

Article

On the Syntax of Instrumental Clauses: The Case of *Indem*-Clauses in German

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Abstract: In this article, I examine the external and internal syntax of instrumental *indem*-clauses in German. As a subordinating conjunction, *indem* takes a finite TP as its complement and triggers verb final position. I provide evidence showing that instrumental *indem*-clauses can only operate on the content level and that they cannot be interpreted epistemically, nor can they modify a speech act. Furthermore, I argue that although *indem*-clauses are restricted to a particular interpretation, they can attach at two distinct heights in the matrix clause. If they are analyzed as central adverbial clauses, they attach as T[ense]P[hrase] adjuncts. If, on the other hand, instrumental *indem*-clauses are treated as peripheral adverbial clauses, they are taken to be J[udge]P[hrase] adjuncts. Main evidence for the analysis comes from: i) variable binding and Principle C effects, ii) movement to the left periphery of the matrix clause, and iii) licensing conditions of weak and strong root phenomena.

Keywords: instrumental clause; adverbial clause; syntax; German; *indem*



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1. Setting the Scence

The main aim of this article is to examine the syntax of subordinate clauses headed by the instrumental complementizer *indem* ‘by’ in modern German, cf. (1).

- (1) Immerhin sorgte er verdächtig schnell für die Identifizierung von
anyway arrange.3SG.PST he suspiciously quickly for the identification of
Nadine Weimer, indem er auf Anhieb das *Pequeno Paraíso* angesteuert
Nadine Weimer *indem* he right away the *Pequeno Paraíso* head:for.PTCP
hatte.
have.3SG.PST
‘Anyway, he arranged the identification of Nadine Weimer suspiciously quickly by
heading for the hotel *Pequeno Paraíso* right away.’ (PS, p. 96)

Syntactically, *indem* heads a subordinate clause, connects it with the matrix clause, and triggers the final position of the finite verb. Semantically, *indem* introduces, as Sæbø (2015, p. 1435) puts it, an action as an instrument of another action. In (1), the action of quick heading for the hotel *Pequeno Paraíso* (and questioning its staff) is understood as an instrument of the action of quick arranging of Nadine Weimer’s identification. The task of the instrumental clause is to elaborate on the content of the matrix clause by providing more specific content.

The main argument supporting the view that *indem*-clauses are instrumental clauses comes from the observation that they are asked for by means of the *wh*-phrase *how* that can address methods, means, manners, and instruments, as exemplified in (2) (for more details

on the diversity of *how*-questions the interested reader is referred to [Jaworski \(2009\)](#) and [Sæbø \(2015\)](#).

(2) A: How did Judith handle the problem?

B: i) With great patience.

ii) With the help of an advanced software tool.

iii) By fixing the costs, taking a loan and hiring an expert.

([Jędrzejowski & Umbach, 2023](#), p. 3, ex. 6)

The subordinate *indem*-clause can, as well, be used as an answer to a *wie*-question, as the dialogue presented in (3) shows:

(3) A: Wie hatte er ihr geholfen?
how have.3SG.PST he her.DAT help.PTCP
'How did he help her?'

B: Indem er auf Anhieb das *Pequeno Paraíso* angesteuert hatte.
indem he right away the *Pequeno Paraíso* head:for.PTCP have.3SG.PST
'By heading for the hotel *Pequeno Paraíso* right away.'

I therefore follow [Sæbø's \(2015\)](#) definition in labeling *indem*-clauses as instrumental clauses.¹

Different studies have addressed the use of *indem* in modern German, cf. [Behaghel \(1905\)](#), [Stojanova-Jovčeva \(1976\)](#), [Pusch \(1980\)](#), [Homberger \(1996\)](#), [Zifonun et al. \(1997](#), pp. 1148, 2277–2278), [Fabricius-Hansen \(2000](#), pp. 337–338; 2011), [Engel \(2004](#), p. 281), [Breindl et al. \(2014](#), pp. 582–588), [Bücking \(2014](#), pp. 31–35), [Sæbø \(2015](#), pp. 1435–1436), [Pittner \(2016](#), p. 517). However, not much is known about the syntax of *indem*-clauses. The main aim of this article is therefore to examine their external and internal syntax, and to contribute to a deeper understanding not only of manner expressions but also of adverbial clauses.

This article is organized as follows. In Section 2, I set out the syntactic taxonomy of adverbial clauses in terms of their dependency relationship to the matrix clause. Section 3 is devoted to *indem*-clauses at the syntax-semantics interface. Whereas in Section 3.1, I outline semantic properties and restrictions of *indem*-clauses, in Section 3.2 external syntax is examined. In Section 4, I investigate internal syntax of instrumental *indem*-clauses and elaborate on their variation. Section 5 offers some cross-linguistic observations. Finally, Section 6 summarizes the most important findings and addresses open questions for future work.

2. Syntactic Typology of Adverbial Clauses

In what follows, I briefly delineate the syntactic typology of adverbial clauses advocated by [Haegeman \(2006, 2010, 2012, 2021\)](#), [Badan and Haegeman \(2022\)](#), [Schönenberger and Haegeman \(2023\)](#), and [Frey \(2011, 2012, 2016a, 2023a, 2023b, 2023c, 2023d\)](#). The typology is the theoretical basis for the analysis of *indem*-clauses that is given in the sections to follow. Since this article is about an adverbial clause type occurring in German, I present the typology using German data as well.

Adverbial clauses have been divided into three main groups, depending on the extent to which they are syntactically embedded into the matrix clause and at what structural height they attach to it, cf. (4).

(4) Three types of adverbial clauses:

a. central adverbial clauses (abbreviated as CACs)

b. peripheral adverbial clauses (abbreviated as PACs)

c. non-integrated adverbial clauses (abbreviated as NACs)

CACs are syntactically embedded clauses and attach at the TP level of the matrix clause, while PACs are considered less dependent and are often analyzed as JP² adjuncts. NACs are taken to be syntactically independent clauses having their own illocutionary force. Different tests are used to keep them apart, cf. Table 1.

Table 1. Selected tests for differentiating between the three types of adverbial clauses.

	CACs	PACs	NACs
variable binding	+	–	–
under the scope of matrix negation	+	–	–
movement to Spec-CP of the matrix clause	+	+	–
embedding together with its host clause	+	+	–
possible occurrence of weak root phenomena	–	+	+
possible occurrence of strong root phenomena	–	–	+

CACs and PACs differ in two main respects. Whereas the former allow variable binding, (5a), and can fall within the scope of matrix negation, (6a), the latter disallow variable binding, (5b),³ and are not sensitive to the elements occurring in the matrix clause, e.g., to negative operators, (6b).

- (5) a. Fast [jeder Anwesende]_i wurde bleich, weil [er]_i erschrocken
 nearly every become.3SG.PST pale because he frighten.PTCP
 ist.
 be.SG
 ‘Almost every attendant got pale because he was frightened.’
 (Frey, 2016a, p. 156, ex. 5a)
- b. *[Kein Kollege]_i wirkt richtig erholt, obwohl [er]_i lange im
 no colleague appear.3SG really recovered although he long in:the.DAT
 Urlaub war.
 holiday be.3SG.PST
 Intended: ‘No colleague seems recovered, although he has been on a long
 vacation.’
 (Frey, 2011, p. 53, ex. 24b)
- (6) a. Sein Freund ist nicht gegangen, weil sie noch Gesellschaftsspiele
 his friend be.3SG NEG go.PTCP because they still parlor:games
 spielen wollten.
 play.INFV wollten.3PL.PST
 a. ‘His friend didn’t go because they were still going to play parlor games.’
 (= the reason was the parlor games) OK(weil > ¬)
 b. ‘His friend didn’t go because they were still going to play parlor games (but
 because ...)’ OK(¬ > weil)
 (Eberhardt, 2017, e71, ex. 17)
- b. Max ist nicht gegangen, obwohl Maria kam *(sondern obwohl
 Max be.3SG NEG go.PTCP although Maria come.3SG.PST but although
 die Musik gut war).
 the music good be.3SG.PST
 a. ‘Max didn’t leave although Maria came.’ OK(obwohl > ¬)
 b. Intended: ‘Max didn’t leave although Maria came, but although the music got
 good.’ OK(¬ > obwohl)
 (Frey, 2020, p. 4, ex. 7b)

Based on the contrasts in (5) and in (6), we observe that causal *weil*-clauses should be analyzed as CACs, whereas concessive *obwohl*-clauses are either PACs or NACs. Since they can occur in the prefield position of the matrix clause, (9b), they clearly qualify as PACs.

A further difference between CACs and PACs concerns the occurrence of root phenomena. They are divided into weak and strong root phenomena. Weak root phenomena involve a subjective judgement that is often expressed by modal particles and adverbs associated with the C-domain. Strong root phenomena, in turn, are primarily phenomena of spoken language that express a modification or a qualification of a speech act and contain question tags and interjections. An overview of selected root phenomena in German is presented in (7).

(7) Root phenomena in German

a. weak root phenomena:

- i. modal particles: *ja, denn, wohl, eben, doch, halt, einfach, eigentlich*
- ii. adverbs: *wahrscheinlich* ‘probably’, *angeblich* ‘allegedly’, *leider* ‘unfortunately’, *glücklicherweise* ‘fortunately’, *offensichtlich* ‘obviously’, *offenbar* ‘apparently’, *anscheinend* ‘seemingly’

b. strong root phenomena:

- i. question tags: *oder etwa nicht?* ‘isn’t that so’, *hab ich recht?* ‘am I right?’, *nicht wahr?* ‘isn’t that so?’
- ii. interjections: *Mann* ≈ ‘Dude’, *verdammt* ‘damn’

By using the modal particle *ja*, as [Thurmair \(1989\)](#) argues, the speaker asserts *p* and indicates that *p* is known to both speaker and hearer. [Grosz \(2021, p. 9\)](#) points out that there are two components of *ja*: “(i) some type of *factuality* component—that is, a speaker of a *ja*-containing utterance conveys at a non-truth-conditional level (e.g., as a presupposition) that the modified proposition is true; and (ii) some type of *uncontroversiality* component—that is, the notion that the modified proposition is uncontested”, (8).

$$(8) \llbracket ja \rrbracket(p) \rightsquigarrow \underbrace{p \text{ is true}}_{\text{FACTUALITY}} \text{ and } \underbrace{\text{speaker believes } p \text{ uncontroversial}}_{\text{UNCONTROVERSIALITY}} \quad (\text{Grosz, 2021, p. 9, ex. 13})$$

- (9) a. *[Keiner von uns]_i ist verzweifelt, weil [er]_i ja kein Geld hat.
 no:one of us.DAT be.3SG desperate because he MP no money have.3SG
 Intended: ‘No one of us is desperate because he has no money.’
 ([Frey, 2016a](#), p. 167, ex. 42b)
- b. Obwohl Max ja häufig unterbrochen wurde, blieb er
 although Max MP frequently interrupt.PTCP PASS.AUX.3SG.PST stay.3SG.PST he
 ruhig.
 calm
 ‘Although Max was frequently interrupted, he remained calm.’
 ([Frey, 2020](#), p. 8, ex. 23b)

As the contrast between (9a) and (9b) shows, causal *weil*-clauses used as CACs do not allow weak root phenomena, concessive *obwohl*-clauses, on the other hand, do not exhibit such a restriction, leading to the conclusion that they cannot be treated as CACs.⁴

NACs behave differently and contrast to both CACs and PACs in several respects, too. As they are syntactically not embedded and possess their own illocutionary force, they can host expressions modifying a speech act. Questions tags like *hab ich recht?* (‘am I right?’) add an inquisitive illocutionary act to an assertion and invite the hearer to give a yes-no answer. The interjection *Mann* ‘Man’, in turn, leads to, as [Frey \(2020\)](#) observes, a (rather rude)

strengthening of the illocutionary force, and expresses a strong emotional involvement of the speaker concerning *p*. Their licensing in adverbial clauses depends on the clause type. Let us stick to concessive clauses to illustrate some differences. Concessive clauses can be headed by the dedicated complementizer *although* ‘although’ or be introduced by moving the finite verb to the C^0 position, by leaving the prefield position empty, and by using the modal particle *auch* (lit. ‘also’).⁵ While, in the former case, strong root phenomena are ruled out, (10a) and (10c), verb first concessives do not exhibit such restrictions, as (10b) and (10d) persuasively show (taken from Frey, 2020).

- (10) a. ??[Obwohl Maria sehr begabt ist, hab ich recht?], hat sie
 although Maria very talented be.3SG have.1SG I right have.3SG she
 nicht schnell promoviert.
 NEG quickly graduate.PTCP
 Intended: ‘Maria didn’t graduate quickly although she is very talented, am I right?’
- b. Maria hat nicht schnell promoviert, [ist sie auch sehr begabt,
 Maria have.3SG NEG quickly graduate.PTCP be.3SG she also very talented
 hab ich recht?]
 have.1SG I right
 ‘Maria hasn’t graduated quickly although she is very talented, am I right?’
- c. *[Obwohl Max echt wenig gearbeitet hat, Mann], hat er die
 although Max MP wenig work.PTCP have.3SG man have.3SG he the
 Prüfung brilliant gemeistert.
 exam brilliantly master.3PTCP
 Intended: ‘Max passed the exam although he really didn’t work much, man.’
- d. Max hat die Prüfung bestanden, [hat er auch echt wenig
 Max have.3SG the exam pass.PTCP have.3SG he MP MP little
 gearbeitet, Mann].
 work.PTCP man
 ‘Max passed the exam although he really didn’t work much, man.’

We can therefore conclude that verb first concessives should be analyzed as NACs. By virtue of being NACs, they are also expected to host weak root phenomena. This prediction is borne out, cf. (11a) for the modal particle *ja*, and (11b) for the epistemic adverb *wahrscheinlich* ‘probably.’

- (11) a. Die beiden Männer waren sehr glaubwürdig, sind sie ja auch echte
 the both men be.3PL.PST very credible be.3PL they MP MP real
 Schauspieler.
 actors
 ‘The both men were very credible although they are real actors.’
- b. Die Planeten sind relativ dunkel, enthalten sie auch wahrscheinlich
 the planets be.3PL relatively dark contain.3PL they MP probably
 Eis.
 ice
 ‘The planets are relatively dark although they probably contain ice.’

Furthermore, verb first concessive clauses disallow variable binding, (12a), and are not sensitive to material occurring in the matrix clause, (12b), similarly to PACs. Unlike PACs, however, they cannot appear in the Spec-CP position of the matrix clause, (12c), and they are not embeddable together with the host clause, (12d). The following examples are taken from Frey (2020) and demonstrate these restrictions.

- (12) a. *[Keiner]_i wurde bleich, ist [er]_i auch erschrocken.
 no:one PASS.AUX.3SG.PST pale be.3SG he MP frightened
 Intended: ‘No one turned pale when he got frightened.’
- b. *Max ist nicht gegangen, kam auch Maria, sondern war
 Max be.3SG NEG go.PTCP come.3SG.PST MP Maria but be.3SG.PST
 auch die Musik gut.
 MP the music good
 Intended: ‘Max didn’t leave although Maria came but although the music got good.’
- c. *Ist sie auch sehr begabt, hat Maria nicht schnell promoviert.
 be.3SG she MP very talented have.3SG Maria NEG quickly graduate.PTCP
 Intended: ‘Although she is very talented, Maria hasn’t graduated quickly.’
- d. *Hans denkt, [dass Maria nicht schnell promovieren wird, ist sie
 Hans think.3SG that Maris NEG quickly graduate.INFV will.3SG be.3SG she
 auch sehr begabt].
 MP very talented
 Intended: ‘Hans thinks that Maria won’t graduate quickly although she’s very talented.’

In his recent work, Frey (2023c, 2023d) refines the typology of adverbial clauses and proposes to distinguish two distinct types of clauses appearing outside the matrix clause structure, (13).

- (13) External adverbial clauses:
- a. world-related external adverbial clauses (abbreviated as W-ExtAdvCls)
 - b. discourse-related external adverbial clauses (abbreviated as D-ExtAdvCls)

W-ExtAdvCls refer to the world or to a conceptualization of the world and contribute to the propositional meaning of an utterance, whereas by using D-ExtAdvCls the speaker links his or her speech act to a discourse context and to discourse participants. Furthermore, D-ExtAdvCls do not contribute to the propositional meaning of an utterance and have a conversation controlling function. Verb first concessive clauses, (10b), and irrelevance conditional clauses, (14a), for example, are considered W-ExtAdvCls. In turn, relevance conditionals, (14b), and speech act related adverbials, (14c), are analyzed as D-ExtAdvCls.

- (14) a. Ob es regnet oder nicht – wir gehen spazieren.
 whether it rain.3SG or NEG – we go.1PL walk.INFV
 ‘Whether it is raining or not – we will go for a walk.’
 (d’Avis, 2004, p. 141, ex. 2a)
- b. Wenn Sie sich erinnern, das Buch erschien erstmals im Jahr 1982.
 if you REFL recall.3PL the book appear.3SG.PST first:time in:the year 1982
 ‘If you recall, the book appeared for the first time in 1982.’
 (Thim-Mabrey, 1988, p. 56)
- c. Um ehrlich zu sein, ich habe nie viel von Kriminalromanen
 in:order honestly to be.INFV I have.1SG never much of crime:novels
 gehalten.
 hold.PTCP
 ‘To be honest: I always had a low opinion of crime novels.’
 (Pittner, 1999, p. 357, ex. 71)

What W-ExtAdvCls and D-ExtAdvCls have in common are two properties: i) They are NACs. ii) They often trigger the so-called verb third position in the matrix clause, whereby the adverbial clause occurs to the left of the matrix clause, Spec-CP is occupied by a

constituent, and the finite verb follows. However, W-ExtAdvCls and D-ExtAdvCls also differ. For example, W-ExtAdvCls must follow D-ExtAdvCls if they co-occur to the left of the matrix clause, cf. (15a) vs. (15b). If, on the other hand, they co-occur to the right of the matrix clause, D-ExtAdvCls must follow W-ExtAdvCls, cf. (15c) vs. (15d) (examples adopted from Frey, 2023c).

- (15) a. [D-ExtAdvCls Wenn du mich fragst], [W-ExtAdvCls wer immer das war],
 if you me.ACC ask.2SG who always that be.3SG.PST
 er muss für den Schaden aufkommen.
 he must.3SG for the.ACC damage pay.INFV
 ‘If you ask me, whoever it was, he must pay for the damage.’
- b. *[W-ExtAdvCls Wer immer das war], [D-ExtAdvCls wenn du mich
 who always that be.3SG.PST if you me.ACC
 fragst], er muss für den Schaden aufkommen.
 ask.2SG he must.3SG for the.ACC damage pay.INFV
- c. Ich gehe jetzt, [W-ExtAdvCls wenn du auch der Chef bist],
 I go.1SG now if you also the boss be.2SG
 [D-ExtAdvCls um das ganz offen zu sagen].
 in:order that totally openly to say.INFV
 ‘To put it bluntly, I’m going now even if you are the boss.’
- d. *Ich gehe jetzt, [D-ExtAdvCls um das ganz offen zu sagen],
 I go.1SG now in:order that totally openly to say.INFV
 [D-ExtAdvCls wenn du auch der Chef bist].
 if you also the boss be.2SG
 Intended: ‘To put it bluntly, I’m going now even if you are the boss.’

Frey (2023d) also observes further striking differences. i) W-ExtAdvCls can be used parenthetically without strong prosodic signs of separation, whereas D-ExtAdvCls behave more like an interruption. ii) Only W-ExtAdvCls can follow a coordinating conjunction. iii) D-ExtAdvCls can stand alone more easily than W-ExtAdvCls without a uniquely given host. iv) The semantic scope of D-ExtAdvCls, but not that of W-ExtAdvCls, may encompass the content of several subsequent sentences. I will not discuss these differences in detail here because as we will see below *indem*-clauses cannot appear outside the matrix clause, meaning that they can be used neither as W-ExtAdvCls nor as D-ExtAdvCls. It should be kept in mind, though, that W-ExtAdvCls and D-ExtAdvCls constitute two distinct types of clauses that operate on two distinct levels. While W-ExtAdvCls are handled by sentence grammar, D-ExtAdvCls are handled by discourse grammar.

Bringing together all the observations made in this section leads to five distinct attachment heights of adverbial clauses in general:

- (16) Adverbial clauses can attach at the following heights:
- CACs attach as TP adjuncts,
 - PACs attach as JP adjuncts,
 - NACs attach as ActP adjuncts,
 - W-ExtAdvCls (in the left outerfield (= *Außenfeld*) position) are ActP adjuncts, and
 - D-ExtAdvCls attach as adjuncts via cooptation from the domain of sentence grammar to the separated domain of discourse grammar (cf. Kaltenböck et al., 2011).

In Section 3.2, I examine the syntax of *indem*-clauses to figure out whether they can be analyzed as CACs, PACs, NACs, W-ExtAdvCls, or D-ExtAdvCls. But first I briefly describe their meaning.

3. Instrumental *Indem*-Clauses in Modern German

3.1. Semantics

The meaning of *indem*-clauses has been examined in Behrens and Fabricius-Hansen (2002) and Bücking (2014). In this section, I summarize the most important findings from both studies and elaborate on the issues that are crucial for a better understanding of the syntax of *indem*-clauses.

Indem-clauses are often considered classical cases of elaboration, whereby, as Halliday (1994, p. 220) puts it, “one clause expands another by elaborating on it or some portion of it by restating in other words, specifying in greater detail, commenting, or exemplifying”. Bücking (2014, p. 25) argues that the embedded event must be conceivable as one of the matrix type. In (1), for example, the author elaborates on the way that the matrix subject acted to identify Nadine Weimer, namely by immediate investigation of the hotel *Pequeno Paraíso*.

The elaboration definition of instrumental *indem*-clauses given above means that we take the embedded proposition to describe the same eventuality as the proposition expressed in the matrix clause in a more specific or less abstract manner. Such a dependency relationship between the matrix clause and the subordinate clause may often impose semantic restrictions on the latter. One of the restrictions, as pointed out by Behaghel (1905) and specified by Behrens and Fabricius-Hansen (2002) for instrumental *indem*-clauses, is subject identity:

“In order for the elaborating clause to contribute with an event which ‘matches’ the underspecified subevent in the matrix, Agent Identity is required.”
(Behrens & Fabricius-Hansen, 2002, p. 47)

“[...], the *indem*-clause [...] specifies the causing subevent of the matrix clause event (complex); thus, *indem* relates the two clauses by way of Elaboration [...], introduces an event referent *e*₂ to be identified with the causing event referent *e*₁ that is presupposed by the main clause (S1). This means, among other things, that there must be an Agent of *e*₂ to be identified with *x*—the Agent of the matrix clause event (complex) *e*₁. Likewise, the time and location of *e*₂ must be identical to or part of the time and location of *e*₁.”
(Behrens & Fabricius-Hansen, 2002, p. 48)

The restriction of the subject’s identity was also noticed by Stojanova-Jovčeva (1976, p. 116), who argues that *indem*-clauses can be analyzed as adversative, temporal or modal adverbial clauses and who shows by means of corpus examples that it is too strong because subjects may differ. Since I focus solely on instrumental *indem*-clauses in the present paper, the question of how non-instrumental *indem*-clauses behave will not be discussed here. However, I think that instrumental *indem*-clauses do not always require subject identity, as the following example illustrates:

- (17) Beschwerden sollen verschwinden, indem die Selbstheilungskräfte
complaints should.3PL disappear.INFV *indem* the self-regulating:forces
angeregt werden, sei es mit Nadeln, Spritzen, mit
stimulate.PTCP PASS.AUX.INFV be.3SG.KONJ I it with needles syringes with
Sauerstoff oder Tropfen.
oxygen or drops
‘Complaints should disappear by activation of self-regulating forces, be it with
needles, syringes or with oxygen or drops.’ (DeReKo, *stern*, 16 June 1987)

It clearly follows from (17) that self-regulating forces are expected to make the complaints disappear. They cannot be co-referential, nor can they be activated one by another. No subject identity is therefore involved in (17). The content of the *indem*-clause itself, in turn,

is conceived of as the instrument by which we can make complaints disappear. In addition, (17) highlights two related issues. First, it indicates that agentivity is not the right notion to invoke, as *verschwinden* ‘disappear’ has no agent argument at all, and although the passive in the *indem*-clause has an implicit agent, it is not in any obvious sense identified with an argument of the matrix clause. Second, we might want to salvage some sort of identity condition on *indem*-clauses by arguing that in (17), and similar such examples, the identity requirement plays itself out at the level of implicit arguments of the predicates involved (the implicit agent of *anregen* ‘stimulate’, and perhaps a source argument in the case of *verschwinden* ‘disappear’). It seems highly unlikely, however, that in the particular case of (17) such an approach would get much mileage.⁶

The second lexical restriction observed in the literature refers to the type of eventualities the *indem*-clause can host. Behrens and Fabricius-Hansen (2002) claim that *indem* is restricted to, or preferably occurs with, clauses that describe activities or accomplishments. Bücking (2014, pp. 31–32) states this restriction more precisely. First, he shows that statives such as *gefallen* ‘please’, *wiegen* ‘weigh’, *ähneln* ‘resemble’, *auffallen* ‘stand out’, and constructions with the copula *be* are deviant with *indem*, cf. e.g. (18). Second, as the contrast between (19a) and (19b) clearly indicates, the stative restriction applies only to the proposition expressed in the subordinate clause, and not to the proposition encoded in the matrix clause.

- (18) ??Paula gefiel allen, indem sie Marilyn Monroe ähnelte.
 Paula please.3SG.PST all.DAT *indem* she Marilyn Monroe resemble.3SG.PST
 Intended: ‘Paula pleased everyone by resembling Marilyn Monroe.’
 (Bücking, 2014, p. 31, ex. 45a)
- (19) a. ??Er erregte Aufsehen, indem er ein Gentleman war.
 he cause.3SG.PST sensation *indem* he a gentleman be.3SG.PST
 Intended: ‘He caused a sensation by being a gentleman.’
 (Bücking, 2014, p. 31, ex. 46a)
- b. Er erregte Aufsehen, indem er sich wie ein Gentleman verhielt.
 he cause.3SG.PST sensation *indem* he REFL like a gentleman behave.3SG.PST
 ‘He caused a sensation by behaving like a gentleman.’
 (Bücking, 2014, p. 32, ex. 46b)

Correspondingly, *indem* requires an event controlled by an agent, whereas the predicate of the matrix clause allows for all aspectual classes.

Finally, I would like to elaborate on one issue that has not previously been examined in connection with *indem*-clauses.

Adverbial clauses can usually operate on three cognitive levels: i) the content level, ii) epistemic level, and iii) speech act level, giving rise to three distinct interpretations. Frey (2016a) persuasively demonstrates that causal *weil*-clauses in modern German can operate on all three levels:

- (20) a. Maria ist sehr bleich, weil sie krank ist.
 Maria be.3SG very pale because she ill be.3SG
 ‘Maria is very pale because she is ill.’
- b. Maria ist krank, weil sie so bleich ist.
 Maria be.3SG ill because she so pale be.3SG
 ‘Maria is ill because she is so pale.’
- c. Maria ist krank, weil du dich doch immer für sie
 Maria be.3SG ill because you REFL MP always for her.ACC
 interessierst.
 be:interested.2SG
 ‘Since you are always interested in Maria, she is ill.’ (Frey, 2016a, p. 154, ex. 1a–c)

In the content domain, (20a), the proposition embedded in the causal clause is interpreted as a fact causing another fact. Concretely, the fact that Maria is ill is an explanation for why she is pale. Following Davidson (1967), R. Larson (2004, pp. 31–34), Frey (2016a, pp. 168–169), and R. K. Larson and Sawada (2012), I argue that *weil* in (20a) relates two eventualities (instead of two propositions), and refer to such clauses as eventuality related clauses (= ERC).⁷ A different interpretation arises on the epistemic level. In (20b), the speaker specifies the reason for why she or he thinks the content of the matrix clause is true. Based on this line of reasoning, the speaker takes the event of Maria’s being pale to be a reasonable argument by which to assume that she is ill. There is some (in)direct evidence perceived by the speaker that allows her or him to make such an assumption. Here I follow Morreall (1979) by labelling such clauses as evidential clauses (= EC). Finally, the *weil*-clause in (20c) provides the motivation for why the speaker is performing a speech act. A natural paraphrase of (20c) could then be *I’m telling you that Maria is ill, and the reason why I’m making this statement is that you are always interested in her*. I refer to such clauses as speech act related clauses (= SAR). What is interesting about (20a)–(20c) is that they receive a different semantic interpretation, although they are all headed by a single subordinating conjunction.⁸

The observation that causal *weil*-clauses can operate on these three cognitive levels is not surprising for two main reasons. First, causal clauses in other languages can express all three relations too, cf. Morreall (1979), Sweetser (1990) for *because*-clauses in English and Ángantýsson and Jędrzejowski (2023) for *af-pvi-að*-clauses in Icelandic. Second, some other types of adverbial clauses can also operate on these three cognitive levels, cf. van Dijk (1977, pp. 68–76), Takami (1988), and Ros (2005) for conditional clauses, Breindl (2015a) for irrelevance conditional clauses, Breindl (2015b), Antomo and Steinbach (2013), and Frey (2020) for concessive clauses, and Jędrzejowski et al. (2022) and Ángantýsson et al. (2023) for exceptive clauses.

How do instrumental *indem*-clauses behave? It has been observed in the literature (see Table 2) that they are restricted to eventuality related interpretations, (21a):

- [...]; vollspezifiziert schließlich sei *indem*, das ausschließlich propositionale Verknüpfungen zulässt. (Breindl et al., 2014, p. 189)
- ‘[...] finally, the use of *indem* is fully specified, as it can operate on the content/propositional level only.’

Both evidential and speech act related interpretations are ruled out, as (21b) and (21c) show, respectively.

- (21) a. Du gehst mir auf die Nerven, indem du ständig nachfragst.
you go.2SG me.DAT on the nerves *indem* you constantly ask:again.2SG
‘You get on my nerves by keeping asking all the time.’
- b. *Du musst ihn beleidigt haben, indem du ihn heute
you must.2SG him.ACC offend.PTCP haben.INFV *indem* you him.ACC today
Abend komplett ignoriert hast.
evening totally ignore.PTCP have.2SG
- c. *Indem du ständig nachfragst, du gehst mir auf die Nerven.
indem you constantly ask:again.2SG you go.2SG me.DAT on the nerves
Intended: ‘By keeping asking all the time, you get on my nerves.’

Table 2. Interpretations of causal *weil*- and instrumental *indem*-clauses in modern German.

	eventuality related	evidential	speech act related
<i>weil</i> -clause	+	+	+
<i>indem</i> -clause	+	–	–

It is not clear to me why instrumental *indem*-clauses cannot operate on the other two levels. As far as the evidential domain is concerned, it is hard to imagine a context in which an event is taken to specify another event and in which, at the same time, the latter event is taken by the speaker to be evidence for the assumption that the matrix clause might be true. As for the speech act level, it is rather difficult to imagine that the speaker uses an instrumental clause as motivation for uttering a speech act. There might be other ontological reasons for these gaps and more reasoning is needed in this respect.

Nevertheless, we can already safely conclude at this point that *indem*-clauses cannot be D-ExtAdvCls because they cannot operate on the discourse level. If *indem*-clauses then operate on the sentence level only, and are not available in the discourse domain, we expect them to be a target of linguistic material, i.e. of anaphoric expressions. This prediction is borne out:

- (22) A: Er hat mich beleidigt, indem er mich heute Abend
 he have.3SG me.ACC offend.PTCP *indem* he me.ACC today evening
 vollkommen ignoriert hat.
 completely ignore.PTCP have.3SG
 'He offended me tonight by ignoring me completely.'
 B: Das stimmt (nicht; er hat dir zugezwinkert).
 that be:true.3SG NEG he have.3SG you.DAT wink.PTCP
 'That's (not) true; (he gave you a wink).'

In (22), in the response of speaker B, the anaphoric expression *das* 'that' takes up the proposition that the embedded subject ignored someone tonight. This is supported by the continuation phrase *er hat dir zugezwinkert* 'he gave you a wink' when speaker B disagrees with speaker A.

I now move on to examine the syntactic properties of *indem*-clauses to better determine the degree of their dependency.

3.2. Syntax

To the best of my knowledge, the syntax of *indem*-clauses has not been investigated in the literature. The aim of this section is to fill this gap.

3.2.1. Verb Position Within the *Indem*-Clause

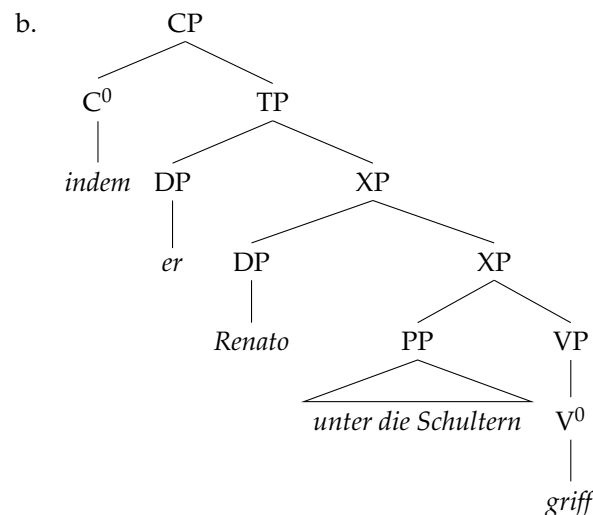
German is an asymmetric language with respect to the position of the finite verb. In independent declarative clauses, the finite verb occupies the second position in the clause structure by moving from the V^0 to the C^0 position, (23a), whereas in subordinate clauses it remains in situ, (23b). The V-to-C movement is blocked by a subordinating element that indicates a dependency relationship between the matrix clause and the subordinating clause; cf. [den Besten \(1983\)](#) and [Haider \(1986, 2010: pp. 45–85\)](#), among many others, for more details.

- (23) a. [_{CP} Der Lehrer [_C⁰ liest]_i jeden Monat [_{VP} einen Krimiroman [_V⁰ *t_i*]]].
 the teacher read.3SG every month a.ACC crime:novel
 'The teacher reads a crime novel every month.'
 b. [_{CP} [_C⁰ dass] der Lehrer jeden Monat [_{VP} einen Krimiroman [_V⁰ liest]]]
 that the teacher every month a.ACC crime:novel read.3SG
 'that the teacher reads a crime novel every month'

In (23b), the declarative complementizer *dass* 'that' blocks movement of the finite verb *liest* 'reads' to the C^0 position. It introduces a subordinate clause and establishes a dependency relationship between two propositions (for the meaning of *that* see [Kratzer \(2006\)](#) and

Moulton (2009)). Likewise, *indem* blocks movement of the finite verb *griff* ‘grasped’ to the C-domain in (24). The finite verb must remain within the VP domain.

- (24) a. Er befreite sie von der Last, indem er Renato unter die Schultern griff.
 he release.3SG.PST her.ACC of the.DAT load *indem* he Renato under the shoulders grasp.3SG.PST
 ‘He relieved her of the load by taking Renato under the shoulders.’ (PE, p. 171)



Syntactically *dass* and *indem* have three properties in common: a) they are base-generated as C-heads, b) they make the finite verb stay in situ, and c) they take finite clauses as their complements.⁹ The verb final position in the *indem*-clause points to the presence of a subordinate clause.

One of the anonymous reviewers of this article raised a question about the morphological make-up of *indem*, and wonders whether it is a complementizer or a preposition taking a case-inflected demonstrative as its complement. I argue that *indem* is a complementizer, i.e., a C-head, in modern German. In what follows, I outline two arguments supporting this view, one from the diachrony and one from the synchrony of *indem*-clauses.

First, in older German *indem*-clauses are often combined with the declarative complementizer *dass* ‘that’, (25), as pointed out by Paul (1897, pp. 232–233), Behaghel (1928, pp. 189–192), Ebert et al. (1993, p. 477), Breindl et al. (2014, pp. 582–583), and Greisinger (2016, pp. 120–123), to mention just a few.

- (25) so laufen die Blättlein, indem daß sie trocknen, also zusammen
 so run.3PL the leaves *indem* that they dry.3PL so together
 ‘so fall the leaves by drying, that is, together’

(Peter Pomet, 1717, *Der aufrichtige Materialist und Specerey-Händler*, p. 176; cit. in Greisinger, 2016, p. 122, ex. 39)

- (26) [PP inP⁰ [DP dem_D⁰ [CP dass_C⁰ [...]]]] →
 [CP [indem dass]_C⁰ [...]] →
 [CP [indem]_C⁰ [...]] (Greisinger, 2016, p. 122)

I agree that *indem* used to be a PP, but it changed its status diachronically by developing into a C-head. According to Greisinger (2016), this process happened in the 18th cent., cf. (26). In (25), *indem* co-occurs with *daß* ‘that’, whereby the latter’s function is to introduce a subordinate clause and to make the finite verb remain in situ. It does not contribute any meaning. Over time, *indem* takes over the syntactic function of the declarative complementizer, making its presence redundant. Although this is one of the last steps of this language

change process, it clearly shows, at least from a diachronic point of view, that *indem* is a C-head in modern German.

Second, S. Müller (1999, pp. 100, 202–203) observes that a PP can be extracted from another PP:

- (27) [PP Mit Norwegen]_i befinden wir uns allerdings [PP in einem langfristigen
with Norway be.3PL we REFL however in a.DAT longterm
Stellungskrieg t_i].
positional:war
'With Norway, however, we are engaged in a long-term positional war.'
(S. Müller, 1999, p. 100, ex. 9.30a)

In (27), the PP *mit Norwegen* 'with Norway' is base-generated within the PP *in einem langfristigen Stellungskrieg* 'in a long-term positional war' and moved to the Spec-CP position, crossing the finite verb in the C-position. If instrumental *indem*-clauses were PPs, we should be able to extract other PPs from them. This is, however, not the case.

- (28) a. Max hat Lena beleidigt, indem er [PP mit ihrer besten Freundin]
Max have.3SG Lena offend.PTCP *indem* he with her.DAT best friend
[PP über ihre Ex-Freunde] gesprochen hat.
over her ex-friends speak.PTCP have.3SG
'Max offended Lena by talking to her best friend about her ex-friends.'
b. *[PP Mit ihrer besten Freundin]_i hat Max Lena beleidigt, [PP indem
with her.DAT best friend have.3SG Max Lena offend.PTCP *indem*
er t_i [PP über ihre Ex-Freunde] gesprochen hat].
he over her ex-friends speak.PTCP have.3SG
c. *[PP Über ihre Ex-Freunde]_i hat Max Lena beleidigt, [PP indem er
over her ex-friends have.3SG Max Lena offend.PTCP *indem* he
[PP mit ihrer besten Freundin] t_i gesprochen hat].
with her.DAT best friend speak.PTCP have.3SG

If *in* were a P-head in *indem*, we should be able to extract a PP out of the *indem*-clause. But as (28b) and (28c) convincingly show, PP extraction leads to ungrammatical results. This problem disappears once we assume that *indem* is a C-head. In this case, it constitutes a barrier in the sense claimed by Chomsky (1986) and blocks movement.

Another synchronic argument underpinning the claim that *indem* is a C-head is discussed in Section 3.2.4 below.

In what follows, I examine the extent to which *indem*-clauses depend on the matrix clause.

3.2.2. Constituent Status

When subordinate clauses are constituents of their matrix clause, they can be usually asked about using a *wh*-question and used as an answer to this question. (3), repeated below as (29), shows that *indem*-clauses are constituents of the matrix clause.

- (29) A: Wie hatte er ihr geholfen?
how have.3SG.PST he her.DAT help.PTCP
'How did he help her?'
B: Indem er auf Anhieb das *Pequeno Paraíso* angesteuert hatte.
indem he right away the *Pequeno Paraíso* head:for.PTCP have.3SG.PST
'By heading for the hotel *Pequeno Paraíso* right away.'

Asking a question with the *wh*-phrase *how* 'how', speaker A asks for the way in which someone was helped. Speaker B replies by using an *indem*-clause. In doing so, she or he specifies the action of helping.

3.2.3. Position of the *Indem*-Clause

Behrens and Fabricius-Hansen (2002, p. 48, fn 2) mention in passing that “*indem*-clauses may follow or precede their matrix clause, or occur in the so-called middle field, in the medial position of a free adverbial”. In fact, instrumental *indem*-clauses are not restricted to any particular position in the matrix clause. They can occur on its right edge following the matrix VP (= *Nachfeld*), (30a), in the middle field, (30b)¹⁰, and in the prefield (*Vorfeld*) position of the matrix clause, i.e. in Spec-CP, (30c):

- (30)

a.

Er befreite_i sie [VP von der Last t_i], indem er Renato unter

he release.3SG.PST her.ACC of the.DAT load *indem* he Renato under

die Schultern griff.

the shoulders grasp.3SG.PST

‘He relieved her of the load by taking Renato under the shoulders.’ (PE, p. 171)

b.

Wohl gewinnt_i [Spec-TP Seeman], indem er das Leid der Betroffenen

presumably win.3SG seaman *indem* he the sorrow of:the victims

erfasst, emotionale Wirkungen t_i, aber [...].

apprehend.3SG emotional effects but [...]

‘Presumably, the seaman will get emotional effects by apprehending the victims’

sorrow, however [...].’ (Stojanova-Jovčeva, 1976, p. 113, ex. 2)

c.

[CP [Spec-CP Indem er anderen half], [C⁰ würde] er indirekt

indem he others.DAT help.3SG.PST would.3SG he indirectly

auch das Unrecht bekämpfen], das ihm selbst widerfahren war.

also the injustice fight.INFV that him.DAT himself happen.PTCP be.3SG.PST

‘By helping others, he would also fight the injustice indirectly that happened to

himself.’ (PE, p. 166)

Behrens and Fabricius-Hansen (2002, p. 48, fn. 2) point out that *indem*-clauses occur most frequently in the *Nachfeld* position. Similar observations are made in Stojanova-Jovčeva (1976, p. 113), who examined 303 occurrences of *indem*-clauses in different genres. In her corpus, *indem*-clauses predominantly occur on the right edge of the matrix clause Table 3:¹¹

Table 3. Position of the *indem*-clause in Stojanova-Jovčeva’s (1976) corpus.

<i>Vorfeld</i>	<i>Mittelfeld</i>	<i>Nachfeld</i>	‘standalone’
11.9%	6.6%	79.2%	2.3%

Based on the order of subordinate clauses proposed by Haider (1994, 1995, 1997) and Pittner (1999), (31), *indem*-clauses used as adverbial clauses are expected to occur on the right edge of the *Nachfeld*, i.e., they are expected to follow both relative and complement clauses.

- (31)

[*Nachfeld* relative clause > complement clause > adverbial clause]

This expectation is borne out, as (32) and (33) convincingly show (whereby the symbol ‘>’ means ‘precedes’ in terms of the linear order of subordinate clauses).^{12,13}

- (32)

a.

relative clause > *indem*-clause

Der Anwalt kümmert sich um die Angelegenheit, die seinen

the lawyer care.3SG REFL about the issue which his.ACC

Mandanten nicht schlafen lässt, indem er mit dem Finanzamt

client.ACC NEG sleep.INFV let.3SG *indem* he with the.DAT tax:office

verhandelt.

negotiate.3SG

‘The lawyer deals with the issue which doesn’t let his client sleep by negotiating

with the tax office.’

b. *indem*-clause > relative clause

??Der Anwalt kümmert sich um die Angelegenheit, indem er mit dem Finanzamt verhandelt, die seinen Mandanten nicht schlafen lässt.

(33) a. complement clause > *indem*-clause

Ein Anwalt erklärt seinem Mandanten, dass er Anspruch auf
a lawyer explain.3SG his.DAT client.DAT that he right on
Arbeitslosengeld hat, indem er die entsprechenden
unemployment:benefit have.3SG *indem* he the corresponding
Voraussetzungen und gesetzlichen Regelungen erläutert.
requirements and legal regulations elucidate.3SG
'A lawyer explains to his client that he is entitled to file for unemployment
benefits by explaining to him the corresponding requirements and legal
regulations.'

b. *indem*-clause > complement clause

?Ein Anwalt erklärt seinem Mandanten, indem er die entsprechenden Voraussetzungen und gesetzlichen Regelungen erläutert, dass er Anspruch auf Arbeitslosengeld hat.

If *indem*-clauses co-occur with other types of adverbial clauses, they usually precede them. If they occur after them, the less natural word order seems to be driven by information-structural reasons.

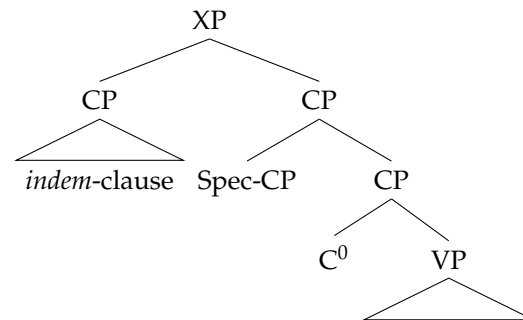
(34) a. Sie beleidigte ihn, indem sie ihn nicht beachtete, weil
she offend.3SG.PST him.ACC *indem* she him.ACC NEG notice.3SG.PST because
sie ihm feindlich gesonnen war.
she him.DAT hostile minded be.3SG.PST
'She offended him by not taking notice of him.'b. Sie beleidigte ihn, weil sie ihm feindlich gesonnen
she offend.3SG.PST him.ACC because she him.DAT hostile minded
war, indem sie ihn nicht beachtete.
be.3SG.PST *indem* she him.ACC NEG notice.3SG.PST

'She offended him because she felt hostility towards him by not taking notice of him.'
(Pittner, 1999, p. 314, ex. 222a,b)

While in (34a) the *indem*-clause precedes the causal *weil*-clause, the reverse order is given in (34b). The former order is strongly preferred over the latter one, and it sounds more natural. This is to some extent expected if we recall the possibility of occurring *indem*-clauses in place of canonical complement clauses headed by the declarative complementizer *dass* 'that', cf. Section 3.2.4 below for more details.

Furthermore, *indem*-clauses cannot appear outside the matrix clause structure, in the so called *Außenfeld* position, (36), and trigger verb third position in the matrix clause, as the examples in (35), slightly modified versions of (30), show:

- (35) a. *[CP Indem er Renato unter die Schultern griff], [CP [_{Spec-CP} er] [_C⁰ befreite] sie von der Last.
b. *[CP Indem er das Leid der Betroffenen erfasst], [CP [_{Spec-CP} Seemann] [_C⁰ gewinnt] wohl emotionale Wirkungen, aber [...]].
c. *[CP Indem er anderen half], [CP [_{Spec-CP} er] [_C⁰ würde] indirekt auch das Unrecht bekämpfen], das ihm selbst widerfahren war.

(36) Instrumental *indem*-clauses as potential W-ExtAdvCls:

The ungrammaticality of (35a)–(35c) provides strong evidence for one important observation, viz. *indem*-clauses cannot be W-ExtAdvCls, i.e. adverbial clauses that occur in the left outerfield (= *Außenfeld*) position, that attach as ActP adjuncts, and that are still handled by sentence grammar, contributing to the propositional meaning of the utterance.

So far, we have observed that *indem*-clauses can be neither D-ExtAdvCls nor W-ExtAdvCls. Now, we need to figure out whether they are CACs, PACs or NACs.

3.2.4. The Proforms *Damit* and *Dadurch*

If we take *indem*-clauses to encode an instrumental relation, we expect them to be able to refer to a corresponding proform. Stojanova-Jovčeva (1976, p. 116) could not identify any examples in her corpus that would contain a proform in the matrix clause and that refers to the content of the *indem*-clause. Likewise, Pittner (1999, p. 291) and Eisenberg (2020, p. 362) argue that adverbial *indem*-clauses cannot refer to any correlates in the matrix clause. However, in modern German the proform *damit* contains the preposition *mit* ‘with’, which takes DPs as its arguments and often gives rise to an instrumental interpretation of the PP, cf. e.g. [PP *mit* [DP *einem Schraubenzieher*]] ‘with a screwdriver’. We therefore expect *indem*-clauses to refer to the proform *damit*. As the corpus examples registered in (37) demonstrate, this prediction is borne out.

- (37) a. Sie behelfen sich [damit]_i, [indem sie jede Folge viermal pro
they make:do.3PL REFL *damit* *indem* they every episode four:times per
Woche wiederholen]_i.
week repeat.3PL
‘They make do with repeating the episode four times a week.’
(DeReKo, *Süddeutsche Zeitung*, 25 August 1995)
- b. Mumsi tröstet sich [damit]_i, [indem sie sich auf das Positive ihrer
Mumsi console.3SG REFL *damit* *indem* she REFL on the positive of:her
Amtszeit fokussiert]_i.
term:in:office focus.3SG
‘Mumsi consoles herself by focussing on the bright side of her term in office.’
(DeReKo, *Nürnberger Nachrichten*, 25 November 2020)

Another preposition that is often taken to encode instrumental relations is *durch* ‘through’. It is therefore not surprising that *indem*-clauses can be co-referential with the proform *dadurch*:¹⁴

- (38) a. Leader wird man [dadurch]_i, [indem man Leistung erbringt]_i.
leader become.3SG one *dadurch* *indem* one achievement deliver.3SG
‘You can become leader by delivering performance.’
(DeReKo, *Burgenländische Volkszeitung*, 25 June 2008)

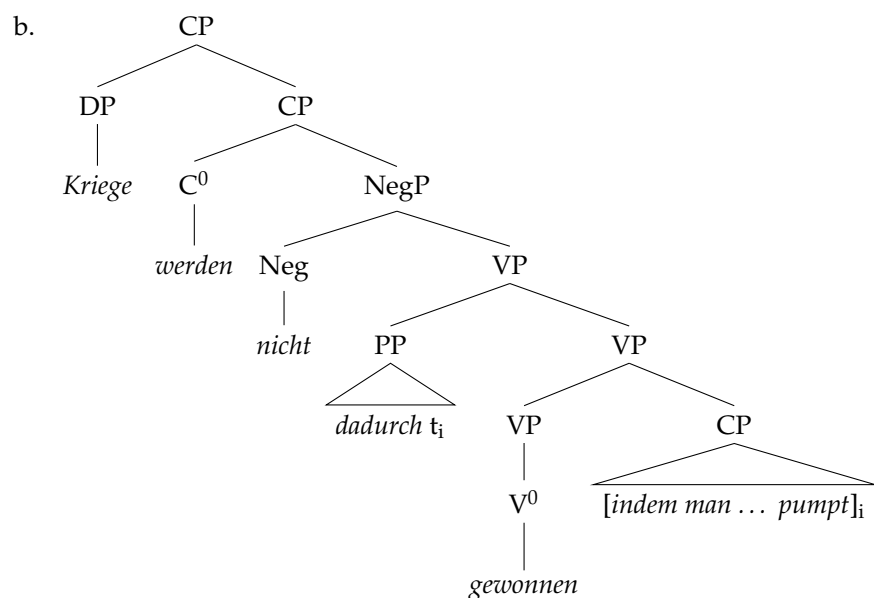
- b. Man helfe den Opfern oft schon [dadurch]_i, [indem man one help.3SG.KONJ I the.DAT victims.DAT often MP *dadurch* *indem* one ihnen einfach zuhöre]_i.
them.DAT just listen.to.3SG.KONJ I
'One can often help the victims by listening to them.'
(DeReKo, *Mannheimer Morgen*, 26 September 2000)
- c. Menschen definieren sich [dadurch]_i, [indem sie sich mit anderen people define.3PL REFL *dadurch* *indem* they REFL with others vergleichen]_i.
compare.3PL
'People define themselves by comparing to other people.'
(DeReKo, *Nürnberger Zeitung*, 9 November 2010)

In all the cases listed in (37) and (38), *indem* can be replaced by the declarative complementizer *dass* 'that':

- (39) a. Sie behelfen sich [damit]_i, [dass sie jede Folge viermal pro Woche wiederholen]_i.
b. Mumsi tröstet sich [damit]_i, [dass sie sich auf das Positive ihrer Amtszeit fokussiert]_i.
c. Leader wird man [dadurch]_i, [dass man Leistung erbringt]_i.
d. Man helfe den Opfern oft schon [dadurch]_i, [dass man ihnen einfach zuhöre]_i.
e. Menschen definieren sich [dadurch]_i, [dass sie sich mit anderen vergleichen]_i.

I argue that instrumental *indem*-clauses are base-generated within a PP in the matrix clause when they refer to one of the *da*-proforms.

- (40) a. Kriege werden nicht [dadurch]_i gewonnen, [indem man mehr Truppen wars PASS.AUX.3PL NEG *dadurch* win.PTCP *indem* one more troops und Geld in sie pumpt]_i.
and money into them.ACC pump.3SG
'Wars are not won by pumping more troops and money into them.'



- c. Joint appearance of the *da*-proform and the *indem*-clause in the middle field:
[CP Kriege [C⁰ werden] nicht [PP *dadurch*, [CP *indem* man mehr Truppen wars PASS.AUX.3PL NEG *dadurch* *indem* one more troops und Geld in sie pumpt]], [VP gewonnen]].
and money into them.ACC pump.3SG win.PTCP

- d. Movement of the *da*-proform and the *indem*-clause to the prefield position:
 [CP [Spec-CP [PP Dadurch, indem man mehr Truppen und Geld in sie
dadurch indem one more troops and money into them.ACC
 pump*t*_i], werden Kriege nicht *t*_i gewonnen].
 pump.3SG PASS.AUX.3PL wars NEG win.PTCP
- e. VP-preposing containing the *indem*-clause but not the proform:
 *[CP [Spec-CP Gewonnen, indem man mehr Truppen und Geld in sie
 win.PTCP *indem* one more troops and money into them.ACC
 pump*t*], werden Kriege nicht *dadurch*].
 pump.3SG PASS.AUX.3PL wars NEG *dadurch*
- f. Movement of the *indem*-clause across the proform:
 *[CP [Spec-CP Indem man mehr Truppen und Geld in sie pump*t*_i],
indem one more troops and money into them.ACC pump.3SG
 werden Kriege nicht [PP *dadurch t*_i] gewonnen].
 PASS.AUX.3PL wars NEG *dadurch* win.PTCP

In (40a), the *indem*-clause is base-generated within the PP and then extraposed to the right edge of the matrix clause, (40b). Evidence for this account comes from the following observations. First, both the proform and the *indem*-clause occur adjacent to each other in the middle field, (40c), and move together to Spec-CP, (40d). Second, it is not possible to prepose the matrix VP along with the *indem*-clause and to simultaneously leave the proform in the middle field, (40e). Finally, it is not possible to move the *indem*-clause to Spec-CP without the proform, (40f).

A detailed syntactic analysis of the cases involving *da*-proforms is beyond the scope of the present article, and interested readers are referred to G. Müller (1995) and Frey (2016b) and references cited therein for more details. For the purpose of this article it suffices to observe that instrumental *indem*-clauses can refer to proforms. We should, in addition, stress that the availability of a proform and its co-referentiality with the instrumental *indem*-clause always seems to be possible when the embedded proposition can be instrumentalized and when the instrumental theta-role is assigned to it.

One of the anonymous reviewers of this article wonders whether instrumental *indem*-clauses can also refer to the proform *darin*, which contains the preposition *in* 'in'. If so, then the *in*- in *indem* cannot be considered a preposition from a synchronic point of view. According to the account developed in the present paper, we expect *darin* and the *indem*-clause to co-occur as soon as the criteria mentioned above are met. One case in point is given (41).

- (41) Der Alkoholextrakt rundet in der Aromatherapie jeden Seelenduft
 the alcohol:extract round.3SG in the.DAT aroma:therapy every.ACC soul:scent
 harmonisch ab und verleiht ihm eine samtige Weichheit. Die Stärke
 harmoniously VPRTL and give.3SG him.DAT a velvet tenderness the strength
 dieses Öles liegt [darin]_i, [indem es das Gefühl von Geborgenheit und
 this.GEN oil.GEN lie.3SG *darin indem* it the feeling of safety and
 Sicherheit vermittelt]_j.
 security convey.3SG
 'The alcohol extract harmoniously completes every soul scent and gives a velvet
 tenderness to it. The strength of this oil is to convey the feeling of safety and
 security.'
 (DeReKo, *Niederösterreichische Nachrichten*, 21 September 2018)

In (41), the *indem*-clause elaborates on the strength of the oil and specifies its function. They are linked through the clause-embedding predicate *liegen in* 'lie in'. It takes the proform *darin*, which is referentially linked to the proposition in the subordinate clause which, in turn, is headed by the complementizer *indem*. Its main function is to instrumentalize the embedded proposition. Cases like (41) strongly suggests that instrumental *indem* is a

C-head, and not a PP consisting of the preposition *in* ‘in’ and its nominal dative-marked complement *dem* ‘that’, contrary to what Axel (2002, pp. 35–37) claims for adverbial clauses in German in general; see also Section 3.2.1 for more arguments against the PP status of *indem*.

Another anonymous reviewer raises the question of whether instrumental *indem*-clauses can refer to the proform *so* ‘so’. Based on my understanding, this is barely possible and found only occasionally:¹⁵

- (42) Ich bin nur der Meinung, dass man in der heutigen Zeit nicht mehr
I be.1SG only the.GEN opinion that one in the.DAT today’s time NEG more
jemanden wie früher in der Schule einfach in die Ecke stellen
someone.ACC like earlier in the.DAT school simply in the.ACC corner place.INFV
kann. Probleme müssen angesprochen und ausdiskutiert werden
can.3SG problems must.3PL address.PTCP and talk:out.PTCP PASS.AUX.INFV
können. Ein Teamchef kann sich doch nicht [so]_i verhalten, [indem er
can.INFV a team:manager can.3SG REFL MP NEG so behave.INFV *indem* he
den Problemen einfach aus dem Wege geht]_i.
the.DAT problems simply from the.DAT way go.3SG
‘I think that nowadays we shouldn’t make someone stand in the corner like earlier in
the school. Problems must be addressed and talked out. A team manager cannot
behave in such a way that he shirks the problems’.
(DeReKo, *Tages-Anzeiger*, 12 April 2000)

Since the pattern illustrated in (42) instantiates a peripheral phenomenon of German grammar, I will not examine it here. However, the question of why *so* appears to be hardly compatible with the instrumental *indem*-clause still remains an important one and should be addressed in future work;¹⁶ for more details on *so*, see König and Umbach (2018).

3.2.5. Negation Scope

We have seen in Section 2 that adverbial clauses can fall under the scope of a negation operator or attach higher and be beyond its scope. Based on this diagnostic test, we can determine how deeply an adverbial clause is syntactically embedded in the matrix clause at the LF level. Behrens and Fabricius-Hansen (2002, p. 59) point out that “[*indem*]-clauses apparently fall outside the scope of the negator in the matrix; they do not—at least not easily—attach to the matrix clause below propositional negation”, cf. (43).

- (43) Keiner machte Platz, indem er zurücksetzte.
nobody make.3SG.PST space *indem* he reverse.3SG.PST
‘Neither gave way by reversing.’ (*¬ > *indem*-clause / ^{OK}*indem*-clause > ¬)
(Behrens & Fabricius-Hansen, 2002, p. 47, ex. 1a)

However, they also observe that *indem*-clauses can occur under (contrastive) ‘phrasal’ negation, by referring to examples such as those given in (44).

- (44) Den größten Wert legt Leni auf die frischen Brötchen, die sie sich nicht
the.ACC biggest value lay.3SG Leni on the fresh rolls which she REFL NEG
bringen lässt, sondern eigenhändig aussucht, nicht, indem sie
bringen.INFV let.3SG but single-handedly pick:out.3SG NEG *indem* she
sie betastet, nur, indem sie deren Farbe begutachtet.
them.ACC finger.3SG only *indem* she their color examine.3SG
‘What Leni cares about most is the fresh rolls; rather than have them delivered she
picks them out herself, not by fingering them, merely by inspecting their color.’
(^{OK}¬ > *indem*-clause)
(Behrens & Fabricius-Hansen, 2002, p. 47, ex. 1a)

Similar examples are also present in the DeReKo corpus. Some of them are given in (45).

- (45) a. Das kriegt man beim Film nicht hin, indem man alle
 that.ACC manage.3SG one at:the.DAT movie NEG VPRTL *indem* one all.ACC
 zusammenschreit, sondern indem man jeden ermutigt, seine Arbeit
 shout:at.3SG but *indem* one every.ACC encourage.3SG his work
 bestmöglich zu machen.
 at:best to make.INFV
 ‘While producing a movie one cannot manage it by bringing all together, but by
 encouraging everyone to do his job at best.’
 (DeReKo, *Mannheimer Morgen*, 13 August 2005)
- b. Wasser wirke nicht, indem es dem Organismus Stoffe
 water function.3SG.KONJ NEG *indem* it the.DAT organism substances
 zuführe, sondern indem es Schadstoffe aufnehme und
 supply.3SG.KONJ but *indem* it pollutants resorb.3SG.KONJ and
 ausschwemme.
 wash:out.3SG.KONJ
 ‘Water does not operate by supplying substances for the organism, but by
 resorbing pollutants and by washing them out.’
 (DeReKo, *Rhein Zeitung*, 26 February 2005)
- c. Newton hat mit der Formulierung des Gravitationsgesetzes
 Newton have.3SG with the.DAT formulation the.GEN law:of:gravity.GEN
 diesen Akt vollzogen, nicht indem er einen festen Punkt fand,
 this.ACC act perform.PTCP NEG *indem* he a.ACC concrete point find.3SG.PST
 sondern indem er alle festen Punkte überhaupt auflöste, [...].
 but *indem* he all concrete points after:all resolve.PTCP [...]
 ‘By formulating the law of gravity Newton performed this act, not by finding one
 concrete point, but by resolving all concrete points after all, [...].’
 (DeReKo, *NZZ am Sonntag*, 7 July 2002)

It is crucial to note here that cases given in (44)–(45) differ from what we have observed in Section 2 about causal *weil*-clauses (cf. (6a)). While in cases where the propositional negation scopes over the adverbial clause and the matrix event is also affected, this is not the case in the examples containing the (contrastive) phrasal negation *nicht* (... *sondern*). In such cases, only one of the subordinate propositions is negated, not the matrix event itself. This made Behrens and Fabricius-Hansen (2002, p. 59) conclude that “the *indem*-clause has scope over the negated matrix proposition”. I disagree with this claim.¹⁷

First, it does not play a role that the negation does not affect the matrix event itself. What is more important is the observation that the negation CAN target the content of the instrumental subordinate *indem*-clause. Keep in mind that neither evidential nor speech act related causal *weil*-clauses can fall under the scope of negation operators, regardless of whether the matrix clause is negated or not, or whether a propositional or a (contrastive) ‘phrasal’ negation is used. If a negation operator can target the content of the *indem*-clause, we should conclude that it also has the possibility to attach deeper in the clause structure, as in particular (45a) and (45b) clearly show. Pittner (1999) also mentions an example in which *nicht* ‘not’ has a scope over the *indem*-clause, (46), and argues that *indem*-clauses can fall under the scope of negation.

- (46) Du kannst diese Aufgabe nicht lösen, indem du jemand anderen um
 you can.2SG this task NEG solve.INFV *indem* you someone else about
 seine Meinung fragst.
 his opinion ask.2SG
 ‘You cannot solve this problem by asking someone else about his opinion.’
 (Pittner, 1999, p. 291, ex. 168b)

Second, there might be two explanations for why cases like (43) are considered unambiguous by some native speakers of German. One explanation is synchronic, the other is diachronic.

Synchronically, instrumental *indem*-clauses can be also employed as PAC, i.e., as JP adjuncts that are not in the c-command domain of negation. Section 4.2 provides more details on *indem*-PACs. In this case, we expect them not to fall under the scope of negation.

Diachronically, *indem* as a C-head developed out of a PP. As Greisinger (2016, p. 122) observes, this process happened in the 18th cent. The PP harks back to the preposition *in* ‘in’ and the dative-marked demonstrative pronoun *dem* ‘that’. It seems that *indem* might still be interpreted as a correlative PP that refers to the content of the following explicative sentence, which, in turn, modifies the correlate. The negation is then restricted only to the matrix clause and does not target the relative clause. Although this is not semantically transparent from the perspective of modern German, the internal structure of the complementizer *indem* may still have some morphosyntactic reflexes. This observation is, of course, tentative and requires a deeper investigation.

3.2.6. Variable Binding and Principle C Effects

It is well-known that a quantifier can bind an agreeing pronoun occurring in the subordinate clause if and only if the quantifier c-commands the pronoun. Otherwise variable binding is not possible, cf. Chomsky (1981, pp. 183–230), Enç (1989, pp. 62–64), Buring (2005, pp. 83–93), von Wietersheim (2016, 2022), and von Wietersheim and Featherston (2019) for more details. We have seen in (5a) that variable binding into the causal *weil*-clause is possible. Instrumental *indem*-clauses pattern with causal *weil*-clauses in this regard.¹⁸

- (47) a. [Jeder Teilnehmer]_i hat die Prüfung bestanden, indem [er]_i mindestens
every attendee have.3SG the exam pass.PTCP *indem* he at:least
10 von 15 Fragen richtig beantwortet hat.
10 of 15 questions correctly answer.PTCP have.3SG
‘Every attendee passed the exam by answering at least 10 out of 15 questions correctly.’
- b. [Jeder Katholik]_i entlastet sich von seinen Sünden, indem [er]_i beichtet.
every Catholic clear.3SG REFL from his.DAT sins *indem* he confess.3SG
‘Every Catholic clears himself from his sins by confessing.’
(Homberger, 1996, p. 23, ex. 1; slightly modified by author)
- c. [Keiner]_i wollte Platz machen, indem [er]_i zurücksetzte.
nobody want.3SG.PST space make.INFV *indem* he reverse.3SG.PST
‘Nobody wanted to give way by reversing.’
(Behrens & Fabricius-Hansen, 2002, p. 58, fn. 9; slightly modified by author)

Furthermore, independently referring terms such as *Maria* in (48) are not allowed to be c-commanded by co-referential expressions according to binding Principle C, cf. (48a) vs. (48b).¹⁹

- (48) a. Max hat [Maria]_i beleidigt, indem er [sie]_i vollkommen
Max have.3SG Maria offend.PTCP *indem* he her.ACC completely
ignoriert hat.
ignore.PTCP have.3SG
‘Max offended Maria by ignoring her completely.’
- b. *Max hat [sie]_i beleidigt, indem er [Maria]_i vollkommen
Max have.3SG her.ACC offend.PTCP *indem* he Maria completely
ignoriert hat.
ignore.PTCP have.3SG
Intended: ‘Max offended her by ignoring Maria completely.’

3.2.7. Embeddability with the Host Clause

Finally, the instrumental *indem*-clause, as (49) shows, can be embedded along with its host clause.

- (49) Max sagte, [dass Maria ihn beleidigt hat, indem sie ihn
Max say.3SG.PST that Maria him.ACC offend.PTCP have.3SG *indem* she him.ACC
komplett ignoriert hat].
completely ignore.PTCP have.3SG
'Max said that Maria offended him by ignoring him completely.'

3.3. Interim Summary

An overview of the properties instrumental *indem*-clauses exhibit is given in Table 4.

Table 4. Selected properties of *indem*-clauses in modern German.

PROPERTY	<i>indem</i> -clause
eventuality related interpretation	+
evidence related interpretation	–
speech act related interpretation	–
target of anaphoric expressions	+
verb final position	+
constituent status	+
<i>Nachfeld</i> position	+
<i>Vorfeld</i> position	+
middle field position	+
<i>Außenfeld</i> position	–
proform coreference (<i>damit</i> and <i>dadurch</i>)	+
(phrasal) negation scope	+
variable binding	+
embeddability with the host clause	+

The data considered so far clearly show that instrumental *indem*-clauses should be analyzed as CACs, i.e., as adverbial clauses that are in the c-command domain of the constituents of their licensing clauses. They cannot attach outside the matrix clause structure, nor can they operate on discourse level and express non-at-issue content. They can be targeted by anaphoric expressions and co-referential with instrumental proforms. As syntactically integrated subordinate clauses, instrumental *indem*-clauses can occupy the Spec-CP position of the matrix clause and be embedded along with its host clause. But most importantly, they allow variable binding and obey Principle C of the binding theory. Taken all together, I conclude that instrumental *indem*-clauses attach as TP adjuncts.

In the next section, I examine their internal syntax and discuss first thoughts on whether *indem*-clauses operating on the content level exhibit variation and can be analyzed as PACs or NACs, too.

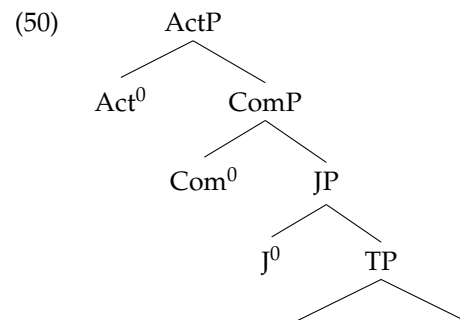
4. Internal Syntax

This section is divided into two parts. In Section 4.1, I outline Krifka's approach to decomposition of assertive speech acts, whereas in Section 4.2, I apply this approach to instrumental *indem*-clauses to determine their variation.

4.1. The Decomposition of Assertive Speech Acts

Krifka (2019, 2023, 2024) decomposes an assertion into four layers: i) proposition, ii) judgement, iii) commitment, and iv) speech acts. All of them are formally represented through syntax. A proposition φ is represented by a Tense Phrase, TP. Private judgements

are attributed to JP, Judge Phrase, which is equipped with a syntactic head that turns a proposition φ into the propositional function that a judge x judges the proposition φ to be true. Syntactically, this is rendered as $xJ-\varphi$, whereby $J-$ stands for the head of the JP. Public assertions are taken to be encoded in a Commitment Phrase, ComP, possessing the head $\vdash$ that turns a proposition φ into the propositional function that the speaker x is publicly committed in world i to φ : $x \vdash_i \varphi$. Finally, to keep different speech acts apart, Krifka (2024) makes use of the functional projection ActPhrase, ActP, and takes $\bullet$ to represent an assertion operator, whereas $'?$ ' stands for a question operator. Either operator is the syntactic head of ActP, which is the highest structural category in the clause structure, (50).



Evidence for the existence of JP, ComP and ActP comes from dedicated adverbial modifiers. A sample of selected modifiers associated with the dedicated layer is presented in (51). It is, of course, by no means exhaustive, and for their contribution the interested reader is referred in particular to Krifka (2023).

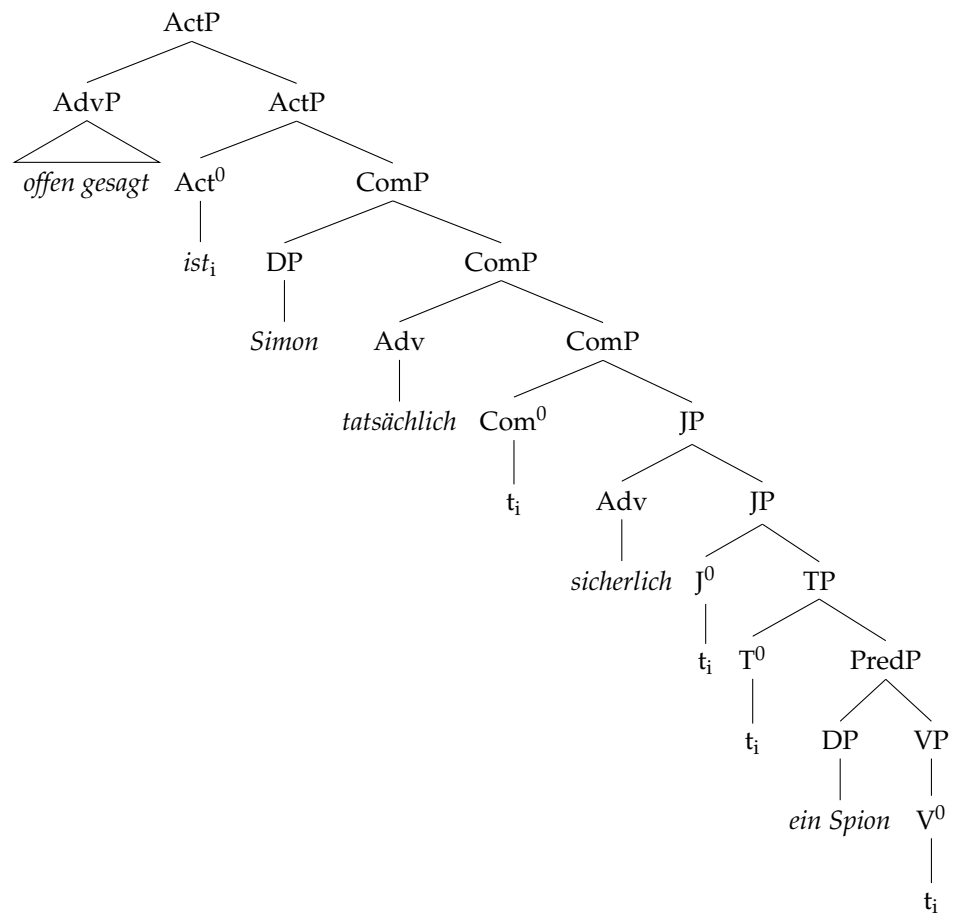
(51) Adverbial modifiers in modern German:

- a. JP modifiers: *angeblich* 'allegedly', *wohl* 'presumably', *anscheinend* 'apparently', *wahrscheinlich* 'probably', *sicherlich* 'certainly', *scheinbar* 'seemingly'.
- b. ComP modifiers: *wirklich* 'really', *tatsächlich* 'in fact', *bei Gott* 'by God', *Gott sei mein Zeuge* 'let God be my witness', *bei meiner Seele/Mutter* 'at my soul/mother', *ungelogen* 'truly', *im Ernst*, *allen Ernstes*, *ernsthaft* 'in earnest'.
- c. ActP modifiers: *offen gesagt* 'frankly speaking', *mit Verlaub gesagt* 'if I may say so', *übrigens* 'by the way', *mit anderen Worten* 'in other words', *am Rande bemerkt* 'as a marginal note', *jedoch* 'however'.

An example containing adverbial modifiers that represent all functional layers is given in (52a). Its partial derivation follows in (52b).

- (52) a. Offen gesagt ist Simon tatsächlich sicherlich ein Spion.
 openly say.PTCP be.3SG Simon in:fact certainly a spy
 'Honestly speaking, Simon is in fact certainly a spy.'

b.



Offen gesagt ‘honestly speaking’ is a standard ActP modifier; *tatsächlich* ‘in fact’ is a commitment phrase by means of which the speaker increases the strength of their commitment; and *sicherlich* ‘certainly’ is an epistemic adverb expressing the speaker’s attitude towards what is embedded. The most natural word order is when the ActP modifier *offen gesagt* occurs on the left edge of the clause, where it c-commands the commitment phrase *tatsächlich* and the epistemic adverb *sicherlich*. Correspondingly, the adverbial modifiers are base-generated in the dedicated functional projections ActP, ComP, and JP. Derivationally, the finite verb, *ist* ‘is’ in (52), moves as a V-head to the Act⁰ position, where the speech act itself is determined. What role do adverbial clauses play here? They behave like modifiers in (51) by attaching to a dedicated functional projection. According to Frey (2023a), CACs are TP adjuncts, PACs attach as JP adjuncts, and NACs are ActP modifiers. Adverbial clauses attaching as ComP modifiers have not been attested yet.

I take instrumental *indem*-clauses to be subordinate assertions. The question then arises whether they can project up to ActP. This is addressed in the next section.

4.2. Variation of Instrumental ‘Indem’-Clauses

So far, we have seen that instrumental *indem*-clauses are CACs attaching at the TP layer of the matrix clause (see Section 3.2). However, this is not the only position they can attach to. The following corpus examples convincingly show that instrumental *indem*-clauses can host expressions encoding private judgements, i.e. JP modifiers, cf. *wohl* ‘presumably’ in (53), *anscheinend* ‘apparently’ in (54), *wahrscheinlich* ‘probably’ in (55), and *angeblich* ‘allegedly’ in (56).

- (53) Von der verrückten 90. Minute etwa, in der zunächst Top-Stürmer
 from the.DAT crazy 90th minute roughly in which.DAT first ace:striker
 Ebbe Sand die Schalker zum zweiten Mal in Führung brachte
 Ebbe Sand the Schalker:players to:the second time in leadership bring.3SG.PST
 und FCK-Abwehrspieler Ingo Hertzsch Sekunden später ausglich, indem er
 and defence:player:of:FCK Ingo Hertzsch seconds later level.3SG.PST *indem* he
 wohl zum ersten Mal im Leben mit links aufs Tor
 presumably to:the first time in:the life with left(:leg) on:the goal
 schoss, [...].
 shoot.3SG.PST, [...].
 ‘From the 90th minute onwards, in which the ace striker Ebbe Sand put his team into
 the lead first and in which then the defense player of FCK Ingo Hertzsch leveled few
 seconds later by presumably taking a shot at the goal with his left leg for the first
 time in his life, [...].’ (DeReKo, *Rhein-Zeitung*, 24 September 2004)
- (54) Herr Heinrich Heeger disqualifiziert sich mit seiner Replik selber, indem er
 Mr. Heinrich Heeger disqualify.3SG REFL with his reply REFL *indem* he
 anscheinend nicht berücksichtigt, daß das Deutsche eine lebende
 apparently NEG consider.3SG that the German:language a living
 Sprache ist, die ständig dem Wandel unterworfen ist.
 language be.3SG which constantly the.DAT change subject:to be.3SG
 ‘Mr. Heinrich Heeger disqualifies with this reply himself by apparently not taking
 into account that German is a living language that changes all the time.’
 (DeReKo, *Der Spiegel*, 11 January 1971)
- (55) Die Kreditinstitute gewöhnen uns an den Euro, indem sie
 the credit:institutions accustom.3PL us.ACC at the.ACC euro *indem* they
 wahrscheinlich schon 1999 anfangen, uns alle Beiträge auf dem
 probably already 1999 begin.3PL us.DAT all dues on the.DAT
 Kontoauszug in D-Mark und Euro aufzulisten.
 bank:statement in Deutschmark and euro to:list.INFV
 ‘The credit institutions accustom us to the Euro currency by starting probably in 1999
 registering all dues on the bank statement both in Deutschmark and in Euro.’
 (DeReKo, *Rhein-Zeitung*, 27 April 1998)
- (56) Für Irritationen sorgte der Nationalspieler, der noch ein Jahr Vertrag
 for irritations care.3SG.PST the international:player who still a year contract
 hat, indem er angeblich seine Wohnung in einem Dortmunder Vorort
 have.3SG *indem* he allegedly his apartment in a.DAT Dortmund.ADJ suburb
 aufgelöst hat.
 annul.PTCP have.3SG
 ‘The international, who still has a contract running for one year, caused confusion by
 allegedly canceling his rental agreement in a Dortmund suburb.’
 (DeReKo, *Mannheimer Morgen*, 8 June 1999)

Hentschel (1986), in addition, mentions one case containing the discourse particle *eben* (lit. ‘flat’, ‘smooth’):²⁰

- (57) Schließlich befreite sie sich von seiner Tyrannei, indem sie ihn
 finally get:free.3SG.PST she REFL of his.DAT tyranny *indem* she him.ACC
 eben vergiftete.
 MP poison.3SG.PST
 ‘Finally, she could get rid of his tyranny by poisoning him.’

(Hentschel, 1986, p. 203)

By using *eben* in (57), the speaker indicates that the way in which the embedded subject killed someone could or even should have been obvious to his or her interlocutor(s); see

Abraham (1991), Karajosova (2003), and Autenrieth (2005) for more details on the meaning of *eben*.

The occurrence of weak root phenomena in *indem*-clauses clearly indicates that they can be PACs too. They can host speaker-oriented adverbs, and the presence of discourse particles strengthens this claim, cf. (53) for *wohl* and (57) for *eben*. The use of other discourse particles is also attested; cf. (58) for *ja*, (59) for *eigentlich*, and (60) for *halt*.

- (58) Wollen Sie die Gruppe künftig noch stärker auf diesen Markt ausrichten, indem Sie ja auch als Sport-Sponsor aktiv sind?
want.3PL you the group in:future additionally stronger on this.ACC market adjust.INFV *indem* you MP also as sports-sponsor active are.3PL
'Do you plan to adjust the group on this market stronger in the future by becoming active as a sports sponsor?'
(DeReKo, VDI nachrichten, 14 September 2007)
- (59) Sie sollen Firmenkonglomerate aufgebaut haben, indem sie eigentlich wertlose Firmen an die Börse gebracht und deren Aktienkurse durch wechselseitigen Handel in die Höhe getrieben haben.
they should.3PL company:conglomerates establish.PTCP have.INFV *indem* they MP useless companies at the stock:market bring.PTCP and their equity:prices through mutual trading into the height bid:up.PTCP have.3PL
'They are supposed to have established company conglomerates by floating useless companies on the stock market and by bidding up their stock prices through mutual trading.'
(DeReKo, Nürnberger Zeitung, 19 December 2008)
- (60) Die beiden Chöre kompensierten das Fehlen weiterer Gesangvereine, indem sie halt ein paar Liedchen mehr sangen.
the both choirs compensate.3PL.PST the absence further.GEN choral:societies *indem* they MP a couple of ditties more sing.3PL.PST
'Both choirs compensated the absence of further choral societies by singing a couple of songs more.'
(DeReKo, Rhein-Zeitung, 21 July 1999)

The examples (53)–(60) provide evidence for the claim that instrumental *indem*-clauses can be considered PACs, too, and that they attach as JP adjuncts. This is corroborated by the other diagnostic tests registered in Table 1. Instrumental *indem*-clauses treated as PACs can occur in the Spec-CP position, (61a), disallow variable binding, (61b), can be embedded together with their host clause, (61c), can host weak root phenomena, (53)–(55), and, finally, cannot host strong root phenomena, (61d).

- (61) a. [CP [Spec-CP *Indem* Heeger anscheinend nicht berücksichtigt, dass das Deutsche eine lebendige Sprache ist]_j, [C⁰ blamiert]_i er sich sicherlich [VP *t_i t_j*]].
German:language a living language be.3SG make:a:fool he REFL certainly.
'By apparently not taking into account that German is a living language, Heeger certainly makes a fool of himself.'
- b. *[Jeder Linguist]_i blamiert sich, indem [er]_i anscheinend nicht berücksichtigt, dass das Deutsche eine lebendige Sprache ist.
every linguist make:a:fool.3SG REFL *indem* he apparently NEG consider.3SG that the German:language a living language be.3SG
Intended: 'Every linguist makes a fool of himself by apparently not taking into account that German is a living language.'

- c. Max sagte, [dass Heeger sich blamiert, indem er anscheinend
Max say.3SG.PST that Heeger REFL make:a:fool.3SG *indem* he apparently
nicht berücksichtigt, dass das Deutsche eine lebendige Sprache
NEG consider.3SG that the German:language a living language
ist].
be.3SG
'Max said that Heeger makes a fool of himself by apparently not taking into
account that German is a living language.'
- d. *[Indem Heeger anscheinend nicht berücksichtigt, dass das Deutsche
indem Heeger apparently NEG consider.3SG that the German:language
eine lebendige Sprache ist, hab' ich recht?], blamiert er sich.
a living language be.3SG have.1SG I right make:a:fool.3SG he REFL
Intended: 'Heeger makes a fool of himself by apparently not taking into account
that German is a living language, am I right?'

Now, the question should be addressed whether instrumental *indem*-clauses can project up to ActP. Since they seem not to be able to host ActP modifiers, this option is ruled out, as seen in (62).

- (62) *Max hat mich beleidigt, indem er offen gesagt / übrigens /
Max have.2SG me.ACC offend.PTCP *indem* he openly say.PTCP / by:the:way /
jedoch komplett ignoriert hat.
however completely ignore.PTCP hat.3SG
Intended: 'Max offended me by honestly speaking / by the way / however ignoring
me completely.'

We can safely conclude that instrumental *indem*-clauses can be employed either as CACs or as PACs, but not as NACs.

5. Cross-Linguistic Observations

We have seen in the present paper that *indem* selects for a finite clause and makes the finite verb stay in situ, as seen in (1). Cross-linguistically, this is rather an uncommon strategy because manner elaboration on the clause level is usually expressed by non-finite strategies, as the examples collected in (63) persuasively show.

- (63) a. English
He helped her **by taking** her to the hospital.
- b. Indonesian
Dia (mem-)bantu dia **dengan** (mem-)bawa dia ke rumah sakit.
3SG AV-help 3SG with/by AV-bring 3SG to sick house
'S(He) helped him/her by taking him/her to the hospital.'
(Melody Violine, pers. comm.)
- c. Italian
L'ha aiutata **portando-la** all'ospedale.
he:have.3SG help.3SG.PST bringing-her to:hospital
'He helped her by taking her to the hospital.'
(Selene Muscianese, pers. comm.)
- d. Polish
Pomógł jej, **zawożąc** ją do szpital-a.
help.1-PTCP.SG.M her.DAT bringing her.ACC to hospital-GEN
'He helped her by taking her to the hospital.'

e. Icelandic

Hann aðstoðar hana með því að fara með hana á sjúkrahúsið.
 he assist.3SG her with that to go.INFV with her to hospital:the
 ‘He helps her by taking her to the hospital.’

(Ásgrímur Angantýsson, pers. comm.)

f. Norwegian

Han hjalp henne ved å ta henne til sykehuset.
 he help.3SG.PST her by to take.INFV her to hospital:the
 ‘He helped her by taking her to the hospital.’

g. Faroese

Hann hjálpti henni við at fara við henni á sjúkrahúsið.
 he help.3SG.PST her by to go.INFV with her to hospital:the
 ‘He helped her by taking her to the hospital.’

(Annika Simonsen, pers. comm.)

h. Dutch

Hij heeft haar geholpen door haar naar het ziekenhuis te brengen.
 he have.3SG her help.PTCP through her to the hospital to bring.INFV
 ‘He helped her by taking her to the hospital.’

(Danli Peters, pers. comm.)

i. Ukrainian

Vin dopomih jij [tym]_i, [ščo vidviz jij do likarni]_i.
 he help.3SG.PST her.DAT that.INS that bring.3SG.PST her.ACC to hospital
 ‘He helped her by taking her to the hospital.’

(Alina Yehorova, pers. comm.)

j. Czech

Pomohl jí [tím]_i, [že ji odvezl do nemocnice]_i.
 help.1-PTCP.SG.M her.DAT that.INS that her.ACC bring.1-PTCP.SG.M to
 hospital
 ‘He helped her by taking her to the hospital.’

(Radek Šimík, pers. comm.)

Based on this language sample, we can identify five different syntactic strategies. To the first group belong languages that use prepositions. One case in point is Indonesian, (63b), which uses the preposition *dengan* ‘with’/‘by’ to elaborate on the matrix proposition. Languages like Italian and Polish constitute the second group. They do not make use of prepositions; instead they convert the verb occurring in the subordinate clause into a gerundive form by attaching a suffix to it, *-ando*/ *-endo* in Italian, (63c), and *-ąc* in Polish, (63d). English combines both strategies, making it the third group. As shown in (63a), the gerund *ing*-clause is headed by the preposition *by*. A similar strategy is to be observed in Icelandic, Norwegian, Faroese and Dutch, where a (grammaticalized) preposition takes an infinitive clause as its argument, (63e)–(63h). The preposition varies from language to language, cf. *með* ‘with’ in Icelandic, *við* ‘by’ in Faroese, or *door* ‘through’ in Dutch, but the infinitive itself is always accompanied by an infinitive marker, *að* in Icelandic, *å* in Norwegian, *at* in Faroese, and *te* in Dutch. These Germanic languages form the fourth group. Another strategy is used in Ukrainian, (63i), and in Czech, (63j), where the subordinate clause headed by the declarative complementizer *ščo*/*že* ‘that’ is referentially linked to the DP *tym*/*tím* ‘this’ marked for the instrumental case.

We do not know much about the instrumental clause types and their syntax in the languages registered in (63). Some studies examine the meaning of *by* in English, cf. Anscombe (1957), Bennett (1994), Fabricius-Hansen (2006), Sæbø (2008), Schneider (2009), and Bück-

ing (2014), but less attention has been paid to the degree of dependency instrumental clauses exhibit.

From a comparative point of view, Sæbø (2011, pp. 1435–1436) briefly discusses the meaning of *by*-phrases in English and mentions, in passing, their French and German equivalents. Fabricius-Hansen and Behrens (2001), Behrens and Fabricius-Hansen (2002), and Fabricius-Hansen (2006, pp. 54–56) observe, mainly based on translation studies, that *indem*-clauses have a wider field of use than their counterparts in other languages, i.e. *by* in English, *en* in French, or *ved å* in Norwegian. A deeper semantic look into *by*-clauses in English and *indem*-clauses in German is offered in Bücking (2014). A comparative study between Italian and German is also presented in Pusch (1980). However, the comparative findings still need to be embedded into the syntactic typology of adverbial clauses presented in Section 2.

6. Conclusions and Outlook

The main aim of this article was to examine the external and internal syntax of instrumental *indem*-clauses in modern German and to embed the findings into the syntactic typology of adverbial clauses. I discussed evidence showing that instrumental *indem*-clauses should be analyzed either as central or as peripheral adverbial clauses, attaching at two distinct heights as either TP or JP adjuncts. I could, in addition, present evidence that instrumental *indem*-clauses never occur as non-integrated adverbial clauses and adjoin outside the clause structure of the matrix clause.

Furthermore, the question should be addressed how instrumental *indem*-clauses came into being and how they develop(ed). Not much is known about their diachrony. Behaghel (1905) points out that they developed out of temporal *indem*-clauses. In (64), an example from New High German (1650–1900), *indem* can be paraphrased as ‘when’, ‘while’ or ‘after’:

- (64) Jetzt schien mir der Weg beynahe noch reizender, indem die Natur
 now seem.3SG.PST me.DAT the way almost still more:lovely *indem* the nature
 sich noch mehr verschönerte.
 REFL still more become:beautiful.3SG.PST
 ‘Now, the route seemed to me almost more lovely after it had become more
 beautiful.’ (Karlsbad, p. 6)

Diachronic corpus data is expected to provide answers to at least three questions. First, if instrumental *indem*-clauses are taken to have developed out of temporal *indem*-clauses, the circumstances that paved the way for this development should be examined. Second, temporal clauses are usually considered CACs. It would be interesting to learn whether temporal *indem*-clauses were CACs too and, more generally, whether the development of CACs into another semantic type of CACs led to any consequences for the syntax of adverbial clauses. Finally, to have a complete diachronic picture of instrumental *indem*-clauses, it is crucial to figure out when they began to be used as PACs.

I leave all these questions open for future research.

7. Data Sources

- DeReKo – Das Deutsche Referenzkorpus, version 2.4.5.1,
<http://www.ids-mannheim.de/cosmas2/>
 (accessed on 15 December 2024).
- Karlsbad – Franz Hieronymus Brüdmann, 1785, *Bemerkungen auf einer Reise nach Karlsbad*, Braunschweig: In der Fürstl. Waysenhausbuchhadlung.
- PE – Luis Sellano, 2016, *Portugiesisches Erbe*. München: Wilhelm Heyne.
- PS – Luis Sellano, 2023, *Portugiesische Sünde*. München: Wilhelm Heyne.

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Abbreviations

The following abbreviations are used in this manuscript:

1/2/3	1st/2nd/3rd person
ACC	accusative
ADJ	adjective
AV	actor voice
DAT	dative
GEN	genitive
INFV	infinitive
INS	instrumental
KONJ I	Konjunktiv I
<i>l</i> -PTCP	<i>l</i> -participle (inflected for number and gender)
MP	modal particle
NEG	negation
PASS.AUX	passive auxiliary
PL	plural
PST	past tense
PTCP	past participle
REFL	reflexive
SG	singular
VPRTL	verb particle

Notes

¹ It should be kept in mind, however, that the label ‘instrumental clause’ was attributed to *indem*-clauses already in older work on German, cf. Jung (1971, p. 69), Helbig and Buscha (1972, p. 585), Grebe (1973, p. 321), Heringer (1988, p. 270), Homberger (1996, pp. 26–27), among many others.

² JP stands for Judge Phrase, see Section 4.1 for more details.

³ One of the anonymous reviewers points out the following example:

(65) [Niemand]_i war verärgert, obwohl [er]_i nicht eingeladen wurde.
nobody be.3SG.PST upset although he NEG invite.PTCP PASS.AUX.3SG.PST
‘Nobody was upset, although he wasn’t invited.’

A similar example of variable binding is also mentioned in Freywald (2018):

- (66) Natürlich kann [ein jeder]_i, obwohl [er]_i sich für die Marathonstrecke angemeldet hat, auch
 of:course can.3SG one every although he REFL for the marathon:distance sign:up.PTCP have.3SG also
 entweder die 115 km oder die 165 km Strecke fahren.
 either the 115 km or the 165 km distance drive.INFV
 ‘Of course everyone can drive either the 115 km or the 165 km distance although he signed up for the marathon.’
 (Freywald, 2018, p. 70, ex. 23b)

First, I personally judge (65) as ungrammatical. Second, Frey (2020), based on d’Avis (2016), persuasively shows that (66) does not instantiate a counterexample to the status of concessive *obwohl*-clauses as PACs. In the case of violation of so-called conception of an expected course of events, we can even expect variable binding to be possible into concessive *obwohl*-clauses, but then they are not run-off-the-mill concessives. Accordingly, Frey (2020) concludes that in the context-free use concessives do not appear as CACs. Finally, direct support for Frey’s (2020) reasoning comes from experimental work. von Wietersheim and Featherston (2019) observe that variable binding into *obwohl*-clauses is not completely impossible, however their “results suggest that participants seem to use pragmatic and processing mechanisms to improve their interpretation of such structures if possible” (p. 283). In such cases, the conception of an expected course of events is violated, which, in turn, can lead to a change of the syntactic status of the adverbial clause itself.

I thank an anonymous reviewer for drawing my attention to this issue.

- 4 Of course, causal *weil*-clauses can host weak root phenomena, as (67) illustrates:

- (67) Weil er eben doch erschrocken ist, wurde Fritz bleich.
 because he MP MP frighten.PTCP be.3SG PASS.AUX.3SG.PST Fritz pale
 ‘Because he was frightened, Fritz got pale.’ (Frey, 2016a, p. 167, ex. 41)

(67) is a PAC, though. This is not surprising because a single adverbial clause type can be a CAC, a PAC or a NAC, often depending on lexical properties of a particular complementizer. The question of the variation of causal *weil*-clauses is addressed in Frey (2016a) and in Jędrzejewski and Fleczonek (2023), and the occurrence of modal particles in them is examined in Schenner and Sode (2014). I will not elaborate on this topic here.

- 5 Verb first concessives with the modal particle *doch* behave differently and I will not discuss them here. To my knowledge, a detailed comparison of verb first concessives that use *auch* and their counterparts that use *doch* has not been conducted yet. As both clause types constitute rather a peripheral phenomenon of German grammar and their differences are very subtle, meticulous experimental studies are needed to understand their distributional properties and differences.

- 6 I thank an anonymous reviewer for drawing my attention to both issues.

- 7 Nothing hinges on the terminology used in the present paper.

- 8 This might differ from conjunction to conjunction and from language to language, as *since*, for instance, hardly introduces ERCs, see Charnavel (2017) for more details. Similar observations have been made by Thim-Mabrey (1988) and Frey (2012) about *da* ‘since’ in German.

- 9 Infinitival complements based on *indem* are ungrammatical in modern German:

- (68) *Er befreite sie von der Last, indem sie unter die Schultern (zu) greifen.
 he release.3SG.PST her.ACC of the.DAT load *indem* her.ACC under the shoulders (to) grasp.INFV
 Intended: ‘He relieved her of the load by taking Renato under the shoulders.’

Furthermore, to my knowledge, *indem* never developed into a discourse marker preceding a verb-second clause, (69), as other adverbial complementizers did, cf. Gohl and Günthner (1999) for *weil* ‘because’, Günthner (2000) for *obwohl* ‘although’, or Gaumann (1983) for *während* ‘while’.

- (69) *Er befreite sie von der Last, indem er griff sie unter die Schultern.
 he release.3SG.PST her.ACC of the.DAT load *indem* he grasp.3SG.PST her.ACC under the shoulders
 Intended: ‘He relieved her of the load by taking her under the shoulders.’

- 10 Translations in glosses in (30b) are mine. In addition, keep in mind that the *indem*-clause in (30b) can be also analyzed as a parenthetical structure. I do not examine such structures in the present paper, but interested readers are referred to Schindler (1990), Pittner (1994), Brandt (1996), d’Avis (2005), Dehé and Kavalova (2007), Dehé (2009), and Frey and Pittner (2025). ‘standalone’ refers to cases in which the *indem*-clause stands on its own.

- 11 (33a) is from <https://www.juraforum.de/lexikon/indem>; last accessed: 31 November 2024.

- 12 (33b) is completely fine if the *indem*-clause is analyzed as a parenthesis.

- 13 One example with the proform *dadurch* is also cited in Breindl et al. (2014):

- (70) Man kann Diskriminierung nicht [dadurch]_i aufheben, [indem man eine andere verhängt]_i.
 one can.3SG discrimination NEG *dadurch* repeal.INFV *indem* one an another impose.3SG
 ‘One cannot repeal discrimination by replacing it with another one.’ (Breindl et al., 2014, p. 583, ex. 43)

15 Ole Letnes (pers. comm.) pointed out to me that the *indem*-clause in (42) is rather a modal/manner clause, and not an instrumental clause. This might explain why it can be co-referential with the proform *so*.

16 One of the worth considering suggestions is the observation on the use of *so*.

- (71) A: Und dann hat Max das Fenster [mit dem Schraubenzieher]_i aufgemacht?
 and then have.3SG Max the window with the.DAT screwdriver
 ‘And did Max open the window with the screwdriver?’

B: ?Ja, [so]_i hat er das getan.
 yes, so have.3SG he that do.PTCP
 ‘Yes, he did it so.’

By using *so* in (71), speaker B refers both to the instrument, i.e., to the screwdriver, and to the way in which it was used. It involves an implicit manner. *so*’s co-reference only with the instrument sounds questionable. This might explain why instrumental *indem*-clauses cannot be referentially linked to *so*.

17 (Bücking, 2014, p. 34, fn. 22) expresses his doubts as well:

Behrens and Fabricius-Hansen (2002), for instance, suggest that English *by* and German *indem* behave differently with regard to matrix negation scope. I am not fully convinced by their judgments; however, this issue deserves a detailed discussion [...].

I share Bücking’s (2014) intuition.

18 One of the anonymous reviewers of this article points out that (43) and (47c) cannot be correct at the same time. If we agree with Behrens and Fabricius-Hansen’s (2002) intuition that negation cannot take scope over the *indem*-clause in (43), the *indem*-clause cannot scope over the negation of the host clause and at the same time contain a pronoun bound by a QP inside the host clause in (47c). However, I disagree with the view that *indem*-clauses cannot be in the scope of negation operators. First, as the examples given in (45) in Section 3.2.5 show, instrumental *indem*-clauses can occur within the scope of the phrasal negation. Second, native speakers of German corroborate that (47c) is well-formed. Support for this claim also comes from similar corpus examples:

- (72) a. [Kein Unternehmen]_i wird Marktführer, indem [es]_i Geschenke verteilt.
 no company become.3SG market:leader *indem* it gifts distribute.3SG
 ‘No company will become a market leader by distributing gifts.’
 (DeReKo, Braunschweiger Zeitung, 18 July 2007)
- b. [Kein Körper]_i wird schöner, indem man [ihn]_i überlädt.
 no body become.3SG more:beautiful *indem* one him
 ‘No body will become more beautiful by cluttering it (with more clothes).’
 (DeReKo, Mannheimer Morgen, 30 July 2011)

Against this background, (43) and (47c) are discussed in different contexts and should not be considered mutually exclusive.

19 One of the anonymous reviewers of this article objects that if instrumental *indem*-clauses are considered CACs that adjoin as TP modifiers, then *sie* ‘she’ should be able to bind *Maria* in (48b) because the personal pronoun appears vP-internal, that is, too low to induce a Principle C violation. In addition, she or he argues that if we insert the discourse particle *wohl* ‘presumably’, then it must follow the personal pronoun *sie* ‘she’. I agree with the observation about the word order, but I disagree with the objection. I take the discourse particle *wohl* to be a JP modifier. As shown by Zimmermann (2008, p. 218), while in assertions the epistemic reference point of *wohl* is the speaker, in questions the epistemic reference point is the addressee or the addressee and speaker together. Now, if *wohl* is a JP adjunct and if it must follow *sie*, then the pronoun cannot be vP-internal. It merges between Act⁰, where *hat* ‘has’ has moved, and JP where *wohl* adjoins, i.e., high enough to induce a Principle C violation. For more on Principle C effects in different types of adverbial clauses, interested readers are referred to Valmala (2009).

20 Thurmair (1989), in turn, disagrees and claims that discourse particles in instrumental *indem*-clauses are barely possible:

- (73) Sie hat die Prüfung bestanden, indem sie (*ja/*doch/?eben/?halt) Tag und Nacht gelernt hat.
 she have.3SG the exam pass.PTCP *indem* she MP/MP/ MP/ MP) day and night learn.PTCP have.3SG
 ‘She passed the exam because she had learned day and night.’

(Thurmair, 1989, p. 77, ex. 141)

As the English paraphrase indicates, however, (73) seems to have a causal interpretation. This might explain the contrast between (57) and (73).

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