

# The Emergence of the Infinitival Left Periphery

Joachim Sabel

## 1. Introduction

The languages of the world differ with respect as to whether they allow for infinitival interrogatives and infinitival relative clauses. In order to explain this variation, I postulate the “*Wh*-Infinitive-Generalization” that links the (non-) availability of infinitival interrogatives and infinitival relatives to morphological properties of the infinitival *C*-system. Based on synchronic and diachronic evidence, it is shown that *wh*-infinitives as well as infinitival relatives are impossible in languages in which the left periphery of the infinitive cannot be occupied by a phonetically realized infinitival complementizer. In contrast, languages with *wh*-infinitives do exhibit infinitival complementizers. In order to derive the “*Wh*-Infinitive-Generalization”, I argue that infinitival *C*<sup>0</sup> is “defective” in languages without *wh*-infinitives (/ infinitival relatives) where “defective” infinitival *C*<sup>0</sup> is understood in analogy to defective *T*<sub>def</sub><sup>0</sup> (see Chomsky 2000, 2001, 2008), i.e. *C*<sub>def</sub><sup>0</sup> cannot bear the complete range of features specific for *C*<sup>0</sup> (i.e. [*focus*]-, [*wh*]-, [*topic*]-, and [*pred*]-features). As a consequence, the specifier of *C*<sub>def</sub><sup>0</sup> like the specifier of *T*<sub>def</sub><sup>0</sup> may serve only as an intermediate but not as a final landing site of movement.

## 2. The impossibility of infinitival interrogatives and relatives

In this section, I will give a description of the phenomenon of infinitival interrogatives and I will show that the absence of this type of construction in German does not have lexical but has syntactic reasons. Infinitives in the languages of the world behave differently in several respects. One difference relates to their potential to be used in the formation of indirect infinitival *wh*-questions. As can be seen from the following examples, embedded infinitival *wh*-questions and embedded infinitival polar-questions are possible in English (1) but not in German (2).<sup>1, 2</sup>

- (1) a. Lisa has decided [*who* to visit *t*].  
b. Lisa has decided [whether to visit him or not].
- (2) a. \*Lisa hat entschieden [*was* Tom *t* zu sagen].  
Lisa has decided what Tom<sub>DAT</sub> to say  
'Lisa has decided what to say to Tom.'
- b. \*Lisa hat entschieden [ ob Tom etwas zu sagen].  
Lisa has decided whether Tom<sub>DAT</sub> something<sub>ACC</sub> to say

The impossibility of realizing infinitival interrogatives in German is not due to a lexical gap, i.e. because German does not have verbs that select [+*wh*] infinitives (Giusti 1989, Wilder 1989, Sabel 1996). This is illustrated with the examples in (3)-(4). Verbs such as *decide* take all four complement types with respect to [ $\pm$ *wh*], [ $\pm$ *fin*] features. In German, however, only three of the four possibilities are attested with the corresponding verb *entscheiden* ‘decide’.

- (3) a. John has decided [to sell the old car tomorrow]. [-*wh*, -*fin*]  
b. John has decided [that he will sell the old car tomorrow]. [-*wh*, +*fin*]

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\* UCL, Université Louvain (joachim.sabel@uclouvain.be)

<sup>1</sup> For the time being, I refer with infinitival clauses to *to*-infinitives in English and *zu*-infinitives in German. Further infinitival constructions will be discussed in section 5.

<sup>2</sup> The interpretation of *wh*-infinitivals and infinitival relatives involves “modality.” This means that (1a) is understood as *Lisa has decided [who she should/could visit <who>]*, see Bhatt (1999) for discussion of this aspect.

- c. John has decided [*what* he will sell *t* tomorrow]. [+wh, +fin]  
 d. John has decided [*what* to sell *t* tomorrow]. [+wh, -fin]
- (4) a. Tom hat entschieden [den Wagen morgen zu verkaufen]. [-wh, -fin]  
 Tom has decided the<sub>ACC</sub> car tomorrow to sell  
 b. Tom hat entschieden [dass er heiraten wird]. [-wh, +fin]  
 Tom has decided that he<sub>NOM</sub> marry will  
 c. Tom hat entschieden [wen er *t* heiraten wird]. [+wh, +fin]  
 Tom has decided who<sub>ACC</sub> he marry will  
 d. \*Tom hat entschieden [wen *t* zu heiraten]. [+wh, -fin]<sup>3</sup>  
 Tom has decided who<sub>ACC</sub> to marry

The following list contains further German verbs that select [ $\pm$ fin] and [ $\pm$ wh] complements. The only clauses that are excluded with these verbs are [+wh, -fin] complements:

- (5) *berichten* ‘tell/report’, *besprechen* ‘discuss’, *mitteilen* ‘inform’, *entscheiden* ‘decide’, *erkennen* ‘realize’, *erklären* ‘explain’, (*sich überlegen* ‘(reflexive) consider’, (*sich erinnern* ‘(reflexive) remember’, *vergessen* ‘forget’, ...

Given that with all of these verbs the sentence types (4a-c) are possible, it is clear that the impossibility of (4d) does not have lexical (or selectional) but syntactic reasons. Note also that in German, in contrast to English, non-selected infinitives such as infinitival relatives are impossible.

- (6) a. This is a topic [*about which* to argue *t*].  
 b. This is a topic [*about which* one can argue *t*].
- (7) a. \*Lisa sucht das Messer [*mit dem* Käse *t* zu schneiden].  
 Lisa seeks the knife<sub>ACC</sub> with the<sub>DAT</sub> cheese<sub>ACC</sub> to cut  
 ‘Lisa seeks the knife with which to cut the cheese.’  
 b. Lisa sucht das Messer [*mit dem* man Käse *t* schneidet].  
 Lisa seeks the knife<sub>ACC</sub> with the<sub>DAT</sub> one<sub>NOM</sub> cheese<sub>ACC</sub> cuts  
 ‘Lisa seeks the knife with which one cuts cheese.’

In this section, we have seen that indirect infinitival questions in German, in contrast to English are systematically excluded. The reason for this asymmetry between English and German is rooted in syntax rather than the lexicon and must be traced back to a systematic difference in the syntax of these languages. As will be argued below, this asymmetry is related to the impossibility of *wh*-movement<sup>4</sup> into the left periphery of an infinitive as a final destination of movement in German but not in English.

In the next sections I will discuss the variation of operator movement into the infinitival left periphery in other languages from a synchronic and diachronic perspective. I will also turn to the variation of specific infinitival construction types within a certain language. For example, languages such as Eng-

<sup>3</sup> Note that (4d) becomes grammatical if the infinitival complement clause is interpreted as [-wh], as in (4a). The reason is that *wh*-words in German may serve as indefinites. Then, the *wh*-word *wen* is interpreted in situ as the indefinite “someone,” and the word order in (4d) has the meaning *Tom has decided to marry someone*.

<sup>4</sup> In this paper, I focus mainly on *wh*-infinitivals, although I also discuss the implications of my analysis for the analysis of infinitival relatives. Furthermore, the infinitives that I discuss in this paper are control *zu*-infinitives. Other infinitives like raising and bare infinitives that appear as arguments of modals and ECM (i.e. AcI-) verbs in German will not be discussed. The reason is that the latter are not selected by verbs that allow for interrogative complements. Examples of embedded interrogative infinitives without *zu* as in (ia) are lexicalized forms (VPs). Therefore, we don’t find long movement with these infinitives, as illustrated in (ib). As can be seen from (ii), the construction is not productive in German. Relative clauses with these infinitivals are likewise generally excluded.

(i) a. Ich weiß nicht wen besuchen. b.\*Ich weiß nicht wen glauben, dass sie *t* besucht hat.  
 I know not who<sub>ACC</sub> visit-INF I know not who<sub>ACC</sub> believe-INF that she visited has  
 (ii) \*Ich habe entschieden wen besuchen.  
 I have decided who<sub>ACC</sub> visit

lish allow for *wh*-infinitives with *to*-infinitives but not with gerunds. Let us now turn to other languages and investigate whether they allow for indirect infinitival questions.

### 3. Infinitival interrogatives in other languages

Other European languages besides German that do not allow for *wh*-infinitives are Swedish (8), Norwegian (9) and Danish (10).

- (8) \*Han har glömt [*vad* [att köpa *t*]].  
 he has forgotten what to buy
- (9) \*Det er uklart [*hva* [å gjøre *t*]].  
 it is unclear what to do
- (10) \*Han har glemt [*hvad* [at købe *t*]].  
 he has forgotten what to buy

In Polish (11) (Zabrocki 1981: 53), French (12) (Kayne 1984:104), Spanish (13) (LaPolla 1988), European-Portuguese (14) (Raposo 1987), Italian (15) (Napoli 1976) and Dutch (16) *wh*-infinitives are possible, as in English:

- (11) Janek nie wie [*gdzie* [skukać Marka *t*]].  
 Janek not know where to-see Marka
- (12) Je lui ai dit [*où* [aller *t*]].  
 I him have said where to-go
- (13) No se [*qué* [decirle *t*]].  
 not (I-)know what to-say-him
- (14) Nós não sabemos [*quem* [convidar *t* para o jantar]].  
 we not know who to-invite for to-eat
- (15) Nonso [*dove* [andare *t*]].  
 not (I-)know where to-go
- (16) Ik weet niet [*wie* [*t* te bezoeken]].  
 I know not who to visit

Up to here we have discussed variation with respect to the possibility of indirect infinitival *wh*-questions and infinitival relatives in German-type and English-type languages. Variation can be observed in one and the same language as well. *To*-infinitives differ from another infinitival construction, the gerundive construction, where indirect questions and relative clauses are excluded:

- (17) a. \*I wonder [*where* [going *t*]].  
 b. \*The table [*on which* [putting your coat *t*]] is in the house.

How can we explain these differences between languages and different types of infinitivals? In trying to ascertain why infinitival interrogative and infinitival relative clauses are ruled out in some languages (or with certain infinitival constructions, as has been illustrated for English), it is enlightening to look at the C-system of the relevant infinitives. In the next section, I address the question (from a diachronic and synchronic perspective) whether overt subordinating elements like complementizers are equally possible in the languages already discussed.

## 4. Infinitival complementizers and operator movement into the left periphery

### 4.1. Prepositions, complementizers, and infinitival markers

The basic idea of my analysis is that a close connection exists between the absence of overt subordinators in the infinitival C-system and the possibility of interrogative and relative clause formation with infinitives. Languages without phonetically realized complementizers in infinitives do not allow for the formation of indirect infinitival questions and relative clauses with these infinitives. In more

general terms, the realization of a phonologically visible head X is a precondition for overtly filling the Spec of XP.

Let us consider the question of whether there are any subordinators in German, English and Dutch that might be argued to be base-generated in the C<sup>0</sup> or Spec CP position of the infinitives discussed above. German *zu*-infinitives differ in this respect from the infinitives in the two Germanic languages with *wh*-infinitives mentioned above, i.e. from *to*-infinitives in English, and *te*-infinitives in Dutch. In *to*-infinitives, the prepositional complementizer *for* is realized in the infinitival C-system of complement and relative clauses:

- (18) I want [<sub>CP</sub> for [<sub>TP</sub> John to win]].  
 (19) There is someone [<sub>CP</sub> for [<sub>TP</sub> John to talk to]].

It has been established in the literature that infinitives in Indo-European languages have developed from verbal nouns (see Lightfoot 1979, Kageyama 1992, Nunes 1995, Jarad 1997, among others). As a verbal noun, the infinitive was governed by a preposition, for example, by the preposition *to* in Old English and *zi* in Old High German. In the modern European languages the nominal infinitive has become a verb and *zi* and *to* have lost their prepositional categorial nature and have become “infinitival markers.” This is the case with the control infinitives of all modern Germanic languages. Modern German *zu*, Dutch *te* and English *to* have all been analyzed in a similar way, i.e. as a verbal particle in T<sup>0</sup> that has the distribution of an auxiliary, although *zu* and *te* differ from *to* in so far as they are bound whereas *to* is a free morpheme. Neither *to* nor *zu* and *te* are prefixes that are combined with the infinitival verb in the lexicon, and neither *to*, *te* nor *zu* occupy a position in the infinitival C-system (see Bennis & Hoekstra 1989a,b; Beukema and den Dikken 1989, Den Besten & Broekhuis 1989; Rutten 1991, IJbema 2001, among others).

In Middle English (ME) *for* starts to introduce purposive clauses as a complementizer. Before the ME period no *wh*-infinitives are attested, but they are found after the ME period, i.e. after *for* introduces complement clauses as a complementizer. The same development has been observed for *om* in Old/Middle Dutch.<sup>5</sup> Modern Dutch has the *om-te* infinitive. *Om* is the counterpart of *for* (although *om* cannot appear with an overt subject in the infinitive, see below). Like English *for* it appears in adjunct clauses (see (20)-(21)) and acts as a mere subordinator in infinitival complement clauses, cf. (22).

- (20) Bernard ging naar Amerika [om [beroemd te worden]].  
 ‘Bernard went to America, in order to become famous.’  
 (21) ...een bal [<sub>CP</sub> *Op* om [mee *t* te spelen]].  
 a ball (which) Comp with to play  
 (22) ...dat zij probeerde [<sub>CP</sub> (om) [<sub>TP</sub> het boek te lezen]].  
 that she tried (Comp) the book<sub>ACC</sub> to read

As a complementizer, *om* occupies the infinitival C-system (Bennis & Hoekstra 1989a,b; Den Besten & Broekhuis 1989a; Broekhuis & Hoekstra 1990; Rutten 1991, IJbema 2001). These observations illustrate an intrinsic relation between the development of the infinitival C-system and the formation of operator movement into the infinitival left periphery. It is a frequent phenomenon that a preposition becomes a complementizer as a result of grammaticalization and in creolization.<sup>6</sup>

<sup>5</sup> In ME *for* as an infinitival complementizer starts to introduce purposive (adjunct) infinitival clauses that correspond to present *in-order*-clauses (van Gelderen 1998). The use of *for-to*-infinitives without overt subjects is extended to further contexts in ME and is still found in many varieties of modern English (such as for example Belfast English). As a consequence of the grammaticalization process, in *om-* and *for-*infinitival complements a paraphrase with ‘in order to’ is not possible. Note that sentences like (18) do not appear in ME and may have been enabled by a reanalysis of benefactive *for*-PPs in contexts like ...V [for me] [ to ...] (see Fischer et al. 2000, Pak 2005 for discussion of this aspect).

<sup>6</sup> Reanalysis of adpositions as complementizers is common crosslinguistically. For example, in Slave the complementizer *gha*, in both its purposive and non-purposive variations is historically related to the postposition *gha* (Rice 1989: 43, Benner 2005), similar considerations apply to the French preposition *de* as a complementizer (Kayne

In German, a construction that is comparable with the *for-to* and with the *om-te* infinitive is the *um-zu* infinitive. However, in contrast to English and Dutch, *um* as any other phonetically realized complementizers is excluded in infinitival complement clauses ((23a) = (2b)) and is only attested in adjunct clauses, i.e. we find purposive adjunct clauses that are introduced by *um* ‘in order’ (24):

- (23) a. \*Lisa hat entschieden [<sub>CP</sub> ob [<sub>TP</sub> Tom etwas zu sagen]].  
 Lisa<sub>NOM</sub> has decided whether Tom<sub>DAT</sub> something<sub>ACC</sub> to say  
 b. \*dass sie versuchte [<sub>CP</sub> um [<sub>TP</sub> das Buch zu lesen]].  
 that she<sub>NOM</sub> tried COMP the book to read
- (24) Tom und Lisa gingen ins Museum [<sub>PP</sub> um [ die alten Meister anzuschauen]].  
 Tom and Lisa went into-the museum in-order the old masters<sub>ACC</sub> to-take-a-look-at

In (24), *um* is in a CP-external position. Other prepositional elements like *ohne* ‘without’, and *anstatt* ‘instead’ that precede infinitivals as well as finite *dass*- (‘that’-) clauses are also structurally realized outside the infinitival clause:

- (25) a. Max kauft Bücher [<sub>PP</sub> ohne [<sub>CP</sub> dass er sie liest]].  
 Max<sub>NOM</sub> buys books<sub>ACC</sub> without that he them<sub>ACC</sub> reads  
 b. Max kauft Bücher [<sub>PP</sub> ohne [<sub>CP</sub> PRO sie zu lesen]].  
 Max<sub>NOM</sub> buys books<sub>ACC</sub> without them<sub>ACC</sub> to read

Modern German is similar to Old/Middle English and Old/Middle Dutch. It lacks infinitival complementizers, *wh*-interrogatives, and infinitival relatives together. Until Modern German, the category change from a preposition selecting infinitive to an infinitival complementizer has not taken place.

Let us next turn to the languages with *wh*-infinitives, discussed in (11)-(16), in order to see whether the correlation between the realization of infinitival complementizers and operator movement into an infinitival CP can be observed from a synchronic perspective as well. As illustrated below, the infinitival C-system may be filled with a base-generated, phonetically realized element in these languages. This is shown here for the control infinitives in Polish (26) (Zabrocki 1981:69), French (27), Spanish (28) (Luján 1980), European-Portuguese (EP) (29) (Kayne 1991), and Italian (30).

- (26) Chciałem [<sub>CP</sub> żeby [aprosić Kasię]].  
 I-wanted Comp to-invite K.  
 (27) Il a oublié [<sub>CP</sub> de [nettoyer la chambre]].  
 he has forgotten Comp to-clean the room  
 (28) Acabamos [<sub>CP</sub> de [ofrecer se los]].  
 we-have-just Comp to-offer him them  
 ‘We have just offered them to him.’  
 (29) Não sei [<sub>CP</sub> se [ir o não ir]].  
 not (I-)know Comp to-go oder not to-go  
 ‘I don’t know whether to go or not to go.’  
 (30) Gianni non sa [<sub>CP</sub> se [andare al cinema]].  
 Gianni not know COMP to-go to cinema  
 ‘Gianni does not know whether to go to the movies.’

Consider next the other languages discussed in section 3 that do not allow for *wh*-infinitives. *Wh*-infinitives are also excluded in Swedish (8), Norwegian (9) and Danish (10). The same holds for ger-

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1984, 1999). Data from creolization provide further evidence for the fact that sentence-embedding prepositions become infinitival complementizers (Woolford 1981, Eilfort 1986, and Meyerhoff 2002). Note also that other categories than prepositions can be reanalyzed as complementizers. For example, demonstratives grammaticalize as complementizers (‘that’ in English and ‘das(s)’ in German, see Heine and Kuteva (2002:115), Roberts and Roussou (2003:3)). A further source of subordinators are verba dicendi, as demonstrated in Lord (1967) for Ewe and in Simpson and Wu (2002) for Taiwanese.

unds in English (17). As was observed with respect to German *zu*-control infinitives, it is generally assumed that the C-system of gerunds in English, and the C-system of control infinitives in Norwegian, Danish (cf. Holmberg 1986:154ff, Sigurðsson 1989:52, Thráinsson 1998) and Swedish (Johnson und Vikner 1994, Thráinsson 1998) cannot be introduced by a phonetically realized base-generated element in the C-system, i.e. by a subordinating conjunction that takes the form of a preposition or by an infinitival marker that introduces an infinitival clause of the relevant type. *At* in Danish, *å* in Norwegian and *att* in Swedish are infinitival markers that – like German *zu* and English *to* – do not occupy a position in the C-system but a position inside TP. To sum up, in languages with *wh*-infinitivals, infinitival complementizers exist, in contrast to languages without *wh*-infinitives, such as German-type languages, where (i) the category change from preposition selecting to infinitival complementizer has not taken place and (ii) the infinitival marker is not located within the infinitival C-system.

#### 4.2. The “*Wh*-Infinitive-Generalization”

The examples in the preceding sections give rise to the following empirical generalization. For all languages the existence of operator movement that may end up in an infinitival Spec CP as a *final landing* site implies the existence of overt infinitival complementizers:

- (31) *The Wh-Infinitive-Generalization (WHIG)*  
*Wh*-movement may terminate in the Spec CP of an infinitive in a language iff this language possesses the option of filling the C-system of this (type of) infinitive with an overt complementizer.
- (32) i. [+Op-in-SpecCP<sub>Inf</sub>, +Comp<sub>Inf</sub>]  
 ii. [-Op-in-SpecCP<sub>Inf</sub>, -Comp<sub>Inf</sub>]  
 iii. [+Op-in-SpecCP<sub>Inf</sub>, -Comp<sub>Inf</sub>]  
 iv. [-Op-in-SpecCP<sub>Inf</sub>, +Comp<sub>Inf</sub>]

According to (31), no languages of the kind (32iii-iv) should exist. However, to include diachronic facts, a formulation of (31) as an implicational generalization is adequate.

- (31') *The Wh-Infinitive-Generalization (WHIG) (revised)*  
 If *wh*-movement may terminate in the Spec CP of an infinitive in a language then this language possesses the option of filling the C-system of this (type of) infinitive with an overt complementizer).

The WHIG (31') correctly predicts that languages of the types (32i), (32ii), and (32iv) ((32iv) in diachronic respects) are found, whereas languages of the type (32iii) do not exist. In more general terms, the condition (31/31') implies that the existence of a phonetically overt head H (selected by a substantive element) is a precondition for overtly filling its Spec. In the next section, however, I will argue that intermediate movement through a defective C-system is possible.

At least three questions arise at this point: (i) What follows for intermediate movement into an infinitival CP and (ii) how can the generalization in (31/31') be derived? (iii) Does “infinitive” in (31/31') refer to different infinitival construction types?

### 5. Deriving the *Wh*-Infinitive-Generalization

Let us start with question (i). My analysis rests on the assumption that the infinitival left periphery in languages without *wh*-infinitives is “defective.” Based on Chomsky’s (2000, 2001, 2005) analysis of raising and ECM-infinitives, the idea is that “defective” infinitival C<sup>0</sup> has to be understood in analogy to defective (infinitival) T<sup>0</sup><sub>def.</sub>, i.e. as a functional head with an incomplete feature set. DP in Spec TP of a non-defective (finite or infinitival) T is frozen in place and cannot undergo further A-movement, whereas a DP in the specifier of TP of a defective T has to undergo further A-movement. A similar situation exists with A'-movement in the case of *wh*-infinitivals and infinitival relatives. The infinitival left periphery in languages/constructions without *wh*-infinitives (/infinitival relatives) may therefore

like Spec TP in raising and ECM infinitivals serve only as an intermediate landing site but never as a final destination of movement.

In European Portuguese (EP), PRO and lexical NPs are not in complementary distribution in the subject position of selected and non-selected infinitives (see Raposo 1987a, 1987b, 1989 for discussion), infinitival T (ense) has the ability to value nominative case, and to bear  $\phi$ -feature agreement. An infinitival (i.e. tenseless) verb may occur with or without overt agreement morphology, as illustrated in (33) and (35). According to Raposo's analysis, the realization of agreement morphology in (33) depends on verb movement to C<sup>0</sup> (compare (33) vs. (34a)). (34b) shows that *wh*-movement may not target the C-system of an inflected infinitival as a final landing site.

- (33) Eu penso [<sub>C</sub> *continuarem* [<sub>TP</sub> os meninos *t<sub>v</sub>* a chegar cedo]]  
 I think to-continue-Agr the children<sub>NOM</sub> to arrive soon  
 'I think the children to-continue-Agr to arrive soon'
- (34) a. \*Nós nao sabemos [<sub>CP</sub> *quem* [<sub>TP</sub> eles convidarem *t* para o jantar]]  
 we not know who they to-invite-Agr for dinner  
 b. \*Nós nao sabemos [<sub>CP</sub> *quem* convidarem [<sub>TP</sub> eles *t* para o jantar]]  
 we not know who to-invite-Agr they for dinner
- (35) Nós nao sabemos [<sub>CP</sub> *quem* [<sub>TP</sub> PRO convidar *t* para o jantar]]  
 'We don't know who to invite for dinner.'

Note, however, that long extraction from an inflected infinitival is possible, as illustrated in (36) for subject and object extraction (Zubizarreta 1982):

- (36) a. *Que amigos* é que o Manel pensa [*t* terem [<sub>TP</sub> *t* levado o livro]]  
 which friends does Manel think to-have-AGR taken the book  
 b. *Que loja* é que o Manel pensa [*t* terem [<sub>TP</sub> os meninos roubado *t*]]  
 which house does Manel think to have-AGR the children broken into

*Wh*-movement in the inflected infinitivals is only prohibited if it uses the infinitival left periphery as a final landing site. I conclude that EP is a language of the group (32b.i) or (32b.iv), depending on whether the uninflected or the inflected infinitive is realized.

The German example (4d), repeated here as (37a), illustrated that a *wh*-phrase may not end up in the left periphery of a control infinitive. (37b), however, shows that long *wh*-movement is possible:

- (37) a. \*Tom hat entschieden [<sub>CP</sub> *wen* [<sub>TP</sub> PRO *t* zu heiraten]].  
 Tom<sub>NOM</sub> has decided who<sub>ACC</sub> to marry  
 b. *Wen* hat Tom entschieden [<sub>CP</sub> *t* [<sub>TP</sub> PRO <*wen*> zu heiraten]].  
 who<sub>ACC</sub> has Tom<sub>NOM</sub> decided to marry

The same facts can be observed with infinitival relatives. Example (7a), repeated here as (38a), shows that relative pronouns may not terminate in the left periphery position of a *zu*-infinitive in German. If, however, the pronoun is moved further on into the Spec CP position of a finite clause, the sentence is grammatical, as shown in (38b):

- (38) a. \*Lisa sucht das Messer [<sub>CP</sub> *mit dem* [<sub>TP</sub> PRO Käse *t* zu schneiden]].  
 Lisa<sub>NOM</sub> seeks the knife<sub>ACC</sub> with the<sub>DAT</sub> cheese<sub>ACC</sub> to cut  
 'Lisa seeks the knife with which to cut the cheese.'  
 b. Lisa sucht das Messer [<sub>CP</sub> *mit dem* [<sub>TP</sub> sie beabsichtigt  
 Lisa<sub>NOM</sub> seeks the knife<sub>ACC</sub> with the<sub>DAT</sub> she<sub>NOM</sub> intends  
 [<sub>CP</sub> *t* [<sub>TP</sub> PRO Käse *t* zu schneiden]]]].  
 cheese<sub>ACC</sub> to cut  
 'Lisa seeks the knife with which she intends to cut cheese.'

These examples illustrate (like the examples (34b) vs. (36) from inflected infinitivals in EP) that the highest (or the overt) occurrence of an operator-phrase may not appear in the infinitival Spec CP position, although the Spec CP position of the infinitival may be used as an intermediate landing site. This provides the answer to question (i). Let us now turn to question (ii). How can the WHIG be derived?

The absence of *wh*-infinitives might result from the following parametric property.  $C_{\text{def}}$  in control infinitives cannot bear the complete range of features of the C-system. A defective C-system bears a full set of  $\phi$ -features and Tense-features that is transferred to  $T^0$  (assuming the technology in Chomsky 2008), but it lacks the possibility of being endowed with a [*focus*]/[*wh*]-feature in *wh*-question formation (or with a [*topic*]/[*pred*]-feature in relative clause formation). The reason is that Force-, Foc- and Top-features are not realized in the left periphery of infinitives with a defective C-system but only Fin-features i.e. these defective infinitives are FinPs.<sup>7</sup> At the moment FinP may host a complementizer, as a result of infinitival complementizer evolution, TopP and FocP as well, i.e. the whole left periphery may be projected, giving rise to relative clause and indirect *wh*-question formation. The situation in infinitives with a defective C-system is that (similar to an DP in the edge of  $T_{\text{def}}$ ) a *wh* or a relative operator may move to Spec of FinP, due to the possibility of  $C_{\text{def}}$  being endowed with an edge-feature, but it may not remain there, i.e. in a position in which it cannot be properly interpreted. Therefore, Spec  $C_{\text{def}}P$  (the left periphery) and Spec  $T_{\text{def}}P$  may serve only as intermediate landing sites.

This analysis offers also an explanation for the fact that partial *wh*-movement in German (the *wh*-movement step in the embedded clause is triggered by a [*focus*]-feature in the analysis of Sabel 1998, 2000a, 2000b) to the initial position of a [*-wh*] infinitival clause is likewise ungrammatical (McDaniel et al. 1995). The matrix verb *glauben* ‘believe’ in (39) selects [*-wh*,  $\pm$  fin] complements. (39a) illustrates that focus-movement of *wh*-phrases (here *wen* ‘who’)<sup>8</sup> is possible in a finite clause. (39b) shows that the same kind of movement is impossible in infinitives.

- (39) a. Was glaubst du [<sub>CP</sub> *wen* [du wahrscheinlich *t* triffst]]?  
           what believe you who<sub>ACC</sub> you<sub>NOM</sub> probably meet  
       b. \*Was glaubst du [<sub>CP</sub> *wen* [PRO wahrscheinlich *t* zu treffen]]?  
           what believe you who<sub>ACC</sub> probably to meet  
           ‘Who do you believe to meet probably?’

As soon as an overt infinitival complementizer is lexicalized, the whole left periphery is projected. The C-system is no longer defective and a phonetic empty C (complementizer)-counterpart is likewise lexically established, so that the infinitival left periphery may be projected with or without a phonetically overt complementizer as in languages of type (32i):

- (40) [ForceP [TopP [FocP [TopP [FinP di/de/for/Ø ...]]]]]

Note that during language acquisition children likewise look for specific pieces of overt evidence in order to set parameters (the cue-based approach to parameter setting). Lightfoot (1999), for example, argues that in the course of L1 acquisition of the V2 property of German/Dutch, children have to hear sufficient evidence of some constituent other than the subject preceding the verb in main clauses.<sup>9</sup> The overt realized complementizer has a similar function with respect to the formation of infinitival interrogatives/relatives.

<sup>7</sup> See van Riemsdijk (1985, 2001), Sabel 1996 for arguments in support of the assumption that the control infinitives under discussion in German are sentential categories (and not VPs), and Williams (1975), Reuland (1983), Kitagawa (1985a, 1985b) Zagona (1988:62f.), and Law (1991:105ff.) argue that English gerunds are sentential.

<sup>8</sup> It is correctly predicted that copy movement does not yields better results than partial movement. The [*wh*, *focus*]-feature is part of the *wh*-element, and the copy is not distinct from the highest *wh*-element in this respect:

(i) \**Wen* glaubst du [<sub>CP</sub> *wen* [<sub>TP</sub> wahrscheinlich *t* zu treffen]]?  
           who believe you who probably to meet

<sup>9</sup> Note that an operator in situ variant is likewise excluded with  $C_{\text{def}}$ -languages. The reason being that a *wh*-feature that may act as an unselective binder is generated in ForceP but ForceP is not generated in infinitives with defective C-systems or alternatively, if *wh*-in situ involves invisible movement, the landing-site is missing.

The proposed analysis has similarities with Kiparsky's (1995) idea that V2 in Germanic was a consequence of the development of subordinating complementizers (and hence of the CP architecture that provides the necessary landing sites for V2 sentences). Similar facts have been argued to be responsible for the development of V-to-C in Old Irish finite clauses, even though, for independent reasons, the complementizer of a finite CP is located in Force<sup>0</sup> and not in Fin<sup>0</sup>.<sup>10</sup>

Let us now turn to question (iii), i.e. whether the WHIG is a generalization on infinitival construction types. One has to admit that the WHIG is, in fact, a generalization on construction types, not on languages. I already mentioned the difference between English *to*-infinitives and gerunds. Gerunds do not have infinitival complementizers and no movement terminating in the infinitival left periphery:

- (41) a. \*I wonder [*where* [ going *t* ]].  
 b. \*The table [*on which* [ putting your coat *t* ]] is in the house.

This means that language internal variation is also predicted by (31'). Recall the case of European Portuguese inflected (33)-(34) and (36) vs. non-inflected infinitives (35). It has been argued in the literature that the licensing of a lexical infinitival subject involves head movement to C. Then (33)-(34) but not (35)-(36) involve overt or covert verb movement into [+wh]-C which is excluded on general grounds (Rizzi and Roberts 1996, Sabel 1996).

So far we have only discussed indirect infinitival questions. What about root infinitives? In German, *zu*-root infinitives appear as their embedded counterparts only as *wh* (expressive-) exclamatives and not as interrogatives (Grohmann 2000, Gärtner 2013; 2014):

- (42) (So ein Ignorant.) Einfach die Gegenargumente zu ignorieren!  
 (such an ignoramus.) simply the counterexamples to ignore  
 (43) \*Wohin einmal zu gehen?  
 where once to go  
 (44) Where to go?  
 (45) Wat te doen?  
 what to do

In other languages, for example, in English and Dutch, direct infinitival questions are possible similar to indirect infinitival questions. Therefore, it is probably the case that the specific properties of the infinitival left periphery that are realized in an embedded structure are transferred to the left periphery of the corresponding infinitival matrix structures.

## 6. Conclusion

I have illustrated that languages differ with respect to whether they allow non-finite interrogatives and relatives. It was shown that the (non-) availability of these non-finite constructions is linked to morphological properties of the C-system: The absence of *wh*-infinitives in languages correlates with the lack of overt base-generated material (i.e. non-finite complementizers) in the left periphery of non-finite clauses. In contrast, languages that license *wh*-infinitives do exhibit infinitival complementizers. The basic empirical generalization, i.e. the "Wh-Infinitive-Generalization", can be derived from the assumption that languages without *wh*-infinitives or infinitival relatives have a defective C-system in non-finite clauses which excludes *wh*-movement that terminates in the defective infinitival left periphery.

<sup>10</sup> It has been argued that *why* may not appear in infinitival questions (Ko 2005). If this generalization turns out to be correct, its reason could be related to the fact that a high position "Int" in the left periphery (Rizzi 2001) is not available in infinitives (see Ko 2005 for related discussion):

(i) \*I don't know [<sub>CP</sub> why [ to leave]].

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