The Left Periphery and Internal Structure of German *zu*-Infinitives*

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Abstract

In diesem Aufsatz geht es um die linke Peripherie und die interne Struktur von *zu*-Infinitiven. In der Literatur wurde viel diskutiert, ob *zu*-Infinitive VPs oder CPs sind. Es wird aber gezeigt, dass die Eigenschaften von *zu*-Infinitiven, die bislang als CPs analysiert wurden, unterschiedlich sind, wenn man ihre Kombinatorik mit Modalpartikeln und Satzadverbialen betrachtet. In der vorliegenden Arbeit stelle ich zuerst die Analyse von Frey (2012) vor, in der die Eigenschaften von Adverbialsätzen mit Hilfe der ForceP erklärt werden. Danach zeige ich, dass es problematisch ist, Freys Analyse auf *zu*-Infinitive anzuwenden. Um eine einheitliche Analyse für Adverbialsätze und *zu*-Infinitive zu erreichen, gehe ich davon aus, dass es auch im Deutschen Operatorbewegung in der IP-Domäne (cf. Haegeman 2014) und *Speech Act Phrase* (cf. Miyagawa 2013) gibt. Mit dieser Annahme schlage ich Strukturen vor, die die Eigenschaften von *zu*-Infinitiven und das Verhalten von Madalpartikeln und Satzadverbialen darin einheitlich erklären können.

Key Words: Cartography of Syntax, operator movement, Speech Act Phrase, *zu*-infinitive, modal particle

1. Introduction

This paper investigates the left periphery and internal structure of German *zu*-infinitives which are complements of verbs and are treated as CP in the literature so far (Haider 2010 and Rapp & Wöllstein 2013 among many others), observing the behavior of sentence adverbs and modal particles, which express the speaker's mental attitude when they appear in main clauses.

In German, the embedding verb determines whether the sentence adverbs and modal particles can appear in embedded infinitival clauses.

(1) a. Sie bereut, es (*vielleicht / *nachweisbar / *bedauerlicherweise) gegessen zu haben.
she regrets it perhaps demonstrably unfortunately eaten to have
b. Sie bereut, es (*ja / *doch / *wohl) gegessen zu haben.
she regrets it MP MP MP eaten to have

c. Sie leugnete, die Zeugin (*vielleicht / *nachweisbar / *bedauerlicherweise) unter Druck
she denied the witness perhaps demonstrably unfortunately under pressure
gesetzt zu haben.
set to have

d. Sie leugnete, die Zeugin (*ja / *doch / *wohl) unter Druck gesetzt zu haben.
she denied the witness MP MP MP under pressure set to have

(2) a. Er erzählte, sie { vielleicht / nachweisbar / bedauerlicherweise } schon mal getroffen
he explained her perhaps demonstrably unfortunately already once met
zu haben.
to have

b. Er erzählte, sie { ja / doch / wohl } schon mal getroffen zu haben.
he explained her MP MP MP already once met to have

c. Er behauptet, diese Frau { ?vielleicht / nachweisbar / ?bedauerlicherweise } schon lange
he claims this woman perhaps demonstrably unfortunately already long
zu kennen.
to know

d. Er bahauptet, diese Frau { ja / doch / ?wohl } schon lange zu kennen.
he claims this woman MP MP MP already long to know

The examples in (1) show that sentence adverbs or modal particles cannot appear in the infinitival clauses that are embedded by *bereuen* 'regret' or *leugnen* 'deny.' On the other hand, the examples in (2) show that sentence adverbs or modal particles can appear in the infinitival clauses that are embedded by *erzählen* 'explain' or *behaupten* 'claim.'[1] In (2), the sentence adverbs or modal particles express mental attitudes of the matrix subjects, although they express the speaker's mental attitudes when they appear in main clauses (cf. Zimmerman 2004, Frey 2012, Rapp & Wöllstein 2013).

Sentence adverbs and modal particles are so-called main clause phenomena. The clauses embedded by factive predicates (e.g., *regret*, *be surprised*) or inherently negative predicates (e.g., *deny*, *be impossible*) are typical examples of non-root-like contexts, while clauses embedded by verba dicendi (verbs of saying) are classic examples of root-like dependent clauses (cf. Coniglio 2011, Frey 2012).

The goal of this paper is to give a theoretical account of the phenomena observed in (1) and (2) from the perspective of the cartography of syntactic structures, which was devised by Rizzi (1997) and Cinque (1999). More precisely, this study proposes structures for German *zu*-infinitives which can explain i) why the sentence adverbs and modal particles cannot appear in

(1), and ii) why the sentence adverbs and modal particles in (2) express mental attitudes of matrix subjects, but not of the speaker.

The organization of this paper is as follows. Section 2 reviews earlier syntactic studies of German *zu*-infinitives and points out that each of them cannot explain the phenomena observed in (1) and (2). Section 3 introduces Frey (2012) and shows that his analysis of German adverbial clauses has potential for explaining the phenomena in (1) and (2), but cannot be directly applied to German *zu*-infinitives. As an alternative, section 4 introduces Haegeman (2014) and her analysis of English and Romance adverbial clauses. However, this raises another problem that occurs when we apply Haegeman's analysis to German *zu*-infinitives. In order to solve this situation, section 5 assumes the existence of the *Speech Act Phrase* (cf. Miyagawa 2013) as well as the operator movement in the IP-field, as proposed by Haegeman (2014). Subsequently, the behavior of German adverbial clauses, *zu*-infinitives, sentence adverbs and modal particles can be explained in a unified way based on these assumptions. Section 6 presents the conclusion and further issues.

2. Earlier syntactic studies of German *zu*-infinitives

Many studies have discussed the structures of German *zu*-infinitives, and it is controversial whether *zu*-infinitives are VP or CP. The phenomena observed in (3) and (4) constitute one of the reasons for this.

(3) a. dass die Frau [es zu essen] versucht
that the woman it to eat tries
b. ?dass die Frau [es zu wissen] leugnet
that the woman it to know denies
c. ?dass die Frau [es zu wissen] behauptet
that the woman it to know claims

(4) a. dass es_i die Frau [t_i zu essen] versucht

b. *dass es_i die Frau [t_i zu wissen] leugnet

c. *dass es_i die Frau [t_i zu wissen] behauptet

The examples in (3) and (4) show that the element inside the infinitival clause can be scrambled to the outside of the clause if the matrix verb is *versuchen* 'try' and that this scrambling is banned if

the matrix verb is *leugnen* 'deny' or *behaupten* 'claim'. Structures like (3a) and (4a) are called coherent structures and the matrix-verbs that allow coherent structures are called coherent verbs. *Versuchen* 'try' is an example of a coherent verb and *leugnen* 'deny' and *behaupten* 'claim' are examples of incoherent verbs.

Sabel (2001) and Haider (2010) claim that German *zu*-infinitives are always CP when they are extraposed, and proposed special structures, such as *Verbkomplexbildung* (Sabel 2001) or *V^0-cluster* (Haider 2010) for coherent structures. On the other hand, Wurmbrand (2001), Inaba (2007), and Rapp & Wöllsten (2009, 2013) analyze the infinitival clauses embedded by coherent verbs as VP, admitting that the infinitival clauses embedded by incoherent verbs are CP.

This paper does not aim to decide how we should analyze coherent structures like (3a) and (4a). The point I would like to stress is the fact that each of the earlier studies analyzes incoherent infinitival clauses like (3b, c) and (4b, c) as CP. In other words, they assume the same structure for infinitival clauses embedded by *leugnen* 'deny' and those embedded by *behaupten* 'claim.' We saw in (1c, d) and (2c, d) that the nature of the infinitival clause embedded by *leugnen* 'deny' and the infinitival clause embedded by *behaupten* 'claim' are different when we observe the sentence adverbs and modal particles in those examples. Previous syntactic analyses of *zu*-infinitives cannot explain this difference, hence this can be identified as the main problem with those earlier studies.

The next section introduces Frey (2012), which explains the different types of behavior of German adverbial clauses through the (non-)existence of ForceP, and attempts to apply his analysis to *zu*-infinitives in order to determine the difference between the infinitival clauses in (1) and (2).

3. The (non-)existence of ForceP and its consequences

In the literature, it is widely accepted that sentence adverbs and modal particles are licensed by ForceP (cf. Zimmerman 2004, Haegeman 2006, Coniglio 2011, Bayer 2012). According to Frey (2012), there are German adverbial clauses without ForceP as well as with ForceP.[2]

(5) a. *Maria ging oft in die Staatsoper, als sie ja in Wien lebte.
Maria went often into the State-Opera-House when she MP in Vienna lived
b. Er hat die Prüfung nicht bestanden, trotzdem er ja recht intelligent ist.
he has the exam not passed though he MP right intelligent is
(Frey 2012: 411)

Example (5) shows that the modal particle *ja* cannot appear inside the adverbial clause introduced by *als* 'when' (5a), but that it can appear inside the adverbial clause introduced by *trotzdem*

'though' (5b). Frey assumes that the adverbial clause in (5a) has no ForceP, while the adverbial clause in (5b) does have ForceP. He explains the unavailability of the modal particle in (5a) through the non-existence of ForceP.

According to Frey, the (non-)existence of ForceP influences the external syntax of the adverbial clauses.

(6) Was hat Maria gesagt?
what has Maria said
a. Peter fährt nach Paris, weil er dort eine KonfeRENZ besucht. (no ForceP)
Peter goes to Paris because he there a conference visits
b. #Peter fährt nach Paris, da er dort eine KonfeRENZ besucht. (with ForceP)
Peter goes to Paris for he there a conference visits

(7) Warum bleibt Hans zu Hause?
why stays Hans at house
a. Weil seine Frau krank ist. (no ForceP)
because his wife sick is
b. #Da seine Frau krank ist. (with ForceP)
for his wife sick is

(8) a. Geht Peter nach Hause, weil er müde ist? (no ForceP)
goes Peter to house because he tired is
b. *Geht Peter nach Hause, da er müde ist? (with ForceP)
goes Peter to house for he tired is

(Frey 2012: 407-408)

The clauses that have ForceP cannot constitute one focus-background partition (6b), may not be questioned (7b), nor become part of a question (8b). These are only possible for clauses that do not have ForceP (6a, 7a and 8a).

If we apply Frey's analysis to German *zu*-infinitives and assume that infinitival clauses in which sentence adverbs and modal particles can appear have ForceP, we predict that such infinitival clauses will behave just like (6b), (7b), and (8b). Namely, the infinitival clause embedded by *behaupten* 'claim' would not be able to constitute one focus-background partition, could not be questioned, nor become part of a question. However, this prediction is wrong, as its external syntax is the same as that of the infinitival clause embedded by *bereuen* 'regret' (9)-(11).

(9) Was hat Maria gesagt?

a. Peter bereut, die Konferenz beSUCHT zu haben.
Peter regrets the conference visited to have

b. Peter behauptet, die Konferenz beSUCHT zu haben.
Peter claims the conference visited to have

(10) a. Was bereut Peter?—Die Konferenz besucht zu haben.
what regrets Peter the conference visited to have

b. Was behauptet Peter?—Die Konferenz besucht zu haben.
what claims Peter the conference visited to have

(11) a. Bereut Peter, die Konferenz besucht zu haben?
regrets Peter the conference visited to have

b. Behauptet Peter, die Konferenz besucht zu haben?
claims Peter the conference visited to have

This suggests that we should assume a common syntactic status (i.e., the same size of the projection) for German infinitival clauses. The next section introduces Haegeman (2014), which assumes the same size of the projection for English, French, and Italian embedded clauses, and investigates whether her analysis can be applied to German *zu*-infinitives.

4. Operator movement inside German *zu*-infinitives

Haegeman (2014) assumes that operator movement occurs in some English, French, and Italian embedded clauses and explains the unavailability of sentence adverbs in those clauses. According to her, operator movement in embedded clauses prevents sentence adverbs from appearing. If sentence adverbs appear inside the clause in which the operator movement occurs, they give rise to violation of locality. The principle of locality requires that any syntactic movement be applied to the elements in Minimal Configuration (cf. Rizzi 2004).

(12) Y is in a Minimal Configuration (MC) with X iff there is no Z such that
(i) Z is of the same structural type as X, and
(ii) Z intervenes between X and Y. (Rizzi 2004: 224)

Haegeman assumes operator movement illustrated in (13) in complements of factive predicates. The operator is base-generated in the $\text{MoodP}_{\text{irrealis}}$ and moves leftward.[3] She does not mention the operator's specific landing site, but I assume that it is the specifier of ForceP, since that site is higher than TopicP according to her analysis.[4]

(13) [$_{\text{ForceP}}$ [$_{\text{IP}}$ MoodP $_{\text{speech act}}$ > MoodP $_{\text{evaluative}}$ > MoodP $_{\text{evidential}}$ > ModP $_{\text{epistemic}}$ > TP (Past) > TP (Future) > MoodP $_{\text{irrealis}}$

Since sentence adverbs are base-generated at the specifier position of functional phrases in the IP-field (cf. Cinque 1999), they are of the same structural type as the specifier of ForceP.[5] Therefore, if sentence adverbs appeared, the operator and specifier of ForceP would not be in Minimal Configuration, and violation of locality would occur. This is Haegeman's explanation of why sentence adverbs are unavailable inside clauses embedded by factive predicates.

Interestingly, we can also explain the unavailability of modal particles if we assume that operator movement occurs. In the literature, it is widely accepted that German modal particles move to the specifier of ForceP via LF-movement[6] (cf. Zimmermann 2004, Coniglio 2011, Bayer 2012). If the landing site of the operator is the specifier of ForceP, as I assumed above, a modal particle cannot move to the specifier of ForceP since that position is already taken by the operator.[7]

What is the motivation for this operator movement? Haegeman mentions nothing about this, but we can speculate that the operator has some kind of uninterpretable feature that must be checked by the head of ForceP. If the operator does not move, its feature cannot be read in LF and the derivation will crash.

Although Haegeman (2014) does not study German data, there is syntactic and semantic evidence for the existence of the operator in German embedded clauses as well. In terms of syntax, we can observe the intervention effect in clauses embedded by *bereuen* 'regret' (14a) and *leugnen* 'deny' (14b), while there is no such effect in clauses embedded by *erzählen* 'explain' (15a) or *behaupten* 'claim' (15b).

(14) a. *Wie$_i$ bereust du, [t$_i$ das Auto repariert zu haben] ?
how regret you the car repaired to have
b. *Wie$_i$ leugnest du, [t$_i$ das Auto repariert zu haben] ?
how deny you the car repaired to have

(15) a. Wie$_i$ hast du erzählt, [t$_i$ das Auto repariert zu haben] ?
how have you explained the car repaired to have
b. Wie$_i$ hast du behauptet, [t$_i$ das Auto repariert zu haben] ?
how have you claimed the car repaired to have

Since the landing site of the wh-phrase is the specifier position, we can explain the data in (14) and (15) if we assume that there is an operator at the specifier position inside the clauses

embedded by *bereuen* 'regret' and *leugnen* 'deny'. On the other hand, there is no operator inside the clauses embedded by *erzählen* 'explain' and *behaupten* 'claim' and therefore no intervention effect is observed.

In terms of semantics, we can admit the existence of a factive operator in the clause embedded by *bereuen* 'regret' and a negative operator in the clause embedded by *leugnen* 'deny' when we consider the meanings of the embedded clauses. The proposition denoted by the clause embedded by *bereuen* 'regret' is presupposed to be true. This semantic effect may be attributed to the factive operator inside the clause. The proposition denoted by the clause embedded by *leugnen* 'deny' seems to be negated. This becomes apparent when we paraphrase sentence (16a) like (16b).

(16) a. Er leugnet, das Auto repariert zu haben.
he denies the car repaired to have
b. Er behauptet, das Auto nicht repariert zu haben.
he claims the car not repaired to have

The truth condition of (16a) is almost the same as that of (16b). We may decompose *leugnen* 'deny' into *behaupten* 'claim' and *nicht* 'not,' and assume that the clause embedded by *leugnen* 'deny' has a negative operator whose function is similar to *nicht* 'not.'[8]

This is syntactic and semantic evidence for the existence of operator movement in German.[9] When we apply the analysis of Haegeman (2014) to German *zu*-infinitives, we can assume a common syntactic status (i.e., the same size of the projection) for German infinitival clauses. However, one problem still remains. According to this analysis, the syntactic status of *zu*-infinitives is the same as that of adverbial clauses that have ForceP. As we saw in (6)-(11), the external syntax of *zu*-infinitives are the same as adverbial clauses that do not have ForceP. This suggests that the syntactic status of *zu*-infinitives is the same as that of adverbial clauses that do not have ForceP. In order to explain this, I introduce the *Speech Act Phrase* (cf. Miyagawa 2013) in the next section and propose structures that can explain the behavior of German adverbial clauses, *zu*-infinitives, sentence adverbs, and modal particles in a unified way.

5. Adopting the Speech Act Phrase for a unified account

This section first introduces the *Speech Act Phrase*, a functional category originally proposed by Speas & Tenny (2003) and subsequently adopted by Miyagawa (2013) with slight modification. Assuming this functional category also exists in German, I propose structures for German adverbial clauses and *zu*-infinitives as well as a mechanism for how sentence adverbs and

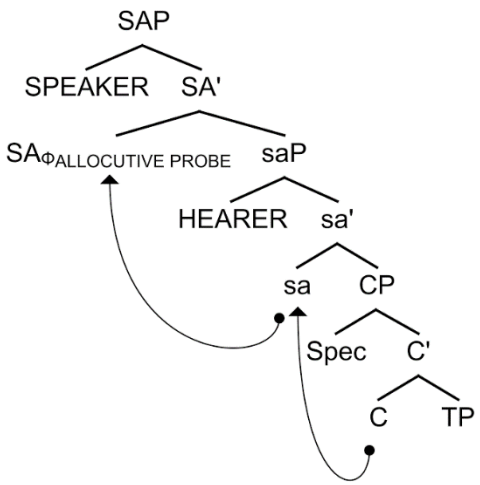
modal particles determine whose mental attitude to express.

5.1 The Speech Act Phrase in German

Miyagawa (2012, 2013) assumes the *Speech Act Phrase* in Souletin (an eastern dialect of Basque) and proposes the mechanism of allcutive agreement in that language. Allocutive agreement is a phenomenon in which a verb inflects agreeing with the features of the hearer. Souletin has specific forms for a male hearer, female hearer, and for a hearer who is older or higher in status.

According to Miyagawa (2013), the allocutive agreement in Souletin occurs in a way illustrated in (17).

(17)

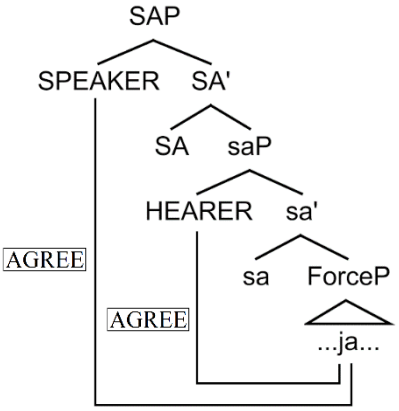


(Miyagawa 2013: 11)

The specifier of the higher Speech Act Phrase (SAP) projects the SPEAKER and the specifier of the lower speech act Phrase (saP) projects the HEARER. The allocutive probe moves from C to SA as a result of head-raising. Then, the allocutive probe properly c-commands its goal, namely, the HEARER, and allocutive agreement occurs.[10]

I assume that the Speech Act Phrase also exists in German, and propose that Agree-relations are a mechanism for how sentence adverbs or modal particles decide whose mental attitude to express, as illustrated in (18). The tree in (18) represents the structure of a main clause that contains the modal particle *ja*.

(18)

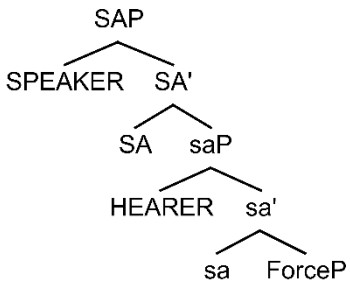


In main clauses, sentence adverbs and modal particles express the speaker's mental attitude, for which the hearer's knowledge (or common ground) is taken into consideration (cf. Speas & Tenny 2003, Zimmermann 2004, Coniglio 2011). Following Deal (2009), I assume that the element in a specifier position can also be a probe. In (18), the probe HEARER is merged and agrees with the modal particle *ja*, and subsequently the probe SPEAKER is merged and agrees with *ja*. The hearer's knowledge (or common ground) is checked by means of the Agree-relation between HEARER and *ja*, while the speaker's mental attitude is checked by means of the Agree-relation between SPEAKER and *ja*. Though I do not go further into the technical details of this mechanism, the main point here is that we predict sentence adverbs and modal particles to reflect the knowledge and mental attitude of the elements that form local relations with them.

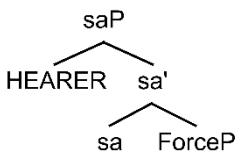
5.2 The structures of German adverbial clauses and *zu*-infinitives

By assuming the existence of the Speech Act Phrase in German, I propose structure (19) for German main clauses and adverbial clauses that allow sentence adverbs and modal particles to appear inside them. For German adverbial clauses that do not allow sentence adverbs or modal particles to appear inside them, I propose structure (20).

(19)



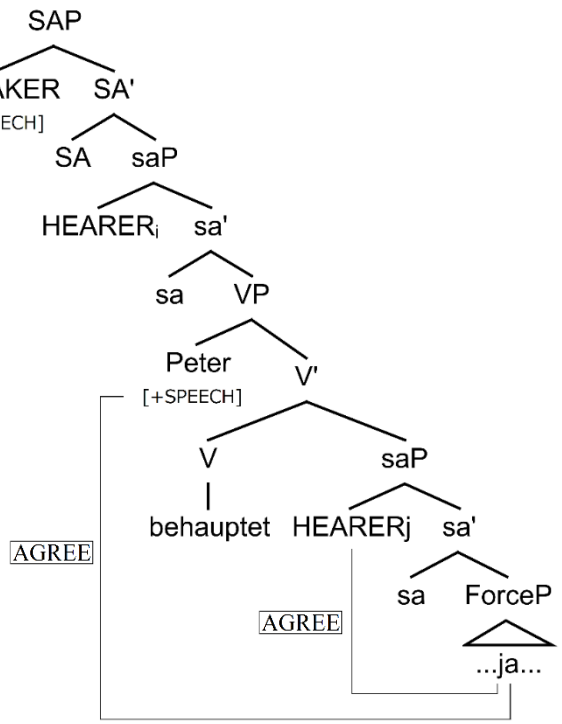
(20)



The differences in the external syntax of the adverbial clauses observed in (6)-(8) are explained by the (non-)existence of SAP. I propose common syntactic status for the structures of German *zu*-infinitives, namely, structure (20). The unavailability of sentence adverbs and modal particles inside the infinitival clauses embedded by *bereuen* 'regret' or *leugnen* 'deny' is explained by the operator movement, as seen in section 4. According to these assumptions, we can correctly predict that the external syntax of *zu*-infinitives is the same as that of adverbial clauses that do not allow sentence adverbs or modal particles to appear inside them, because they have the same syntactic status.

When we assume structure (20) for *zu*-infinitives, how do sentence adverbs or modal particles determine whose mental attitude to express and whose knowledge to take into consideration when appearing inside *zu*-infinitives? The tree in (21) illustrates this mechanism. I assume that the SPEAKER projection has feature [+SPEECH] and that the subjects of verba dicendi (verbs of saying) also have this feature, because they both utter something. Based on this, I slightly modify the sentence adverbs and modal particles' mechanism for determining whose mental attitude to express. Namely, I assume that they express the mental attitude of the element with the feature [+SPEECH].

(21)



The tree in (21) represents the structure of a main clause and an infinitival clause embedded by *behaupten* 'claim' which contains the modal particle *ja* (cf. 2d). The CP- and IP-field, the subject movement, and the head-movement of the matrix verb were omitted, since they do not relate to the present discussion. The saP, which is the complement of *behaupten* 'claim,' is the infinitival clause. We can observe that the HEARER_j and *Peter* form a local relation with the modal particle *ja* and agree with *ja.*[11]

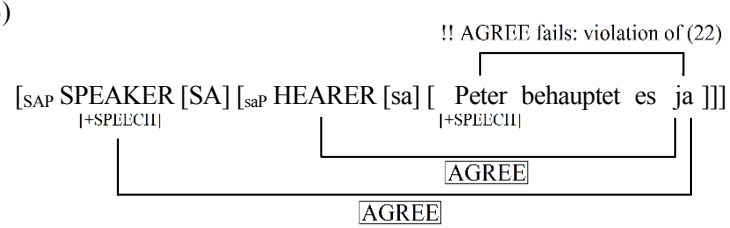
Structure (21) reflects one more important fact, namely, that the sentence adverbs and modal particles in embedded clauses express the matrix-subject's mental attitude and, in this case, the knowledge of the matrix-subject's hearer (not the speaker's hearer) is taken into consideration. "The matrix-subject's hearer" indicates the person who directly hears the matrix-subject's utterance. Since the hearer for the speaker and the hearer for the matrix subject can differ, (21) represents different indices for the two HEARERs. HEARER_i is the speaker's hearer and HEARER_j is the matrix-subject's hearer. The Agree-relations illustrated in (21) correctly predict that the modal particle *ja* inside the infinitival clause expresses the matrix-subject's mental attitude, for which the knowledge of the matrix-subject's hearer is taken into consideration. Note that the SPEAKER and HEARER_i cannot agree with the modal particle *ja*, because they do not form a local relation with *ja*.

Now I formulate the mechanism for how sentence adverbs and modal particles determine whose mental attitude to express as (22).

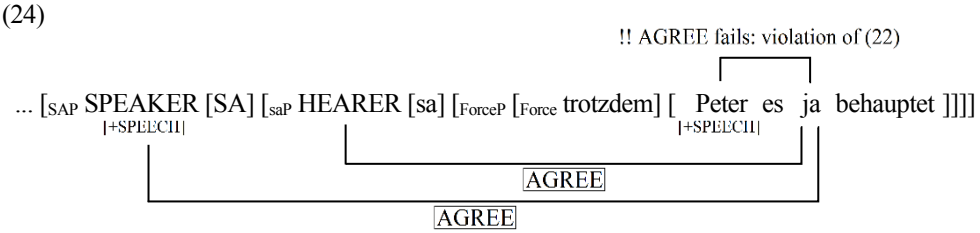
(22) Sentence adverbs and modal particles first agree with the HEARER and determine whose knowledge to take into consideration. Subsequently, they agree with the element [+SPEECH] and determine whose mental attitude to express.

The formulation in (22) correctly predicts whose mental attitude the sentence adverbs or modal particles express inside the main clauses or adverbial clauses, even if the subject is [+SPEECH]. (23) and (24) illustrate their Agree-relations. (23) illustrates the Agree-relation of *ja* in a main clause and (24) illustrates the Agree-relation of *ja* in an adverbial clause. (24) omits the main clause because it does not relate to the present discussion.

(23)



(24)



In both cases, the subject *Peter* cannot agree with the modal particle *ja*, since *ja* has not yet agreed with HEARER when *Peter* merges. Therefore, the formulation in (22) correctly predicts the nature of sentence adverbs and modal particles in any context.

6. Conclusion and further issues

This paper has investigated the left periphery and internal structure of German *zu*-infinitives that the literature has analyzed as CP. First, the difference between the *zu*-infinitives embedded by factive predicates or inherently negative predicates and the *zu*-infinitives embedded by verba dicendi (verbs of saying) was shown—namely, the (un)availability of sentence adverbs and modal particles inside the clauses. Next, the external syntax of German adverbial clauses and *zu*-infinitives was observed. For the unified account of the external syntax of *zu*-infinitives and the (un)availability of sentence adverbs and modal particles inside the clauses, it was assumed that operator movement and the *Speech Act Phrase* also exist in German. According to this assumption, the structures of German adverbial clauses and *zu*-infinitives were proposed. German adverbial clauses that allow sentence adverbs and modal particles to appear inside them have both SAP and saP. German adverbial clauses that do not allow sentence adverbs or modal particles to appear inside them have only saP. Likewise, German *zu*-infinitives have only saP.[12] The external syntax is explained by the (non-)existence of SAP. The unavailability of sentence adverbs and modal particles is explained by operator movement. In addition, a mechanism was proposed for how sentence adverbs and modal particles determine whose mental attitude to express.

In fact, sentence adverbs and modal particles can appear inside clauses embedded by attitude verbs.

(25) a. Ihm fiel ein, sie { vielleicht / nachweisbar / bedauerlicherweise } schon mal
to-him occurred her perhaps demonstrably unfortunately already once
getroffen zu haben.
met to have

b. Ihm fiel ein, sie { ja / doch / wohl } schon mal getroffen zu haben.
to-him occurred her MP MP MP already once met to have

These cases appear problematic at first sight, because the matrix subject does not seem to be [+SPEECH] and the matrix subject has no hearer. However, we can consider this case as a soliloquy (a speech to oneself). Namely, the matrix subject is actually [+SPEECH] and the matrix subject and the HEARER projected inside the infinitival clause have the same index. Subsequently, this paper's analysis can also be applied to this case.

Since this paper mainly examined German *zu*-infinitives, details of German adverbial clauses were not investigated. As seen in (5a), some German adverbial clauses do not allow sentence adverbs or modal particles to appear inside them.

(26)=(5a) *Maria ging oft in die Staatsoper, als sie ja in Wien lebte.
Maria went often into the State-Opera-House when she MP in Vienna lived

In order to explain this, it has to be assumed that operator movement occurs inside the clause. In this paper, I could not show evidence of the existence of the operator inside such adverbial clauses. This issue will be left for future research.

Notes

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[1] The acceptability of the sentences in (2) differs depending on the speakers, but it is far better than that of the sentences in (1) for any speaker.

[2] Frey (2012) divides German adverbial clauses that have ForceP into two subclasses based on their licensing conditions.

[3] Haegeman (2014) gives the data of Meiteilon (Sino-Tibetan) embedded clauses as evidence that the base-position of the operator is $\text{MoodP}_{\text{irrealis}}$.

[4] When we adopt the CP-layer illustrated in (i), which is proposed by Rizzi (1997), no projection is higher

than TopicP except for ForceP.

(i) [$_{ForceP}$ Force^0 [$_{TopP}$ Top^0 [$_{FocP}$ Foc^0 [$_{TopP*}$ Top^0 [$_{FinP}$ Fin^0 IP]]]]] (Rizzi 1997: 297)

[5] When two elements are both in A' specifier positions, they are of the same structural type. See Rizzi (2004) for further details on the "same structural type."

[6] If we adopt the framework of Minimalism, the operation of LF-movement is replaced by Agree without Move. When there is an operator, the head of ForceP agrees with the operator and cannot act as a probe for modal particles.

[7] There is a case where two modal particles appear in one clause.

(ii) Heute ist ja wohl Müllers letzer Arbeitstag. (Zimmermann 2004: 31)
today is MP MP Müller's last working-day

Coniglio (2011) proposes a cluster construction of two modal particles in the specifier of ForceP. I assume that the operator and modal particles cannot build a cluster for some reason. A more detailed explanation must be given by future research.

[8] Note that the negative word *nicht* 'not' does not give rise to the intervention effect, since it does not move like the operator.

[9] There are a lot of studies that assume the existence of such kind of operator (e.g., Melvold 1991, Miyagawa 2012, Roussou 2010, Watanabe 1993, Zanuttini & Portner 2003, Zubizaretta 2001). However, it must be made clear what ensures the presence of the operator. The intervention effect which we observed in (14) may be its strong evidence, but further research must be done in the future to confirm the presence of the operator.

[10] The allocutive agreement is actually pronounced at T. According to Miyagawa (2013), this is some kind of PF requirement. He claims that Japanese polite forms *desu* and *masu* are realized in the same way.

[11] Here, the HEARER$_j$ does not intervene with the Agree-relation between *Peter* and *ja*, since the *ja* is still active after it agreed with HEARER$_j$ in order to check its feature related to [+SPEECH].

[12] According to my theory, the finiteness of the embedded clause has no direct relationship with the syntactic status (i.e., the size of the projection). I assume that the feature of saP ensures the difference between finite clauses and infinite clauses. More specifically, some verbs select only an saP that has the feature [+finite] while some verbs select only an saP that does not have the feature [+finite].

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