18)]

BOULETIC

ich #**müsste** (/ #muss/ #sollte/ ✓soll) ihr Morphium besorgen.  
 I MÜSSTE (/ must/ SOLLTE/ SOLL) her morphine get

‘I am supposed to get her morphine.’

Judgments: #<sup>4.0</sup>**müsste** (/ #<sup>3.6</sup>muss/ #<sup>3.6</sup>sollte/ ✓<sup>1.0</sup>soll)

(74) [Context GOAL OF ANSWERING MAILS, see (29)]

TELEOLOGICAL

Ich ✓**müsste** (/✓muss/ ✓sollte/ #soll) noch zwei E-Mails beantworten,  
I MÜSSTE (/ must/ SOLLTE/ SOLL) still two emails answer

bevor ich nach Hause komme.  
before I to home komme

‘I still have to answer two emails before I go home.’

Judgments: ✓<sup>1.4</sup>**müsste** (/ ✓<sup>1.3</sup>muss/ ✓<sup>2.1</sup>sollte/ #<sup>3.7</sup>soll)

The judgments in (72)-(74) confirm that root *müsste*, like epistemic *müsste*, shares the modal flavours of its base modal *muss*.

Importantly, then, *müsste* shares the modal flavours of *muss* throughout. It contrasts with *sollte* insofar as *sollte* shows a modal flavour switch. Above, we sketched an idea in which the modal flavour switch is related to the incompatibility of the *soll*-flavours with weak necessity. On that way of thinking about this issue, it is expected that *müsste* does not show a modal flavour switch: The meaning of *muss* is compatible with modulation by weak necessity.

Nevertheless, things get a little more complicated when we turn to the modal force of root *müsste* in the next section.

### 5.2.2 Modal force: root *müsste* and the free factive subjunctive

We saw in section 4.1.2 that root *sollte* clearly behaves like a weak necessity modal. In this section we show that the modal force judgments pertaining to root *müsste* can differ from those pertaining to root *sollte*. We outline an account of the differences in terms of interference from the ‘polite’ Konjunktiv II (Fabricius-Hansen 2016), and analyze this in terms of the free factive subjunctive of Csipak (2015).

Recall firstly that the context in (56), repeated in (75), is a context that supports a strong necessity modal. It allows *muss* ‘must’ ((75a)), while *sollte* is deviant ((75b)). However, *müsste* is much better than *sollte* in this context, as shown in (75c).

(75) [Context TÜBINGEN (only regional trains go to Tübingen, see (56))]

- a. Sie ✓<sup>1.1</sup>**müssen** einen Regionalzug nehmen.  
you must a regional.train take  
‘You have to take a regional train.’ (only option)
- b. Sie #<sup>2.9</sup>**sollten** einen Regionalzug nehmen.  
you SOLLTE a regional.train take  
‘You should take a regional train.’ (best option)
- c. Sie ✓<sup>1.8</sup>**müssten** einen Regionalzug nehmen.  
you MÜSSTE a regional.train take  
‘You have to take a regional train.’

Second, (57) (repeated in (76)) is a context with the inverse properties: it sets up everything required for a weak necessity teleological reading. The preajcent is the best, but not the only, option for achieving the goal. Accordingly, it allows weak necessity *sollte* but not strong necessity *muss*. Clearly, root *müsste* patterns with *muss* ‘must’, rather than with *sollte*:

(76) [Context SAARBRÜCKEN, (regional trains cheaper than ICE trains, see (51))]

- a. Sie #<sup>3.9</sup>**müssen**/ #<sup>3.9</sup>**müssten** einen Regionalzug nehmen.  
 you must/ MÜSSTE a regional.train take  
 Lit.: ‘You have to take a regional train.’ (*müssen*: only option)
- b. Sie ✓<sup>1.0</sup>**sollten** einen Regionalzug nehmen.  
 you SOLLTE a regional.train take  
 ‘You should take a regional train.’ (best option)

We relate these observations (and related ones below) to a different use of Konjunktiv II that is called *polite Konjunktiv II* by Fabricius-Hansen (2016:532f). The effect is analyzed by Csipak (2015), who argues that tentativeness, rather than politeness, is the relevant distinction. We will extend Csipak’s analysis of this additional use of Konjunktiv II to root *müsste*. We will propose that *müsste* is truth-conditionally a strong necessity modal, sharing the modal force of *muss*. This accounts for the unacceptability of *müsste* in (76) and for the tendency for *müsste* to be acceptable in (75), in similarity to the judgments for *muss*. We now turn to a more detailed exposition of Csipak’s account and to our refinements of it.

Csipak (2015) postulates a productive use of Konjunktiv II morphology over and above the reportative and counterfactual/non-factual uses. Csipak calls this additional use *free factive subjunctive* (here: FF-subjunctive). An example of the FF-subjunctive use of Konjunktiv II in a non-modal context is given in (77).

(77) [The addressee has just come home from work. The speaker knows that there is pizza in the fridge.]

- Es **wäre** Pizza im Kühlschrank.  
 it be.KII pizza in.the fridge  
 ‘There is pizza in the fridge.’ (Csipak 2015:36)

Csipak (2015) suggests a semantic interpretation for this use of Konjunktiv II in which the asserted meaning is identical to the asserted meaning of the same sentence with indicative morphology. In (77), for example, the speaker is committed to the truth of the prejacent (‘There is pizza in the fridge’) in the actual world, despite the morphological Konjunktiv II. Added to this basic meaning are presuppositional requirements and non-truth-conditional or ‘use-conditional’ content (cf. Potts 2005, 2007, McCready 2010, Gutzmann 2012, 2015, among others). These additional components are motivated in detail and formalized by Csipak (2015); we discuss them informally here. The FF-subjunctive requires a *decision problem* in the context (such as the issue of what the addressee is going to eat in (77)); furthermore, the prejacent must allow the identification of a possible (thus tentative) unique action alternative that solves the decision problem and that is considered desirable to the agent who has the decision problem. In our example, the action alternative that can be identified with the help of the prejacent is for the addressee to open the fridge and eat pizza.

Csipak explicitly refrains from attempting to apply her analysis to Konjunktiv-inflected modals (see pp. 164-165). We are here led to explore such an application. It is formulated in (78).

(78) root *müsste*:

- a. [*muss*+FF-subjunctive] pre-empts a weak necessity reading of *müsste*.  
 b. [*muss*+FF-subjunctive](*p*): *muss*(*p*), with the added decision-problem, in which *p* is the relevant action alternative considered desirable to the agent

(78b) goes beyond an application of the general meaning of the FF-subjunctive to root *muss* insofar as the action alternative that is considered desirable by the agent and that otherwise only needs to be identified with the *help* of *p* is here identified with *p* itself. We are not sure whether this is lexicalized or merely inferred, but we work with this formulation for concreteness. Importantly, an automatic consequence of the notion of action alternatives is that there are also alternative courses of action that entail the negation of *p*.<sup>33</sup> This usage of *müsste* thus expresses that a rule or a goal requires *p*, and it invokes a decision problem in which  $\neg p$  is a possible option. For this to be coherent,  $\neg p$  must be a way of opting out of obeying the relevant rule or opting out of pursuing the relevant goal. Thus, while *sollte* allows that there are multiple ways of satisfying a rule or meeting a goal (and presents the prejacent as the best among these), *müsste* with FF-subjunctive maintains that the prejacent is the only way of satisfying a rule or meeting a goal, but adds with the Konjunktiv a hint to the possibility of opting out of the rule (or goal) and not doing the prejacent.

For example, (79) expresses an obligation on the addressee to come along with the speaker (as well as the assumption that this is considered desirable to the addressee), but also invokes the possibility of opting out of the obligation.

(79) Sie **müssten** jetzt mit mir kommen.  
 you MÜSSTE now with me come  
 ‘You have to come with me now (if you don’t mind).’

A conceivable action alternative may be to opt out of obeying this requirement by pleading sick, or by arguing to be released from obeying the requirement because of a more important task at hand. As in Csipak’s analysis of the FF-subjunctive when applied to non-modal sentences, this provides a reasonable way of understanding the politeness or tentativeness that ensues in the FF-subjunctive use of *müsste* in (79). Allowing for alternatives to performing the prejacent event softens the rigidity of the modal requirement.

We apply the account to (75) and (76) before turning to more examples. In (75), *sollte* is deviant because taking a regional train is not one among the options of getting to Tübingen by train, it is the only one. *Müsste* does not suffer the same fate, since its *muss*-component correctly reflects that the regional train is the only option. This explains why *müsste* is better than *sollte*. The less-than-perfect status of *müsste* could then be related to the relevance of the decision problem invoked by the Konjunktiv, which now needs to include action alternatives outside of the options of the train system, e.g. renting a car. The Konjunktiv adds that taking a regional train is now presented as considered in the context of such action alternatives. The reason why some speakers did not find *müsste* a good fit for the context could thus be as follows: Having to take a regional train (as opposed to a quick Inter-City Express train) is not normally a reason for people who take trains to switch to renting a car. Or, simply put, the addition of the Konjunktiv, as a pointer to such options outside of the system, can be viewed as unmotivated here.

In (76), *muss(p)* is ruled out: nothing makes taking a regional train the only option. Since *müsste(p)* asserts the same thing as *muss(p)* does, *müsste* is ruled out for the same reason. This example provides a clear reason to think that root *müsste* does not allow weak necessity readings in principle, as postulated in (78a). If there were a weak necessity option for *müsste*, it would be as good as weak necessity *sollte* on that reading.

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<sup>33</sup> See, for example, discussion by Csipak (2015:97). In Csipak’s analysis, the FF-subjunctive conveys that there are optimal worlds in which the agent performs the unique action alternative. This allows other optimal worlds in which the agent performs a different action, and this leads to the ‘tentative suggestion’ effect of the FF-subjunctive.

We see confirmation for this account in the judgments for *müsste* in the following two sets of examples:

(80) [Context MONOPOLY, see (24)] (DEONTIC)  
 Du #<sup>3.0</sup>**müsstest**/ #<sup>3.3</sup>**solltest** (/ ✓<sup>1.0</sup>**musst**/ #<sup>2.7</sup>**sollst**) eine Ereigniskarte ziehen.  
 you MÜSSTE/ SOLLTE/ must/ SOLL a chance.card draw  
 ‘You have to draw a chance card.’

(81) [Context MONOPOLY, see (24)] (DEONTIC)  
 Du ✓<sup>1.1</sup>**müsstest**/ #<sup>2.2</sup>**solltest**/ ✓<sup>2.4</sup>**musst** /#<sup>2.7</sup>**sollst** eine Ereigniskarte ziehen,  
 you MÜSSTE/ SOLLTE/ must/ SOLL a chance.card draw  
 aber wir spielen nicht immer strikt nach den Regeln.  
 but we play not always strictly according.to the rules  
 ‘You should draw a chance card, but we don’t always play strictly by the rules.’

We offer the following interpretation of these results: In (80), *muss* is good and *sollte* is deviant since the pre-jacent is the only option according to the rules of the game. *Müsste* is deviant even though its *muss*-component fits the context. We see the following plausible reason for the deviance: *Müsste* is deviant in (80) because the decision problem introduced by the Konjunktiv-marking is unmotivated; drawing a card according to the rules of a game one plays is not the kind of pressure from which opting out is normally a relevant option.<sup>34</sup>

In (81), *muss* and *sollte* are judged variably by our speakers, depending on whether they judge it by the rules of the game or by the overall situation that includes the final additional clause. *Muss* is appropriate relative to the rules of the game but not relative to the overall situation. *Sollte* does not fit relative to the rules of the game but it fits the overall situation. Finally, and importantly, *müsste* is perfect in this case, since it fits both: Its *muss*-component is true for the rules of the game, while the option of opting out from the rules fits the larger situation: the final additional clause describes exactly this possibility. Notice that the additional clause also introduces the decision problem that is relevant to *müsste*.

*Müsste* can thus fail to be felicitous because its strong necessity meaning is inadequate, as in (76), or because the decision problem introduced by the FF-subjunctive is unmotivated, as in (80). It is fine to the extent that both are motivated in the context, as in (81), and, to some extent, in (75).

We now turn to two additional sets of examples that we elicited. They are modeled after examples from von Fintel and Iatridou (2008). In the modal force test in (82), *müsste* does surprisingly well in contrast with *muss*, given that they are both strong necessity modals in our analysis.

<sup>34</sup> We also elicited *sollte* and *müsste* in the similar chess context (23) as shown in the appendix, example [3]. The scores were #<sup>2.1</sup>**müsstest** /#<sup>3.5</sup>**solltest** (/ ✓<sup>1.2</sup>**musst** /#<sup>3.1</sup>**sollst**). The deviation of *sollte* due to its weak necessity is found there as well. The deviance of *müsste*, attributed to the missing motivation for adding Konjunktiv II in the text, is not as pronounced in the chess-example as in (80).

(82) [Maria is starting her new job in a restaurant. Her colleague is explaining the rules to her. She says:]<sup>35</sup>

Nach der Benutzung der Toilette ✓<sup>1.1</sup>**solltest**/ #<sup>3.9</sup>**musst**/ ✓<sup>2.0</sup>**müsstest** du  
 after the use of the toilet SOLLTE/ must/ MÜSSTE you

deine Hände waschen.  
 your hands wash

Eigentlich musst du sogar deine Hände waschen.  
 in.fact must you even your hands wash

‘After using the toilet, you should/ have to wash your hands. In fact, you have to wash your hands.’

We account for this as follows. The first sentence, with *müsste*, sets up a situation in which a rule (call it R) requires Maria to wash her hands. In addition, the FF-subjunctive conveys that while the relevant action alternative is for Maria to obey the rule and wash her hands, there are other alternatives to this. Let us say, she has the option of not washing her hands in special situations. We may thus imagine that R strictly requires hand-washing only in non-special situations. In this scenario, *muss*, in the following sentence, can still contrast with *müsste*: If *muss* quantifies over regular and special situations, requiring hand-washing for these, it makes a minimally different claim than *müsste* does. This is a reasonable basis for the contrast. Nevertheless, the contrast is a bit marginal (in comparison to the strong vs. weak necessity contrast with *sollte*) insofar as it runs on the subtle difference due to the special situations. Recall that these are invoked by the decision-problem indirectly insofar as the decision problem requires the special situations as alternatives to the primary action alternative, the prejacent *p*.

Another modal force test is shown in (83). Here the problem with contrasting the two strong necessity modals *müsste* and *muss* arises more strongly. In our piloting, we also tested this example with the inverse order of the two clauses. We do not show this here, but the comparison makes us think that the relative order of the two clauses plays a crucial role.

(83) [You are not obliged to do it, but ...]

a. ✓<sup>1.1</sup> du **solltest** das Geschirr abwaschen.  
 you SOLLTE the dishes wash  
 ‘you should wash the dishes.’

b. #<sup>3.7</sup> du **musst** das Geschirr abwaschen.  
 you must the dishes wash

c. #<sup>2.9</sup> du **müsstest** das Geschirr abwaschen.  
 you MÜSSTE the dishes wash

The strategy that worked in (82) seems to be less available here because of something like a mini-garden-path effect in (83). In the first clause, the absence of an obligation is most likely interpreted as the absence of any dishwashing obligation at all. This is in contradiction to the presence of a dishwashing obligation (required for *müsste*) in the second clause, which accounts for the deviance of (83c).

The mini-garden-path is that the context sentence in (83) is interpreted as conveying the

<sup>35</sup> In this example block, our speakers judged the acceptability of the final sentence (“Eigentlich ...”) in the context of the different preceding sentences.

absence of any requirement at all. A later sentence containing *müsste* requires backtracking and correcting this to there being a dishwashing obligation, only that it does not hold for ‘special’ cases. The mini-garden-path does not arise with the inverse order (*müsste* before *muss*), as in (82), since *müsste* first introduces the complex scenario with ‘special’ cases (due to its combination of asserted and presupposed meanings), and *muss* can then find a fairly acceptable interpretation relative to that, stricter than *müsste*.

In summary, it seems that the weak necessity interpretation of root *müsste* is systematically blocked by an FF-subjunctive interpretation of root *müsste*. The FF-subjunctive interpretation of root *müsste* has the truth-conditional meaning of *muss* and presents the prejacent as a desirable action in a decision problem, to which alternatives exist; these alternatives must therefore involve opting out of the rule or not pursuing the goal, and not doing the prejacent.

We think that the prohibiting interaction between FF-subjunctive root *müsste* and weak necessity root *müsste* is in some way lexical in nature, i.e. specific to this form. We leave open the issue of FF-subjunctive readings of epistemic *müsste* and root and epistemic *sollte*. We have not come across any evidence for such readings, and we think it is possible that with these other modals, the weak necessity use blocks the FF-subjunctive use.

We are thus led to the more complete picture in the following table. The added elements are root *müsste* with FF-subjunctive (FF-SBJV) and epistemic weak necessity *müsste*.

(84)

Root				Epistemic	
teleological	deontic	bouletic		inferential	reportative
		speaker	other		
<b>muss</b> (SN)				<b>muss</b> (SN)	
<b>müsste</b> (SN, FF-SBJV)				<b>müsste</b> (WN)	
		<b>soll</b>			<b>soll</b>
<b>sollte</b> (WN)				<b>sollte</b> (WN)	

### 5.3 A temporal restriction on epistemic *sollte* and *müsste*

Throughout the discussion so far we have set aside the temporal features of the modals under discussion. In this section we show that epistemic *sollte* and *müsste* are subject to a temporal restriction that is shared with English *should*.

Matthewson (2015b) shows that English epistemic *should* obeys the temporal restriction formulated in (85).

- (85) Restriction on English epistemic *should*: The evidence from which the inference is drawn must temporally precede the time of the prejacent event.

The examples in (86)-(90) from Matthewson (2015b) illustrate this restriction; see also Copley (2006) for relevant discussion (and see Yalcin 2016 on the difference between *should* – when it is licensed – and *probably*). In (86)-(88) the time of the evidence fails to precede the time of the prejacent, and *should* is infelicitous. In (88), for instance, the speaker’s evidence is the expressions on the doctor’s faces, which do not precede the time for which M’s being sick is postulated. Notice that the difference in acceptability between *must* and *should* is not directly a matter of modal force in these environments. *Should* is infelicitous in these contexts, no matter what level of certainty is involved.

- (86) [I meet a friend who I haven't seen for a while. I say:]  
 You ✓**must**/ #**should** have had a haircut.
- (87) [I see some people looking for open windows in your apartment. I say:]  
 They ✓**must**/ #**should** be burglars.
- (88) [P visits M in the hospital. P sees through the window of the hospital room that the doctors look worried. P says:]  
 She ✓**must**/ #**should** be very sick.

In contrast, in (89) and (90), the time of the evidence precedes the time of the preadjacent eventuality and the use of *should* is well-formed. In (89), the poisoning precedes the time at which M is taken to be sick. In (90), my friend's assessment of her situation precedes the estimated time of arrival. (The infelicity of *must* in (90) is a separate temporal fact about English epistemic *must* which goes beyond our current concerns; see Portner 2009:235.)

- (89) [P poisons M's food and leaves. Later, P says:]  
 M ✓**must**/ ✓**should** be very sick now.
- (90) [My friend is late. She calls me and says:]  
 I #**must**/ ✓**should** be there at about 1:30.

German epistemic *sollte* and *müsste* share the temporal restriction of English *should*. This is shown in the following examples. Like *should*, German *sollte* and *müsste* are not possible in the contexts in (91)-(93).

- (91) [I meet a friend who I haven't seen for a while. I say:]  
 Du ✓**musst**/ #**solltest**/ #**müsstest** beim Friseur gewesen sein.  
 you must/ SOLLTE/ MÜSSTE at.the hairdresser been be  
 'You must have been to the hairdresser.'
- (92) [I see some people looking for open windows in your apartment. I say:]  
 Sie ✓**müssen**/ #**sollten**/ #**müssten** Einbrecher sein.  
 they must/ SOLLTE/ MÜSSTE burglars be  
 'They must/ be burglars.'
- (93) [P visits M in the hospital. P sees through the window of the hospital room that the doctors look worried. P says:]  
 Sie ✓**muss**/ #**sollte**/ #**müsste** sehr krank sein.  
 she must/ SOLLTE/ MÜSSTE very sick be  
 'She must be very sick.'

The examples (94) and (95) are well-formed comparison cases corresponding to the English examples (89) and (90) above.

(94) [P poisons M's food and leaves. Later, P says:]

Sie ✓**muss**/ ✓**sollte**/ ✓**müsste** jetzt sehr krank sein.  
she must/ SOLLTE/ MÜSSTE now very sick be  
'She must/ should be very sick.'

(95) [My friend is late. She calls me and says:]

Ich #**muss**/ ✓**sollte** / ✓**müsste** bis 13.30 Uhr da sein  
I must/ SOLLTE/ MÜSSTE by 13.30 o'clock there be  
'I must/ should be there at about 1:30.'

These observations on German are summed up in (96).

(96) In their epistemic use, German *sollte* and *müsste* share the temporal restriction of English *should* in (85): The evidence from which the inference is drawn must temporally precede the time of the prejacent event.

This shared property of English *should* and German *sollte/müsste* strengthens the parallel between the weak necessity modals in the two languages.

## 6 Modal flavours in English modals

In this final section we provide a comparison between German and English, by applying our modal flavour tests to the English modals *have to*, *should* and *be supposed to*. We choose *have to* rather than *must* for our strong necessity modal, as root *must* is subject to register effects which make it less than perfect for many speakers in ordinary discourse contexts. We look at *should* rather than *ought to* for similar reasons. In this section we set aside modal force and concentrate on establishing the flavours allowed by the three modals.

Our results will show that *have to* and *should* are very parallel to German *muss* and *sollte/müsste* in their modal flavours, and that *be supposed to* shares the uses of German *soll*. We will slightly refine Bochnak and Csipak (2017)'s proposal that English *be supposed to* and German *soll* are semantic counterparts: we argue that *be supposed to*, but not *soll*, has a deontic use. To our knowledge the precise claims we make here have not been made before for these English modals.

As mentioned in section 2.3, our empirical claims about English root modals are based on an informal survey of eight speakers. We do not give numerical scores, but unless otherwise stated, the results were clear, and quite consistent across speakers.

### 6.1 Root favours

In bouletic contexts, as in (97) and (98), only *be supposed to* is good and the other two modals are inappropriate. There is some speaker variation on *be supposed to*, but it is clearly far more acceptable than *have to* or *should* in these bouletic contexts.

(97) [Context PENCILS, see (17)]

BOULETIC

I #**have to**/ #**should**/ ✓**am supposed to** advertise the company's pencils in my seminar.

(98) [Context MORPHINE, see (18)]

BOULETIC

I **#have to/ #should/ ✓am supposed to** get her morphine.

Note that the examples also show that the bouletic use of *have to* and *should* cannot employ attitude-holders other than the speaker (or, embedded, a shifted speaker). Otherwise *have to* and *should* would be fine here in a bouletic reading. According to Portner (2009), the modals *have to* and *should* allow any of the priority modal flavours deontic, teleological and bouletic. Our results call for a refinement of this analysis.

In our deontic context (99), all three of the English modals are felicitous. *Have to* and *be supposed to* are both essentially perfect here; *should* is somewhat degraded for some speakers, which we hypothesize is due to its weak necessity status. In the context of the rules of a game, a strong necessity modal is a more appropriate choice.

(99) [Maria and Lisa are playing chess. Neither of them has been playing the game for a long time. Maria sometimes makes moves that don't follow the rules. Lisa explains each rule when this happens. They are playing against each other for the first time, and castling has not come up so far. Now Maria is castling and places the pieces in the wrong way. Lisa says:]

DEONTIC

You **✓have to/ ✓should/ ✓are supposed to** put the king next to the rook.

The results for *be supposed to* – that it is fully acceptable in (99) – differ from those for German *soll*, which is substantially degraded (see (23) above). In this regard, we therefore do not share the assessment of Bochnak and Csipak (2017) that *be supposed to* and *soll* are equivalents of each other.

Further support for a difference between *be supposed to* and *soll* comes from preference-ascriptions, as shown in (102). (We augmented the example that tests *be supposed to* because of interference from a restriction not shared by *soll*: *be supposed to* here seems to prefer to be about a prejacent that is unlikely to occur.)

(100) [Context BOSS AND EMAILS, see (26)]

DEONTIC

- a. I **✓have to/ ✓should** answer two emails now before I come home.
- b. **✓I'm coming home now, even though I'm supposed to** answer two emails now before I do.

Our speakers all judged *have to* as fully acceptable, which we expect, as it uncontroversially allows deontic readings. Average scores were somewhat lower for *should*. In German, we attributed a parallel effect to the tendency of the context to be a strong necessity context. The sentence with *be supposed to* in (102b) was found to be fully acceptable. This supports that *be supposed to* can be lexically deontic (in addition to its bouletic option), since the deontic option allows (102b) to be unaffected by the restriction on preference-ascriptions. We thus conclude from the discussion of (97)- (102) that *be supposed to* allows both bouletic and deontic modal flavours.

Finally, we turn to teleological contexts. In both (103) and (104), *have to* and *should* are fine, but *be supposed to* is unacceptable. These judgments were very clear and consistent across speakers.

(101) [Context GOAL OF ANSWERING EMAILS, see (29)]

TELEOLOGICAL

I **✓have to/ ✓should/ #am supposed to** answer two emails before I come home.

- (102) A: I want to get to Harlem in an hour. TELEOLOGICAL  
 B: You ✓**have to**/ ✓**should**/ #**are supposed to** take the A-train.

In comparison with German, then, *have to* and *should* are similar to *muss* and *sollte* in terms of their modal flavour. *Be supposed to* is similar to *soll* in its bouletic meaning, but it also shows a difference in that it allows a deontic modal flavour.<sup>36</sup>

## 6.2 Epistemic flavours

Turning now to epistemic modal flavours, we find that *have to* and *should* allow an inferential reading while *be supposed to* does not. In (105), *have to* fits the strong necessity inferential context, while *should* is slightly degraded due to its weak necessity force (cf. German *sollte* in (60) above). In the weak necessity inferential context in (106), *should* is fully acceptable while *has to* is ruled out due to force (cf. German *muss* in (59)). In contrast to *have to* and *should*, *be supposed to* is completely ruled out in both types of inferential context:

- (103) [Context KITCHEN (STRONG) (back door obstructed, see (37)):] INFERENTIAL  
 ‘Maria ✓**has to**/ ✓**should**/ #**is supposed to** be in the kitchen.’

- (104) [Context KITCHEN (WEAK) (back door rarely used, see (38))] INFERENTIAL  
 ‘Maria #**has to**/ ✓**should**/ #**is supposed to** be in the kitchen.’

Inversely, (107) shows that *be supposed to* allows a reportative reading without any level of speaker commitment, while *have to* and *should* do not.

- (105) [Context TELEPHONE, see (41)] REPORTATIVE  
 ‘Our telephone #**has to**/ #**should**/ ✓**is supposed to** be broken, but that’s not true.’

With epistemic modal flavours, *have to* and *should* are thus directly parallel to German *muss* and *sollte*, and *be supposed to* is parallel to German *soll*.

The results of our tests for English are summarized in (106). We have not done the modal force tests here, but we rely on the established classification of *must/have to* as strong necessity and *should* as weak necessity (e.g., Copley 2006).

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<sup>36</sup> For the bouletic reading of *have to*, see the translations of (30); *should* seems to pattern similarly. *Be supposed to* seems to be subject to some additional effects: an anti-performativity restriction on deontic readings, and a (probably related) restriction against speaker-oriented bouletics. See footnotes 10 and 11 for related observations about German *soll*. We leave investigation of these effects to future research.

(106)

Root				Epistemic	
teleological	deontic	bouletic		inferential	reportative
		speaker	other		
<b>have to (SN)</b>				<b>have to (SN)</b>	
	<b>be supposed to</b>				<b>be supposed to</b>
<b>should (WN)</b>				<b>should (WN)</b>	

## 7 Conclusion

The proposals we have argued for are as follows.

The root modal flavours of *muss* ‘must’ and *soll* ‘be supposed to’ show only restricted overlap. *Muss*, which allows deontic and teleological readings, allows bouletic readings only where the speaker (or the shifted speaker, in embedded clauses) is the attitude holder. On the other hand, *soll* has only a bouletic lexical modal flavour option. A bouletic-to-deontic inference allows “deontic surface readings” of *soll*.

We argued that the epistemic flavours of *muss* and *soll* do not show overlap at all in their lexical entries, *muss* being inherently inferential and *soll* being inherently reportative. There is only overlap of use insofar as some reportative contexts are compatible with both the inferential meaning of *muss* and the reportative one of *soll*.

The addition of Konjunktiv II to *soll*, resulting in *sollte*, has two effects. The expected effect is that it becomes a weak necessity modal. The unexpected effect is that it adopts the modal flavours of *muss*, letting go of those of *soll*. This modal flavour switch is found both for the root flavours and for the epistemic flavour of *sollte*. The modal *sollte* is thus a weak necessity version of the strong necessity modal *muss* in both root and epistemic uses.

The addition of Konjunktiv II to *muss*, resulting in *müsste*, derives a regular weak necessity version of *muss* in the epistemic domain. Here *müsste* and *sollte* are comparable. In the root domain, the Konjunktiv II in *müsste* is inherently polite Konjunktiv II, which we analyze in terms of free factive subjunctive (Csipak 2015). There is no weak necessity reading of root *müsste*. We suggest that the polite Konjunktiv II here blocks a weak necessity reading in some way.

Our results strengthen the bouletic classification of *soll* by Öhlschläger (1989), Kratzer (1991) and by Sode and Schenner (2013), and establish that the deontic modal flavour suggested as an additional option for *soll* by Bech (1949) is instead specific to its Konjunktiv II form *sollte* after the modal flavour switch.

Our results also strengthen the morphological correlation postulated by von Fintel and Iatridou (2008). We think their morphological correlation may hold in two ways. For one thing, it holds on the surface in one direction, because weak necessity is only found with Konjunktiv II, the morphology used in non-factual conditionals (i.e., with *sollte* and *müsste*). Thus, Konjunktiv II seems to be required to derive weak necessity. The correlation may also hold in the other direction: Konjunktiv II derives a weak necessity modal, modulo motivated exceptions. The motivated exceptions are the quirks we discussed. Thus, we find the predicted effect of Konjunktiv II with epistemic *müsste*, which shows the weak necessity reading in a regular fashion. The absence of a weak necessity reading of root *müsste* seems to be motivated by the free factive subjunctive interpretation of root *müsste*. Further, the interpretation of (root and epistemic) *sollte* is weak necessity, as expected, and the modal flavour switch of *sollte* seems to be motivated at least in part by a more general ban on weak necessity bouletic modals (and perhaps weak necessity reportative modals).

We also applied our tests to English. While *have to* and *should* are similar to German *muss* and *sollte* respectively, English *be supposed to* shows similarities with *soll*, as discussed by Bochnak and Csipak (2017), though *be supposed to* in addition has a deontic option that is

not shared by *soll*.

## References

- Anand, Pranav, and Valentine Hacquard. 2013. Epistemics and attitudes. *Semantics and Pragmatics* 6:1-59.
- Bech, Gunnar. 1949. Das semantische System der deutschen Modalverba. In *Travaux du Cercle Linguistique de Copenhague*, 3-46. Kopenhagen: Einar Munksgaard.
- Bochnak, M. Ryan, and Eva Csipak. 2017. Reportative deontic modality in English and German. *Proceedings of Sinn und Bedeutung*.
- Brünner, Gisela, and Angelika Redder. 1983. Modalverben im Diskurs. In *Studien zur Verwendung der Modalverben*, eds. Gisela Brünner and Angelika Redder, 13-90. Tübingen: Narr.
- Condoravdi, Cleo, and Sven Lauer. 2012. Imperatives: meaning and illocutionary force. In *Empirical Issues in syntax and semantics 9, Papers from the Colloque de Syntaxe et Sémantique à Paris*, ed. Christopher Piñon.
- Copley, Bridget. 2006. What should *should* mean. Ms., CNRS.
- Csipak, Eva. 2015. Free factive subjunctives in German. Doctoral dissertation, Göttingen University.
- Davis, Henry, Lisa Matthewson, and Hotze Rullmann. 2009. 'Out of control' marking as circumstantial modality in St'át'imcets. In *Cross-linguistic semantics of tense, aspect, and modality*, eds. Lotte Hogeweg, Helen de Hoop and Andrej Malchukov, 206-244. Oxford: John Benjamins.
- Deal, Amy Rose. 2011. Modals without scales. *Language* 87:559-585.
- Diewald, Gabriele. 1999. *Die Modalverben im Deutschen. Grammatikalisierung und Polyfunktionalität*. Tübingen: Niemeyer. [Reprint 2012: de Gruyter, Berlin].
- Ehrich, Veronika. 2001. Was *nicht müssen* und *nicht können* (nicht) bedeuten können: Zum Skopus der Negation bei den Modalverben des Deutschen. *Linguistische Berichte, Sonderheft 9*:149-176.
- Fabricius-Hansen, Cathrine. 2016. Das Verb. In *Duden. Die Grammatik*, ed. Angelika Wöllstein-Leisten, 395-578. Mannheim: Dudenverlag.
- Faller, Martina. 2002. Semantics and pragmatics of evidentials in Cuzco Quechua. Doctoral dissertation, Stanford University.
- Faller, Martina. 2007. Evidentiality below and above speech-acts. Ms., University of Manchester.
- Faller, Martina. 2011. A possible worlds semantics for Cuzco Quechua evidentials. In *Proceedings of SALT 20*, eds. Nan Li and David Lutz, 660-683. Ithaca: CLC Publications.
- von Stechow, Kai. 1997. Bare plurals, bare conditionals, and *only*. *Journal of Semantics* 14:1-56.
- von Stechow, Kai, and Anthony S. Gillies. 2010. *Must ... stay ... strong!* *Natural Language Semantics* 18:351-383.
- von Stechow, Kai, and Sabine Iatridou. 2008. How to say *ought* in foreign. In *Time and modality*, eds. Jacqueline Guéron and Jacqueline Lecarme, 115-141. Dordrecht: Springer Netherlands.
- von Stechow, Kai and Sabine Iatridou. 2017. X-marked desires: What wanting and wishing cross-linguistically can tell us about the ingredients of counterfactuality. Paper presented at the Philosophical Linguistics and Linguistical Philosophy Workshop, Tarrytown, NY.

- Fritz, Gerd. 1991. Deutsche Modalverben 1609. Nicht-epistemische Verwendungsweisen. In *Untersuchungen zur semantischen Entwicklungsgeschichte der Modalverben im Deutschen*, eds. Gerd Fritz and Thomas Gloning, 249-305. Tübingen: Niemeyer.
- Glas, Reinhold. 1984. 'Sollen' im heutigen Deutsch. Bedeutung und Gebrauch in der Schriftsprache. Tübingen: Stauffenburg Verlag.
- Gutzmann, Daniel. 2012. Use-conditional meaning. Studies in multi-dimensional semantics. Doctoral dissertation, Goethe-Universität Frankfurt.
- Gutzmann, Daniel. 2015. *Use-conditional meaning. Studies in multidimensional semantics*. Oxford: Oxford University Press.
- Hacquard, Valentine. 2006. Aspects of modality. Doctoral dissertation, Massachusetts Institute of Technology.
- Hacquard, Valentine. 2010. On the event relativity of modal auxiliaries. *Natural Language Semantics* 18:79-114.
- Hinterwimmer, Stefan. 2013. The semantics of German *sollen*. Paper presented at the International Congress of Linguistics, University of Geneva, July 26, 2013.
- Hohaus, Vera, and Jozina Vander Klok. 2017a. Building blocks of weak necessity modals: the view from Paciran Javanese. Poster presented at the 91st Annual Meeting of the Linguistic Society of America.
- Hohaus, Vera, and Jozina Vander Klok. 2017b. Weak necessity modals and modal flavor: The view from Paciran Javanese. Paper presented at *Towards an ontology of modal flavors. Workshop at the 39th Annual meeting of the German Linguistic Society (DGfS)*, Saarbrücken.
- Horn, Laurence. 1972. On the semantic properties of the logical operators in English. Doctoral dissertation, University of California, Los Angeles.
- Howell, Jonathan. 2015. Decomposing weak necessity in English. Ms., Montclair State University.
- Izvorski, Roumyana. 1997. The present perfect as an epistemic modal. *Proceedings of SALT VII*: 222–239.
- Kaufmann, Magdalena. 2012. *Interpreting imperatives*. Heidelberg: Springer.
- Kratzer, Angelika. 1977. What *must* and *can* must and can mean. *Linguistics and Philosophy* 1:337-355.
- Kratzer, Angelika. 1981. The notional category of modality. In *Words, worlds, and contexts*, eds. H.J. Eikmeyer and H. Rieser, 37-74. Berlin: de Gruyter.
- Kratzer, Angelika. 1991. Modality. In *Semantik. Ein internationales Handbuch der zeitgenössischen Forschung*, eds. Arnim von Stechow and Dieter Wunderlich, 639-650. Berlin/New York: de Gruyter.
- Kratzer, Angelika. 2012. *Modals and conditionals: new and revised perspectives*. Oxford: Oxford University Press.
- Matthewson, Lisa. 2013. Gitksan modals. *International Journal of American Linguistics* 79:349-394.
- Matthewson, Lisa. 2015a. Evidential restrictions on epistemic modals. In *Epistemic indefinites. Exploring modality beyond the verbal domain*, eds. Luis Alonso-Ovalle and Paula Menéndez-Benito, 141-160. Oxford: Oxford University Press.
- Matthewson, Lisa. 2015b. Precursive evidential *should*. Talk presented at the University of Potsdam, December 2015.
- Matthewson, Lisa, Henry Davis, and Hotze Rullmann. 2007. Evidentials as epistemic modals. Evidence from St'át'imcets. *Linguistic Variation Yearbook* 7:201-254.
- Matthewson, Lisa, Stefan Hinterwimmer, and Hubert Truckenbrodt. 2018. Imperative blocking: the case of the German root modal *soll*. Paper presented at the Non-Canonical Imperatives workshop, Berlin.

- McCready, Eric. 2010. Varieties of conventional implicature. *Semantics and Pragmatics* 3:1-57.
- Menzies, Stacey. 2010. Kwak'wala modality. B.A. Honours thesis, University of British Columbia.
- Menzies, Stacey. 2012. Nsyilxcen modality: Semantic analysis of epistemic modality. M.A. thesis, University of British Columbia.
- Murray, Sarah. 2010. Evidentiality and the structure of speech acts. Doctoral dissertation, Rutgers University.
- Murray, Sarah. 2017. *The semantics of evidentials*. Oxford: Oxford University Press.
- Öhlschläger, Günther. 1989. *Zur Syntax und Semantik der Modalverben des Deutschen*. Tübingen: Niemeyer.
- Oikonomou, Despina. 2016. Covert modals in root contexts. Doctoral dissertation, Massachusetts Institute of Technology.
- Peterson, Tyler. 2010. Epistemic modality and evidentiality in Gitksan at the semantics-pragmatics interface. Doctoral dissertation, University of British Columbia.
- Portner, Paul. 2009. *Modality*. Oxford: Oxford University Press.
- Potts, Christopher. 2005. *The logic of conventional implicatures*. Oxford, UK; New York, USA: Oxford University Press.
- Potts, Christopher. 2007. The expressive dimension. *Theoretical Linguistics* 33:165-198.
- Reis Silva, M. Amélia. 2009. Circumstantial Modality in Blackfoot. Paper presented at *Chronos 9, International conference on tense, aspect and modality*, Université Paris-Diderot.
- Rett, Jessica. 2016. On a shared property of deontic and epistemic modals. In *Deontic Modality*, eds. Nate Charlow and Matthew Chrisman, 200-229, Oxford University Press.
- Rubinstein, Aynat. 2012. Roots of modality. Doctoral dissertation, University of Massachusetts, Amherst.
- Rullmann, Hotze, Lisa Matthewson, and Henry Davis. 2008. Modals as distributive indefinites. *Natural Language Semantics* 16:317-357.
- Schenner, Mathias. 2008. Double face evidentials in German: reportive 'sollen' und 'wollen' in embedded contexts. In *Proceedings of SuB12*, ed. Grønn Atle, 552-566.
- Schulz, Katrin. 2017. Fake perfect in X-marked conditionals. In *Proceedings of SALT 27*, 547-570, eds. Burgdorf, Dan, Jacob Collard, Sireemas Maspong and Brynhildur Stefánsdóttir.
- Schwager, Magdalena. 2005. Interpreting imperatives. Doctoral dissertation, Johann-Wolfgang-Goethe Universität Frankfurt/Main.
- Schwager, Magdalena. 2008. On what has been said in Tagalog: Reportative *daw*. In *Evidentiality*, eds. Rose-Marie Dechaine, Tyler Peterson, Uli Sauerland and Mathias Schenner, 1-26: UBC Working Papers.
- Silk, Alex. to appear. Weak and strong necessity modals. In *Meaning, decision, and norms: Themes from the work of Allan Gibbard*, eds. Billy Dunaway and David Plunkett.
- Sloman, Aaron. 1970. 'Ought' and 'better'. *Mind* LXXIX:385-394.
- Sode, Frank. 2014. Zur Semantik und Pragmatik des Konjunktivs der Indirektheit im Deutschen. Doctoral dissertation, Humboldt-University Berlin.
- Sode, Frank, and Mathias Schenner. 2013. A revision of Bech's generalization (poster). *Sinn und Bedeutung* 18.
- Truckenbrodt, Hubert. 2006. On the semantic motivation of syntactic verb movement to C in German. *Theoretical Linguistics* 32:257-306.
- Vander Klok, Jozina. 2012. Tense, aspect, and modality in Paciran Javanese. Doctoral dissertation, McGill University.

- Willett, Thomas. 1988. A cross-linguistic survey of the grammaticization of evidentiality. *Studies in Language* 12:51-97.
- Yalcin, Seth. 2016. Modalities of normality. In *Deontic Modality*, eds. Nate Charlow and Matthew Chrisman, 230-255. Oxford: Oxford University Press.
- Zaefferer, Dietmar. 2001. Deconstructing a classical classification: a typological look at Searle's concept of illocution type. *Revue Internationale de Philosophie* 55:209-225.
- Zifonun, Gisela, Ludger Hoffmann, and Bruno Strecker. 1997a. *Grammatik der deutschen Sprache, Band 2*. Berlin/New York: Walter de Gruyter.
- Zifonun, Gisela, Ludger Hoffmann, and Bruno Strecker. 1997b. *Grammatik der deutschen Sprache, Band 3*. Berlin/New York: Walter de Gruyter.

## Appendix: All questionnaire examples, with results and brief comments

Here we provide the German original contexts and examples of our study with 20 speakers. English translations are added for examples not discussed in the text. The averaged judgments are also shown. We furthermore add brief comments on how the judgments fit with our analysis, echoing our explanation in the text. As in the text above, the contexts are labelled in small caps for the interpretations they admit, e.g. DEONTIC, BOULETIC, etc. The italicized interpretations of the results, where bracketed, are to be read as follows. “(✓: deontic)”: the example fits the context because the example admits a deontic reading. “(#: deontic): the example does not fit the context because the example only admits a deontic reading. Where both “(✓: ...” and “(#: ...)” are provided for a given example, “(✓: ...” shows in which respect an example fits with the context and “(#: ...)” points to the source of its deviation.

### 1. PENCILS in (17), (31), (48), and (72), BOULETIC

Professor P ist in seinem Büro, zusammen mit Professorin M. Professor P öffnet einen Brief, den er gerade bekommen hat. Er ist von einer Firma. Professor P hat keine Verpflichtungen gegenüber Firmen. Professorin M fragt Professor P, warum die Firma ihm schreibt. Als Professor P mit dem Lesen fertig ist, antwortet er:

Ich ✓<sup>1.1</sup>soll /#<sup>3.8</sup>muss /#<sup>3.2</sup>sollte /#<sup>3.7</sup>müsste in meinem Seminar Werbung für die Bleistifte der Firma machen.

*Soll can be bouletic (with a 3rd person implicit attitude holder), the other forms cannot.*

### 2. MORPHINE in (18), (32), (49), and (73), BOULETIC

Maria, die als Ärztin in einem Krankenhaus arbeitet, ist mit Lisa Kaffee trinken. Da kriegt Maria eine SMS von ihrer Tochter. Überraschenderweise wird Maria darin von ihrer Tochter gebeten, ihr Morphium aus dem Krankenhaus zu besorgen. Maria wird das natürlich nicht tun. Maria zeigt Lisa die SMS und sagt: Schau ...

ich ✓<sup>1.0</sup>soll /#<sup>3.6</sup>muss /#<sup>3.6</sup>sollte /#<sup>4.0</sup>müsste ihr Morphium besorgen.

*Soll can be bouletic (with a 3rd person implicit attitude holder), the other forms cannot.*

### 3. Chess-example (23), STRONG NECESSITY DEONTIC

Maria und Lisa spielen Schach. Beide spielen noch nicht lange. Maria macht manchmal noch Züge, die nicht den Regeln entsprechen. Lisa erklärt dann nochmal die jeweilige Regel. Sie spielen zum ersten Mal gegeneinander, und die Rochade ist bisher noch nicht aufgekommen. Jetzt macht Maria die Rochade und zieht die Figuren dabei falsch. Lisa sagt:

- #<sup>3.1</sup> Du sollst den König neben den Turm stellen. (#: *bouletic*)
- ✓<sup>1.2</sup> Du musst den König neben den Turm stellen. (✓: *strong necessity deontic*)
- #<sup>3.5</sup> Du solltest den König neben den Turm stellen. (#: *weak necessity*)
- ✓<sup>2.1</sup> Du müsstest den König neben den Turm stellen. (✓: *strong necessity deontic*, #: *problem with motivation for FF-subjunctive*)

### 4. MONOPOLY in (24) and (80), STRONG NECESSITY DEONTIC

Maria und Peter spielen Monopoly. Peter kennt die Regeln noch nicht so gut. Bisher ist noch niemand auf einem Ereignisfeld gelandet. Nun aber landet Peter auf einem Ereignisfeld. Er schaut Maria fragend an. Maria sagt:

- #<sup>2.7</sup> Du sollst eine Ereigniskarte ziehen. (#: *bouletic*)
- ✓<sup>1.0</sup> Du musst eine Ereigniskarte ziehen. (✓: *strong necessity deontic*)
- #<sup>3.3</sup> Du solltest eine Ereigniskarte ziehen. (#: *weak necessity*)
- #<sup>3.0</sup> Du müsstest eine Ereigniskarte ziehen. (✓: *strong necessity deontic*, #: *problem with motivation for FF-subjunctive*)

### 5. MONOPOLY in (81), STRONG NECESSITY DEONTIC

Maria und Peter spielen Monopoly. Peter kennt die Regeln noch nicht so gut. Bisher ist noch niemand auf einem Ereignisfeld gelandet. Nun aber landet Peter auf einem Ereignisfeld. Er schaut fragend in die Runde.<sup>37</sup> Maria sagt:

- #<sup>2.7</sup> Du sollst eine Ereigniskarte ziehen, aber wir spielen nicht immer strikt nach den Regeln.
- ✓<sup>2.4</sup> Du musst eine Ereigniskarte ziehen, aber wir spielen nicht immer strikt nach den Regeln.
- ✓<sup>2.2</sup> Du solltest eine Ereigniskarte ziehen, aber wir spielen nicht immer strikt nach den Regeln.
- ✓<sup>1.1</sup> Du müsstest eine Ereigniskarte ziehen, aber wir spielen nicht immer strikt nach den Regeln.

*See account in the text.*

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<sup>37</sup> Due to an error, the wording of the context in [5] is slightly different from the wording in [4] (roughly, ‘He looked questioningly at the group’ vs. ‘... at Maria’). We do not think that this is likely to have affected the judgments.

6. BOSS AND EMAILS in (26) and (28), (STRONG NECESSITY) DEONTIC, PREFERENCE ASCRIPTION IMPEDING BOULETIC

Bei der Einstellung von Maria hatte die Chefin gesagt, dass sie will, dass Maria wichtige E-Mails immer gleich beantwortet. Maria hat gerade zwei wichtige E-Mails bekommen. Die Chefin ist nicht da. Maria sagt zu Peter am Telefon:

- ✓<sup>2.3</sup> Meine Chefin will, dass ich noch zwei Mails beantworte, bevor ich nach Hause komme.  
(*bouletic; #: restriction against preference ascription*)
- ✓<sup>1.0</sup> Ich muss noch zwei Mails beantworten, bevor ich nach Hause komme.  
(*deontic*)
- #<sup>2.6</sup> Ich soll noch zwei Mails beantworten, bevor ich nach Hause komme.  
(*bouletic; #: restriction against preference ascription*)
- ✓<sup>2.1</sup> Ich sollte noch zwei Mails beantworten, bevor ich nach Hause komme.  
(*deontic, #: weak necessity*)

7. (STRONG NECESSITY) DEONTIC, PREFERENCE ASCRIPTION IMPEDING BOULETIC

Wir haben eine freie Stelle in unserer Abteilung. Der Chef will, dass wir ihm Bewerbungen am selben Tag per E-Mail weiterleiten. Heute ist er nicht da. Niemand hat etwas über die drei Bewerbungen gesagt, die ich heute erhalten habe. Ich sage zu meiner Kollegin: Ich habe heute drei Bewerbungen erhalten.

[There is a position open in our section. The boss wants us to forward the applications to him on the same day. He is not here today. Nobody said anything about the three applications that I received today. I say to my colleague: I received three applications today.]

- ✓<sup>2.2</sup> Mein Chef will, dass ich ihm diese noch weiterleite, bevor ich heute  
my boss wants that I to.him these still forward before I today  
Feierabend mache.  
end.of.working.day do

‘My boss wants me to still forward these to him before I leave work.’

Diese ✓<sup>1.2</sup>**muss** /✓<sup>1.8</sup>**soll** /✓<sup>1.5</sup>**sollte** ich dem Chef noch weiterleiten,  
these must /SOLL /SOLLTE I to.the boss still forward

bevor ich heute Feierabend mache.  
before I today end.of.working.day do

‘I must/SOLL/SOLLTE forward these to the boss before I leave work.’

8. GOAL OF ANSWERING MAILS in (29), (52), and (74), (STRONG NECESSITY) TELEOLOGICAL

Maria hat gerade zwei wichtige E-Mails bekommen. Sie hat das Ziel, wichtige E-Mails immer gleich zu beantworten. Niemand hat sie gebeten, ihre E-Mails gleich zu beantworten. Sie ruft Peter an und sagt:

- #<sup>3.7</sup> Ich soll noch zwei E-Mails beantworten, bevor ich nach Hause komme. (*#: bouletic*)
- ✓<sup>1.3</sup> Ich muss noch zwei E-Mails beantworten, bevor ich nach Hause komme.  
(*✓: strong necessity teleological*)
- ✓<sup>2.1</sup> Ich sollte noch zwei E-Mails beantworten, bevor ich nach Hause komme.  
(*✓: deontic, #: weak necessity*)
- ✓<sup>1.4</sup> Ich müsste noch zwei E-Mails beantworten, bevor ich nach Hause komme.  
(*✓: strong necessity teleological; motivations for opting out e.g. emergencies at home*)

### 9. KITCHEN (STRONG) in (37), (60), and (67), (STRONG NECESSITY) INFERENCE

Ich habe gesehen, wie Maria in die Küche geht. Der Hinterausgang aus der Küche ist von außen verstellt. Niemand hat etwas über Maria gesagt. Ich sage:

- #<sup>4.0</sup> Maria soll in der Küche sein. (#: bouletic)
- ✓<sup>1.2</sup> Maria muss in der Küche sein. (✓: strong necessity inferential)
- ✓<sup>1.9</sup> Maria sollte in der Küche sein. (✓: inferential, #: weak necessity)
- ✓<sup>1.9</sup> Maria müsste in der Küche sein. (✓: inferential, #: weak necessity)

### 10. KITCHEN (WEAK) in (38), (59), and (68), (WEAK NECESSITY) INFERENCE

Ich habe gesehen, wie Maria in die Küche geht. Der Hinterausgang aus der Küche wird selten benutzt. Niemand hat etwas über Maria gesagt. Ich sage:

- #<sup>4.0</sup> Maria soll in der Küche sein. (#: bouletic)
- #<sup>2.7</sup> Maria muss in der Küche sein. (✓: inferential, #: strong necessity)
- ✓<sup>1.4</sup> Maria sollte in der Küche sein. (✓: weak necessity inferential)
- ✓<sup>1.0</sup> Maria müsste in der Küche sein. (✓: weak necessity inferential)

### 11. TELEPHONE in (41), (61), and (69), REPORTATIVE

Der Herr vom Kundenservice sagt, dass unser Telefon kaputt ist, aber ich kenne mich etwas aus, und ich weiß, dass wir nur ein neues Modem ohne Wackelkontakt brauchen. Ich sage:

- ✓<sup>1.0</sup> Unser Telefon soll kaputt sein, aber das stimmt nicht. (✓: reportative)
- #<sup>3.8</sup> Unser Telefon muss kaputt sein, aber das stimmt nicht. (#: inferential)
- #<sup>3.6</sup> Unser Telefon sollte kaputt sein, aber das stimmt nicht. (#: inferential)
- #<sup>3.6</sup> Unser Telefon müsste kaputt sein, aber das stimmt nicht. (#: inferential)

### 12. REPORTATIVE

Die Eltern fragen sich, wo Maria ist. Die Mutter kriegt eine SMS von Marias Freundin: „Maria ist in Sophies Café.“ Die Eltern sitzen aber gerade in Sophies Café, und wissen sicher, dass Maria nicht da ist. Die Mutter weiß daher, dass Marias Freundin schwindelt. Die Mutter zeigt dem Vater die SMS und sagt „Schau ...“

[The parents are wondering where Maria is. The mother receives a text from Maria's friend: "Maria is in Sophie's Café." However, the parents are sitting in Sophie's Café and they know for sure that Maria is not there. The mother thus knows that Maria's friend is fibbing. The mother shows the text to the father and says, "Look ..."]

- ✓<sup>1.2</sup> Maria soll in diesem Café hier sein. (✓: reportative)
  - #<sup>3.9</sup> Maria muss in diesem Café hier sein. (#: inferential)
  - #<sup>2.5</sup> Maria sollte in diesem Café hier sein. (#: inferential)
  - #<sup>2.9</sup> Maria müsste in diesem Café hier sein. (#: inferential)
- ‘Maria SOLL/must/SOLLTE/MÜSSTE be in this café here.’

### 13. TÜBINGEN in (56) and (75), TELEOLOGICAL STRONG NECESSITY

Nur Regionalzüge fahren nach Tübingen. Am Bahn-Infostand:

Lisa fragt: Wie komme ich bitte mit dem Zug nach Tübingen? Der Beamte antwortet:

- ✓<sup>1.1</sup> Sie müssen einen Regionalzug nehmen. (✓: teleological sn)
- #<sup>2.9</sup> Sie sollten einen Regionalzug nehmen. (#: weak necessity)
- ✓<sup>1.8</sup> Sie müssten einen Regionalzug nehmen.  
(✓: teleological sn; #: motivation for FF-subjunctive)
- #<sup>3.9</sup> Sie sollen einen Regionalzug nehmen. (#: bouletic)

14. SAARBRÜCKEN in (51), (57) and (76), TELEOLOGICAL WEAK NECESSITY

Am Bahn-Infostand: Lisa fragt: Wie komme ich bitte mit dem Zug nach Saarbrücken? Der Beamte antwortet: Von hier nach Saarbrücken sind Regionalzüge und ICEs fast genauso schnell und die Regionalzüge sind deutlich billiger.

- #<sup>3.9</sup> Sie müssen einen Regionalzug nehmen. (#: *strong necessity*)
- ✓<sup>1.0</sup> Sie sollten einen Regionalzug nehmen. (✓: *weak necessity*)
- #<sup>3.9</sup> Sie müssten einen Regionalzug nehmen. (#: *strong necessity*)

15. Washing hands in (82), WEAK NECESSITY DEONTIC

Maria tritt ihre neue Arbeit im Restaurant an. Die Kollegin erklärt ihr die Regeln. Sie sagt: Nach der Benutzung der Toilette ✓<sup>1.1</sup>solltest / #<sup>3.9</sup>musst / ✓<sup>2.0</sup>müsstest du deine Hände waschen ...

Eigentlich musst du sogar deine Hände waschen.

*See explanation in the text.*

16. Washing dishes in (83), WEAK NECESSITY DEONTIC

Du bist dazu nicht verpflichtet, aber ...

- ✓<sup>1.1</sup> du solltest das Geschirr abwaschen. (✓: *weak necessity deontic*)
- #<sup>3.7</sup> du musst das Geschirr abwaschen. (#: *strong necessity*)
- #<sup>2.9</sup> du müsstest das Geschirr abwaschen. (#: *strong necessity*)