Case matching as bidirectional Agree

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Abstract

The aim of this paper is to derive the case matching patterns of free relative and parasitic gap constructions in German and Polish by varying the order and directionality of Agree operations. Case matching in both constructions is modeled as an Agree relation between an overt category and an additional covert category. Assuming that derivations proceed bottom-up and obey the Strict Cycle Condition, upward Agree between the two categories results in empty valuation, which in turn leads to configurations where case mismatches are allowed. In that sense, upward Agree counterbleeds the case matching condition that holds in free relatives and parasitic gaps.

1. Introduction

The main goal of this paper is to develop an analysis of case matching effects as they occur with free relatives (FRs) and parasitic gaps (PGs). An example for a free relative clause is given in (1), an example for parasitic gaps is given in (2).

(1) *Free relatives*
I'll buy *what* you are selling.

(2) *Parasitic gaps*
Which article did you file without reading?

In both constructions, we have one overt element that is shared between two verbs. This is obvious for parasitic gap constructions: the wh-phrase *which article* is the object of *file* and *read*. In the case of free relatives, the sharing is less obvious: the wh-pronoun *what* is the object of *sell*, but the entire embedded

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clause is the object of *buy*. Still, the embedded wh-pronoun is perceptible for selectional properties of the matrix verb (Bresnan & Grimshaw 1978). Therefore, the wh-pronoun can also be considered to be part of the matrix clause.

Further evidence for the fact that the wh-phrase in both constructions is shared between the two clauses comes from case matching effects. In both configurations, the overt category has to satisfy the case needs of the matrix verb and the embedded verb.

The aim of this paper is to explore this case matching property in more detail. As shown below, the matching condition is subject to linguistic variation. More concretely, we see that, when it comes to case matching in both constructions, Polish is the mirror image of German: In German, case mismatches are allowed with free relatives but not with parasitic gaps; in Polish, case mismatches are allowed with parasitic gaps but not with free relatives.

The cross-linguistic variation shows that each construction can in principle be subject to a case matching condition. Thus, an analysis is required that allows case matching in both constructions, but can still account for the distribution of case matching effects as shown in (2).

The paper is structured as follows: In section 2, the case matching patterns in German and Polish are introduced. In section 3, an analysis is developed that captures the twofold variation observed in the case matching patterns. The main assumptions of the account is that case matching is modeled as Agree, that Agree is bidirectional, and that the direction of Agree depends on the language and the construction. In case of downward Agree, strict matching is required, while mismatches are possible in case of upward Agree. Section 4 summarizes the interactions between the Agree operations showing that upward Agree leads to counterbleeding of the matching condition. In section 5, some extensions to the basic pattern derived in section 3 are analyzed. These extensions concern speaker variation and syncretisms. Finally, in section 6, I discuss possible alternatives to the bidirectional Agree approach, concluding that this approach fares best with the data. Section 7 concludes.

2. Data

This section shows in detail why Polish can be considered the mirror image of German when it comes to case matching effects. First, the pattern of German is described. Afterwards the facts in Polish are introduced.

2.1. German (Fanselow 1993, Pittner 1995, Kathol 2001, Vogel 2001)

The examples in (3) show that the cases of the parasitic gap and its antecedent have to match in German. In (3a), both the parasitic gap and the antecedent bear accusative case. Thus, the sentence is grammatical. Example (3b) shows that it is also possible to have dative case in both positions. In (3c-d), the cases of the antecedent and the parasitic gap differ. Both sentences are ungrammatical. The cases in (3e) differ, too, but this does not lead to ungrammaticality. In contrast to (3c,d), the differing cases in (3e) are syncretic. This implies that the morphological cases rather than the syntactic cases are subject to the matching condition.

(3) *Parasitic gaps: Strict case matching*

a. weil Hans *die*$_{ACC}$ *Frau* [ohne anzusehen$_{ACC}$]
because Hans the woman without to.look.at
geküsst$_{ACC}$ hat
kissed has
'because Hans has kissed the woman without looking at her'

b. weil Hans *der*$_{DAT}$ *Frau* [anstatt zu helfen$_{DAT}$]
because Hans the woman instead.of to help
schadete$_{DAT}$
hurt
'because Hans hurt the woman instead of helping her'

c. weil Hans **der*$_{DAT}$*/*die*$_{ACC}$ *Frau* [anstatt zu helfen$_{DAT}$]
because Hans the woman instead.of to help
behinderte$_{ACC}$
hampered
'because Hans hampered the woman instead of helping her'

d. weil Hans **der*$_{DAT}$*/*die*$_{ACC}$ *Frau* [anstatt zu
because Hans the woman instead.of to
behindern$_{ACC}$] half$_{DAT}$
hamper helped
'because Hans hampered the woman instead of helping her'

e. weil Hans *der*$_{GEN/DAT}$ *Verstorbenen* [anstatt ein Gedicht zu
because Hans the dead.one instead.of a poem to
widmen$_{DAT}$] in einer Gradrede gedachte$_{GEN}$
dedicate in a eulogy commemorate
'because Hans commemorated the dead one in a eulogy instead of dedicating a poem to her'

Turning to free relative clauses in German, we can observe a different pattern of case matching. Examples (4a) and (4b) show that if the cases assigned to the wh-phrase by the embedded verb and the matrix verb are identical, the resulting sentence is fine, just as with parasitic gaps in (3a-b). The sentences in (4c-d) show that free relatives differ from parasitic gaps in the matching condition. While in (4d), the differing cases lead to ungrammaticality just as in (3d), the case mismatch in (4c) can be resolved if the wh-phrase bears dative case, the case of the embedded clause. This contrasts with (3c), where the same case mismatch could not be resolved in a parasitic gap configuration.

(4) *Free relatives: Absence of case matching (with case restrictions)*

a. Hans mag$_{ACC}$ [*wen*$_{ACC}$ (auch immer) Maria hasst$_{ACC}$].
Hans likes who ever Maria hates
'Hans likes whoever Maria hates.'

b. Hans hilft$_{DAT}$ [*wem*$_{DAT}$ (auch immer) er vertraut$_{DAT}$].
Hans helps who ever he trusts
'Hans helps whoever he trusts.'

c. Hans mag$_{ACC}$ [**wen*$_{ACC}$/*wem*$_{DAT}$ (auch immer) Maria vertraut$_{DAT}$].
Hans likes who ever Maria trusts
'Hans likes whoever Maria trusts.'

d. Hans vertraut$_{DAT}$ [**wen*$_{ACC}$/**wem*$_{DAT}$ (auch immer) Maria mag$_{ACC}$].
Hans trusts who ever Maria likes
'Hans trusts whoever Maria likes.'

2.2. Polish (Citko 2013)

The case matching pattern in Polish differs from the one in German. As can be seen in (5a) and (5b), parasitic gaps in Polish are possible with accusative and dative case. Examples (5c-d) show that the case mismatches that are not allowed in German (3) are fine in Polish.

(5) *Parasitic gaps: Absence of strict case matching*

a. To jest dziewczyna, *którą*$_{ACC}$ Jan tolerował$_{ACC}$ [zanim
this is girl which Jan tolerated before
polubił$_{ACC}$].
liked
'his is the girl Jan tolerated before he grew to like.'

b. To jest dziewczyna, *której*$_{DAT}$ Jan towarzyszył$_{DAT}$ [zanim
this is girl which Jan accompanied before
zaczął pomagać$_{DAT}$].
started help
'This is the girl who Jan kept company before he started to help.'

c. To jest dziewczyna, *którą*$_{ACC}$/ **której*$_{DAT}$ Jan lubił$_{ACC}$ [zanim
this is girl which Jan liked before
zaczął pomagać$_{DAT}$].
started help
'This is the girl Jan liked before he started to help.'

d. To jest dziewczyna, *której*$_{DAT}$/**którą*$_{ACC}$ Jan ufał$_{DAT}$ [zanim
this is girl which Jan trusted before
polubił$_{ACC}$].
liked
'This is the girl Jan trusted before he got to like.'

Finally, the data in (6) show the case matching pattern of free relatives in Polish. If the cases are identical as in (6a) and (6b), the resulting sentence is grammatical. However, if the two cases are not the same, as in (6c) and (6d), the outcoming sentence is not grammatical. The example in (6e) shows again that, if the two mismatching cases are morphologically identical, a conflict can be circumvented.

(6) *Free relatives: Strict case matching*

a. Jan lubi$_{ACC}$ [*kogokolwiek*$_{ACC}$ Maria lubi$_{ACC}$].
Jan likes whoever Maria likes
'Jan likes whoever Maria likes.'

b. Jan pomaga$_{DAT}$ [*komukolwiek*$_{DAT}$ ufa$_{DAT}$].
Jan helps whomever trusts
'Jan helps whomever he trusts.'

c. Jan lubi$_{\text{ACC}}$ [**kogokolwiek$_{ACC}$/*komukolwiek$_{DAT}$* dokucza$_{\text{DAT}}$].
Jan likes whoever teases
'Jan likes whoever he teases.'

d. Jan ufa$_{\text{DAT}}$ [**komukolwiek$_{DAT}$/*kogokolwiek$_{ACC}$* wpuścił$_{\text{ACC}}$ do domu].
Jan trusts whoever let to home
'Jan trusts whoever he let into the house.'

e. Jan unika$_{\text{GEN}}$ [*kogokolwiek$_{GEN/ACC}$* wczoraj obraził$_{\text{ACC}}$].
Jan avoids whoever yesterday offended
'Jan avoided whoever he offended yesterday.'

2.3. Patterns

The patterns we have seen in sections 2.1 and 2.2 are summarized in the tables in (7) to (10). The cells show whether a certain combination of cases is grammatical. The columns correspond to the cases assigned in the embedded clauses. The rows show the cases of the matrix clause. The remarks in brackets indicate under which circumstances a case conflict can be resolved. In parasitic gap configurations in Germans and in free relatives in Polish, only a case syncretism can help to prevent ungrammaticality. In free relative configurations in German, on the other hand, case mismatches are fine as long as the wh-phrase bears the case of the embedded clause.[1] Similarly, in Polish, case mismatches in parasitic gap structures are allowed if the overt antecedent bears the case of the matrix clause.

(7) *Parasitic gaps in German*

M/PG	Acc	Dat	Gen
Acc	✓	*	*
Dat	*	✓	✓(syn)
Gen	*	✓(syn)	✓

[1]The only mismatch that is not allowed is a configuration where the case in the embedded clause is accusative while the case of the matrix clause is dative. This is due to case hierarchy effects active in German free relatives (see Pittner 1991, 1995, Vogel 2001 and Grosu 2003 for details). I do not discuss this complication of the pattern in this paper.

(8) *Free relatives in German*

M/FR	Acc	Dat	Gen
Acc	✓	✓(dat)	✓(gen)
Dat	*	✓	✓(gen)
Gen	✓(acc)	✓(dat)	✓

(9) *Parasitic gaps in Polish*

M/PG	Acc	Dat	Gen
Acc	✓	✓(acc)	✓(acc)
Dat	✓(dat)	✓	✓(syn)
Gen	✓(gen)	✓(syn)	✓

(10) *Free relatives in Polish*

M/FR	Acc	Dat	Gen
Acc	✓	*	✓(syn)
Dat	*	✓	*
Gen	✓(syn)	*	✓

The patterns allow for the following observations: First, German and Polish are mirror images of each other when it comes to case matching: free relatives that lack case matching effects in German, show them in Polish, while parasitic gaps that allow case mismatches in Polish show strict matching in German. Second, free relatives and parasitic gaps are mirror images of each: if one of the two constructions shows case matching effects, the other does not. Finally, we have seen that, in both languages, syncretic forms can repair violations of the case matching condition. Thus, what seems to count for matching are not the abstract Case features but the morphological form. Consequently, under the assumption that the morphological form does not count for narrow syntax, the case matching condition cannot be a principle of narrow syntax (see Trommer 2002 and Riemsdijk 2006 for the same conclusion).

3. Analysis

The analysis of the data presented in section 2 will be carried out in a derivational minimalist framework (Chomsky 1995 et seq.) combined with a derivational

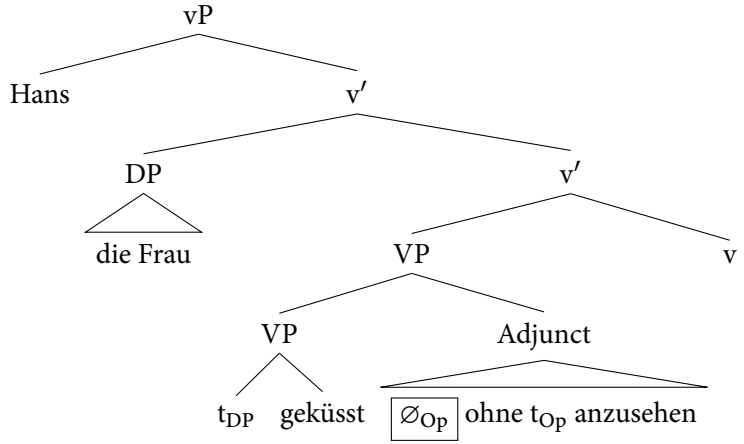
modular version of Distributed Morphology (Halle & Marantz 1993, Arregi & Nevins 2012). In order to derive the patterns of case matches and case mismatches, three points will play an important role: the position of covert categories, the directionality of Agree and the order of Agree operations. In this section, I first present all major assumptions and then go through eight sample derivations that illustrate how the Agree approach to case matching works.

3.1. The structure

As for the first important point – the position of covert categories – I assume that the 'dual task' that the wh-phrase in free relatives and the antecedent of a parasitic gap have to perform with respect to case can be captured if there are actually two categories in the structure that each receive a case and have to agree in case. Since only one category appears in the surface structure, one of the two categories has to be phonologically empty.

For parasitic gaps, this idea has more or less been the standard theory since Chomsky (1982), Engdahl (1983), Kayne (1983), Chomsky (1986), Cinque (1990), Nissenbaum (2000).[2] Concretely, I will follow the basic idea of Chomsky (1986) (see also Lee 1998 and Nissenbaum 2000), which assumes that the covert category is an empty operator in the left periphery of the embedded clause. Following this assumption, the structure for the German example in (3a) looks as depicted in (11).

(11)

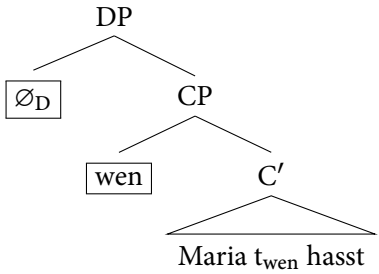


[2] But see Nunes (2004) for an approach to parasitic gaps that does without covert categories.

The main point of this analysis is that the empty operator is generated inside the parasitic gap clause, where it receives case. From this position, it moves up to the embedded Spec-CP position. The gap created by movement of the operator is the parasitic gap. In the Spec-CP position, the operator can enter into a syntactic relation with the antecedent in the matrix clause (chain composition in Chomsky's 1986 approach). The antecedent is a phrase that is generated as an object in the matrix clause and moves to a position that c-commands the empty operator. In the example in (11), the DP *die Frau* is the object of the matrix verb *küssen*. This DP is scrambled to Spec-vP, a position that c-commands the empty operator.

Turning to free relatives, it has often been proposed that the structure contains a covert category as well (Bresnan & Grimshaw 1978, Groos & Riemsdijk 1981).[3] The exact position of this covert category has been subject to much debate. In the present analysis, I will adopt the approach by Groos & Riemsdijk (1981), which builds on the idea that the covert category is an empty D head. The structure for (4a) is given in (12).

(12)



Thus, the difference between a relative clause and a free relative is simply the overtness of a nominal head. Unlike relative clauses with an overt head noun, the empty D head and the relative pronoun (the wh-phrase) in free relatives have a special syntactic relation which will be responsible for the matching effects we observe.

In sum, the present analysis proposes that the relevant elements in parasitic gap and free relative configurations do not receive case from both the embedded

[3] Equally, it has been proposed that only the wh-phrase is present in free relatives, e.g. Citko (2005), Riemsdijk (2006), Donati & Cecchetto (2011). See section 6 for a discussion of these approaches.

and the matrix clause. Instead there are two categories, one overt and one covert, which independently receive case but have to agree in case features.

3.2. Case agreement

Assuming that the covert and the overt category in parasitic gap and free relative structures receive case independently, there must be some sort of case agreement between the two categories. Otherwise, the matching effects cannot be derived. I would like to suggest that the case agreement is part of a more general agreement relation between the two elements. Such an agreement has already been proposed in previous approaches (see Assmann 2012 for parasitic gaps, Grosu 2003, Assmann 2013 and Grewendorf & Groat 2013 among others for free relatives).

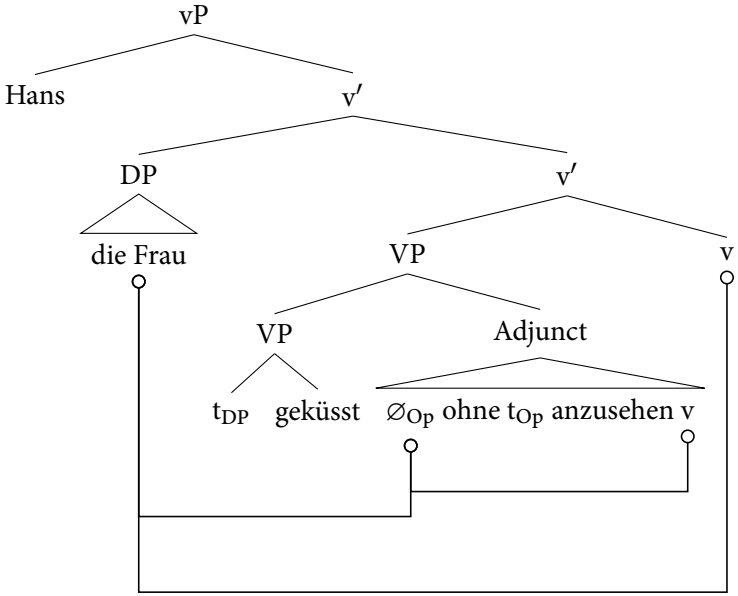
The analysis for case matching effects developed below is based on the crucial assumption that this agreement relation between the two categories is asymmetric: Only one of the two acts as the probe. Anticipating the outcome of the analysis, if the structurally lower category is the probe triggering upward agreement, case matching will not be necessary.

Looking at the properties of this case agreement relationship, I assume that case agreement works like case assignment, which is simply agreement in case features.

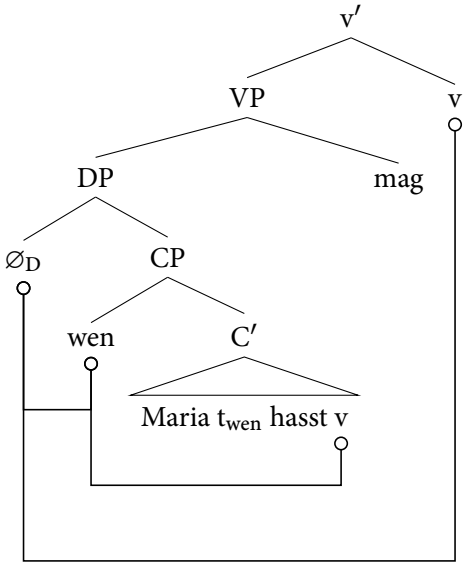
3.3. Case assignment

Case assignment is agreement in case features, which is implemented as an Agree operation: the case features from a case assigning head are copied onto a head that probes for case features. Due to the additional case agreement relation in PG and FR constructions, case features are in principle able to probe twice: once to receive case from a functional head and once to agree in case with the second category in the PG/FR construction. This situation is sketched in (13).

(13) a. *Parasitic gaps*



b. *Free relatives*



In parasitic gap constructions, the antecedent agrees with both matrix v and the empty operator in the embedded clause. The operator agrees with the embedded v. Similarly, in free relative configurations, the wh-phrase agrees with the embedded v and the empty D head. The D head receives case from matrix v.

Following Arregi & Nevins (2012), Agree consists of two operations: a syntactic Agree-Link and a post-syntactic Agree-Copy. Agree-Link establishes a syntactic relation between the probe and the goal. Post-syntactic Agree-Copy copies the case values from the probe onto the goal. Note that the fact that the success of case agreement depends on the morphological form and not the abstract Case features strongly suggests that at least part of the case dependency must be post-syntactic. The assumption that Agree cannot be entirely post-syntactic is confirmed by the fact that the case matching effects do not disappear if the covert category in parasitic gap or free relative constructions is not in a surface c-command relation with its antecedent. This can be illustrated with free relatives in German. Even though, in many cases, case matching is not required, there are cases where a mismatch seems impossible. The relevant example is repeated in (14).

(14) Hans vertraut$_{\text{DAT}}$ [**wen$_{ACC}$*/**wem$_{DAT}$* (auch immer) Maria mag$_{\text{ACC}}$].
Hans trusts who ever Maria likes
'Hans trusts whoever Maria likes.'

Changing the tense to past shows that the free relative can actually be extraposed. Since in German, DPs cannot be extraposed, it must be the CP that is moved, leaving the empty D head behind. But then, the D head no longer c-commands the wh-phrase. Still, a mismatch is not possible. Assuming that a mismatch is the result of an unsuccessful Agree relation and that Agree requires c-command, it follows that Agree must take place before CP-extraposition.

(15) Hans hat vertraut$_{\text{DAT}}$ [$_{\text{DP}}$ D$_{\varnothing}$ t$_{\text{CP}}$] [$_{\text{CP}}$ **wen$_{ACC}$*/**wem$_{DAT}$*
Hans has trusted who
(auch immer) Maria mag$_{\text{ACC}}$].
ever Maria likes
'Hans trusted whoever Maria likes.'

Thus, we have evidence that case agreement takes place quite early in syntax, and we have evidence that it applies post-syntactically. These facts fit well with

the theory proposed in Arregi & Nevins (2012) where it is argued that Agree is not one operation but needs to be split up into a search operation Agree-Link and a valuation operation Agree-Copy.

There are two types of conditions that govern successful Agree. The first condition is the c-command condition that applies to the syntactic Agree-Link operation. The special assumption I would like to make is that the directionality of Agree does not play a role: hence, either the probe c-commands the goal or the goal c-commands the probe. Consequently, there is upward as well as downward agreement for case features (see Zeijlstra 2012 for upward Agree).

The second condition is a matching condition that concerns Agree-Copy. Concretely, Agree-Copy is only successful if the case feature value of probe and goal do not conflict. Obviously, a conflict cannot arise if one of the two features is still unvalued. Thus, the second Agree relation can potentially fail if the probe already bears a feature value that is not matched by the goal.

The final point about Agree concerns the order of Agree operations. As Agree-Link applies in syntax, the order of Agree-Link operations is governed by Earliness (Pesetsky 1989, Řezáč 2004). Post-syntactic Agree-Copy cannot rely on Earliness because the structure is already built. I would like to propose that the order is determined by the syntactic structure, which is still present at the stage when Agree-Copy applies (see Arregi & Nevins 2012). Concretely, case probes that are lower in the structure receive their case features first, that is, Agree-Copy proceeds bottom-up. If a category probes twice for case features, which happens in free relative and parasitic gap constructions due to the additional relation (see above), the order is free.

3.4. Variation

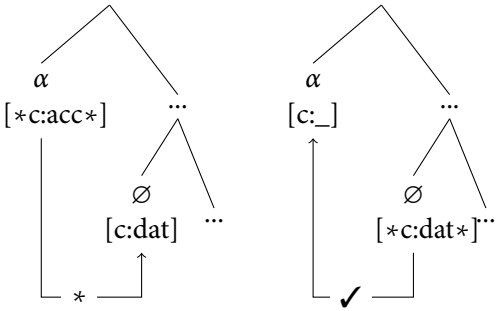
The constraints on Agree and Case assignment proposed above hold cross-linguistically. What can vary, however, is the direction of the additional Agree relation in sharing constructions. This can vary between constructions and, as I would like to suggest, between languages. To account for the difference in case matching between German and Polish, I will propose that Polish and German differ in whether the overt element or the covert element triggers case agreement in FRs and PGs: In German, case agreement is triggered by the overt element, that is, the antecedent of a parasitic gap or the wh-phrase in free relatives. In Polish, on the other hand, the case probe sits on the covert item.

This means that in German, the case feature of the overt item in a PG/FR

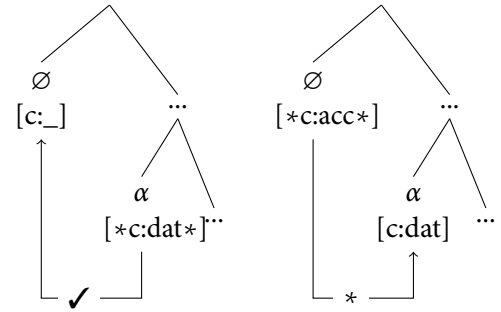
construction has a double probe property: it probes for a case feature on a case assigning head and it probes for the case value of the empty element in these configurations. In Polish, it is the covert item that probes the case assigning head and the case feature of its antecedent in a PG/FR configuration. Henceforth this double probe property will be depicted as [∗case:_∗]. '_' stands for 'I need a value', while '∗ ∗' stands for 'I want to probe a second time' (see Sternefeld 2006 for the notation ∗ ∗). Put simply, sometimes case features need to be valued and additionally checked.

The proposed parameter leads to the four possible configurations shown in (16). Each configuration corresponds to one of the four patterns discussed in section 2.

(16) a. *German PG* b. *Polish PG*



c. *German FR* d. *Polish FR*



The structures show the case features at the time when the case feature on $\alpha/\varnothing$ undergoes post-syntactic Agree-Copy a second time. α stands for the overt element, while $\varnothing$ is the covert item in the structure.

In German parasitic gap constructions, the overt antecedent is higher up in the structure than the empty operator. Therefore, the empty operator receives all its case values before the antecedent. Furthermore, we have downward Agree between the two categories because, in German, the antecedent probes for the case value of the empty operator. This leads to a dilemma in configurations where the two cases are not identical. In (16a), the empty operator has received dative case from the embedded verb and its antecedent has received accusative case from the matrix verb. At the point when the antecedent wants to copy the case value of the empty operator, the matching condition on Agree is violated. Therefore, the case feature of the antecedent cannot be checked a second time and the derivation crashes.

In Polish, on the other hand, we have upward Agree in this configuration because the empty operator is the probe. At the time when the empty operator probes for the case value of the antecedent, the antecedent has not received a case value yet. Thus, matching is trivially fulfilled as seen in (16b). The result of this upward Agree operation is empty valuation on the empty operator. Later on, the antecedent receives its case value, but this comes too late to potentially cause a problem with Agree between antecedent and operator.

Turning to free relatives, we see that the direction of Agree is reversed with respect to parasitic gaps. The reason for this is that in the structure of free relatives, the covert category (the empty D head) is higher in the structure. Therefore, it is the overt category that receives its case value first. Thus, in German free relatives (16c) – because the overt item is the probe – we have upward Agree. Like in Polish parasitic gap structures, upward Agree leads to empty valuation with the result that case mismatches can be tolerated. In Polish free relatives, however, we have downward Agree since in Polish, the empty category is the probe.

In sum, the main idea of the analysis is that if the lower of the two elements is the probe, we have upward case agreement that results in empty valuation because the higher goal has not received its case features yet. Consequently, the case feature value of the higher goal will not count for matching and mismatches are allowed. If, on the other hand, the higher of the two elements is the probe, the lower element has already received its case feature value. In this case, both the case feature value of the higher probe and the lower goal will count for matching and strict case matching is required.

3.5. Derivations

In order to show why downward Agree leads to strict case matching while upward Agree makes mismatching possible, the rest of this section explains some of the most important derivations in detail. We start with German parasitic gaps.

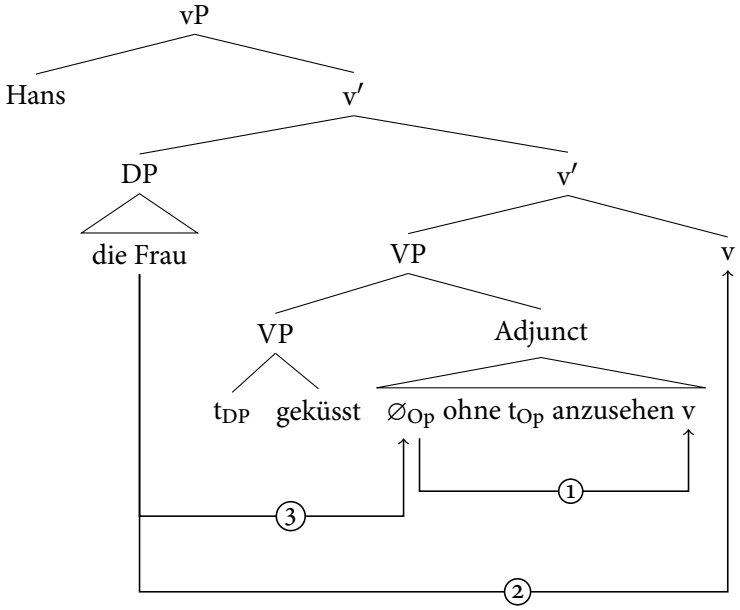
3.5.1. German parasitic gaps

To see how the proposed analysis works, we start with the description of an example with matching case. The relevant example is repeated in (17).

(17) weil Hans *die*$_{ACC}$ Frau [ohne anzusehen$_{ACC}$] küsste$_{ACC}$
because Hans the woman without to.look.at kissed

The structure in (18) shows how the syntactic Agree-Link relations are established.

(18) *Syntactic Agree-Link*



At first, the empty operator in the embedded clause agrees with v. In the matrix clause, the antecedent first agrees with the matrix v head. Afterwards, the antecedent *die Frau* is scrambled to Spec-vP, where it c-commands the empty operator. In this configuration, a third Agree-Link relation can be established between the antecedent and the empty operator.

In the post-syntactic component, Agree-Copy applies and the case features of the antecedent and the parasitic gap are valued. This valuation proceeds bottom-up with the lowest probe being valued first. For case agreement, this means that, in parasitic gap structures, the empty operator receives its accusative from the embedded v before the antecedent *die Frau* receives a value. This step is shown in (19).

(19) Step I: ∅[c:_] ⟶ v[c:acc]: ∅[c:acc]

Next, the case feature of the antecedent is valued. Since its case feature is a double probe, there are two possible orders of case assignment. Both orders lead to the same result, as shown in (20). (Note that *α* stands for the antecedent.)

(20) Step II: α[∗c:_∗] ⟶ v[c:acc]: α[∗c:acc∗]
or α[∗c:_∗] ⟶ ∅[c:acc]: α[∗c:acc∗]

Step III: α[∗c:acc∗] ⟶ ∅[c:acc]: α[c:acc]
or α[∗c:acc∗] ⟶ v[c:acc]: α[c:acc]

In the first option, the antecedent receives accusative case from matrix v and checks it afterwards against the accusative case value of the empty operator. Since there is no mismatch, Agree-Copy applies successfully both times.

In the alternative order, the antecedent first receives accusative from the empty operator and agrees with matrix v afterwards. Again, since all the relevant case values are identical, Agree between the antecedent and the empty operator is possible.

Next, we see that, if the two relevant cases are not identical, Agree between the antecedent and the empty operator in German parasitic gaps fails. The example that illustrates this configuration is repeated in (21).

(21) weil Hans *der_{DAT}/*die_{ACC} *Frau* [anstatt zu $helfen_{DAT}$]
because Hans the woman instead.of to help
$behinderte_{ACC}$
hampered

The syntactic derivation of (21) works as in (18). The difference lies in the cases being assigned. In the derivation of (21), ∅ receives dative case in the embedded clause. For concreteness, dative case is assigned by an empty applicative head Appl. Alternatively, dative can be assigned by an empty preposition or some other functional head. Nothing hinges on that.

The difference in the post-syntactic derivation is that some of the Agree-Copy operations cannot apply due to violation of the matching condition on Agree. The two possible orders of the relevant Agree-Copy operations are shown in (22).

(22)

Step I:		∅[c:_] ⟶ Appl[c:dat]: ∅[c:dat]
Step II:		α[∗c:_∗] ⟶ v[c:acc]: α[∗c:acc∗]
	or	α[∗c:_∗] ⟶ ∅[c:dat]: α[∗c:dat∗]
Step III:		α[∗c:acc∗] ⟶ ∅[c:dat]: ↯
	or	α[∗c:dat∗] ⟶ v[c:acc]: ↯

In the first step, the empty operator receives dative case in the embedded clause. Afterwards, the antecedent (*Hans*) probes for the matrix v head and the empty operator. If it gets accusative case from v first, as shown in the left column in (22), a mismatch arises when it tries to agree a second time with the empty operator. Reversing the order as in the right column does not help either because after receiving dative case from the empty operator, the antecedent can no longer agree with the accusative bearing v due to a violation of the matching condition.

In sum, the fact that in the final Agree-Copy operation, both the probe and the goal bear a case value, requires identity of the values. Otherwise the matching condition is violated.

3.5.2. Polish parasitic gaps

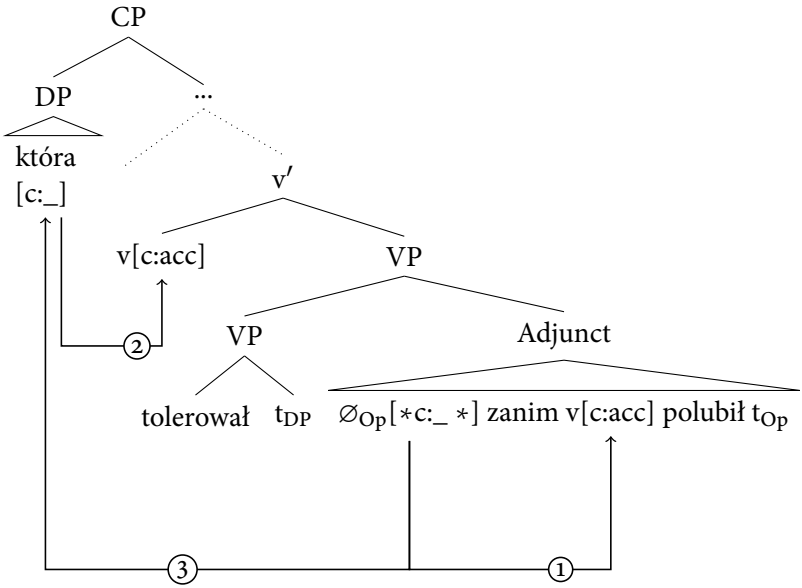
The difference between Polish and German is illustrated by the example in (23).

(23) To jest dziewczyna, *którą*$_{ACC}$ Jan tolerował$_{ACC}$ zanim polubił$_{ACC}$.
this is girl which Jan tolerated before liked.

The syntactic derivation of parasitic gaps in Polish is basically the same as in German. The crucial difference between Polish and German is that ∅ bears the

case feature that probes twice. Thus, we have upward agreement in PGs in Polish. This is shown in (24).

(24) *Syntactic Agree-Link*



The two possible orders of post-syntactic Agree-Copy operations are given in (25).

(25)

Step I:		∅[∗c:_∗] ⟶ v[c:acc]: ∅[∗c:acc∗]
	or	∅[∗c:_∗] ⟶ α[c:_]: ∅[c:_]
Step II:		∅[∗c:acc∗] ⟶ α[c:_]: ∅[c:acc]
	or	∅[c:_] ⟶ v[c:acc]: ∅[c:acc]
Step III:		α[c:_] ⟶ v[c:acc]: α[c:acc]

At first, the empty operator copies the value from the embedded v and the antecedent *która*. Independent of the order between the two copy operations, the empty operator ends up with an accusative case value from the embedded v because *która* does not bear a value at this point. In the final step, *która* receives accusative case from matrix v.

The difference between German and Polish becomes obvious if we look at parasitic gap structures with mismatching cases. The relevant example from section 2.2 is repeated in (26).

(26) To jest dziewczyna, *którą*$_{ACC}$/ **której*$_{DAT}$ Jan lubił$_{ACC}$ zanim zaczął pomagać$_{DAT}$.
this is girl which Jan liked before started help.

In contrast to German, a mismatch in case features is tolerated in Polish parasitic gaps. This comes about because the probe of the α-$\varnothing$ agreement relation is lower than the goal. Consequently, upward agreement will result in empty valuation, which counter-bleeds the matching condition. The derivation is shown in (27).

(27)

Step I:		$\varnothing$[∗c:_∗] ⟶ Appl[c:dat]: $\varnothing$[∗c:dat∗]
	or	$\varnothing$[∗c:_∗] ⟶ α[c:_]: $\varnothing$[c:_]
Step II:		$\varnothing$[∗c:dat∗] ⟶ α[c:_]: $\varnothing$[c:dat]
	or	$\varnothing$[c:_] ⟶ Appl[c:dat]: $\varnothing$[c:dat]
Step III:		α[c:_] ⟶ v[c:acc]: α[c:acc]

The derivation in (27) is basically the same as in (25), the only difference being that the empty operator receives dative from an applicative head. But crucially, since *która* receives its accusative case feature in step III after the empty operator, it cannot conflict with the dative feature on the empty operator. Hence, a violation of the matching condition is prevented by upward Agree.

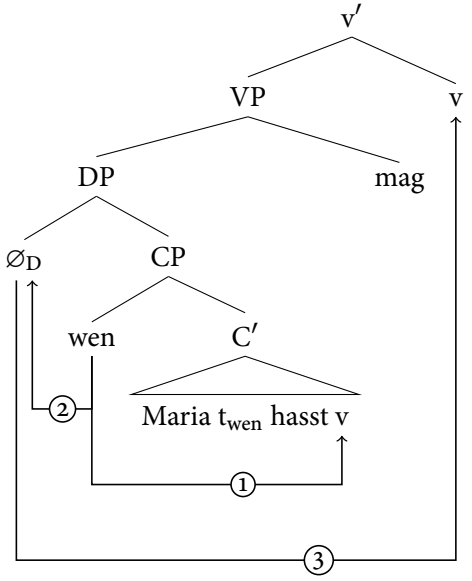
3.5.3. German free relatives

After explicitly showing how variation of case matching in parasitic gap constructions is derived, we turn to free relatives, which are the mirror image of parasitic gaps. We start with German. The crucial example is repeated in (28).

(28) Hans mag$_{ACC}$, wen$_{ACC}$ Maria hasst$_{ACC}$.
Hans likes who Maria hates
'Hans likes who Maria hates.'

The tree in (29) shows the Agree-Link relations.

(29) *Syntactic Agree-Link*



At first, the wh-phrase *wen* is merged as the object of the embedded clause where it establishes an Agree relation with the embedded v. Once the entire relative clause is built, *wen* moves up to Spec-CP. After the empty D head is merged, *wen*, being overt, probes for the D head. This is upward Agree. Finally as the structure-building continues, the D head agrees with matrix v.

The crucial difference to parasitic gaps is that this time, the overt item is lower in the structure. Still, being the probe, it adheres to the property of German, namely that it is the overt item that probes for the covert item.

Turning to the post-syntactic part of Agree, we see that (30) strongly resembles the derivation of parasitic gaps in Polish: the lower of the two categories – this time the covert one – probes for the higher category. Thus, we have upward Agree, which results in empty valuation and counter-bleeds the matching condition. The derivation is shown in (30).

(30)

Step I:		α[∗c:_∗] ⟶ v[c:acc]: α[∗c:acc∗]
	or	α[∗c:_∗] ⟶ ∅[c:_]: α[c:_]
Step II:		α[∗c:acc∗] ⟶ ∅[c:_]: α[c:acc]
	or	α[c:_] ⟶ v[c:acc]: α[c:acc]
Step III:		∅[c:_] ⟶ v[c:acc]: ∅[c:acc]

First, *wen* receives accusative from the embedded v. Since the empty D head does not bear a case value yet, *wen* ends up with accusative case from v after step II. After *wen* has received its case feature values, the case feature on the empty D head is copied from matrix v (Step III).

The fact that German free relatives allow case mismatches, just like Polish parasitic gaps, is shown with the example in (31).

(31) Hans mag_{ACC}, *wen_{ACC}/wem_{DAT} Maria $\text{vertraut}_{\text{DAT}}$.
Hans likes who Maria trusts

The derivation of (31) is the same as in (30), but this time, the wh-phrase *wem* receives dative case in the embedded clause. Again, the reason why this dative case value on *wem* does not conflict with the accusative case on the empty D head is that Agree-Copy between *wem* and D applies before D receives its value in Step III. That is, at the point where the matching condition of Agree applies, no conflict is given.

(32)

Step I:		α[∗c:_∗] ⟶ Appl[c:dat]: α[∗c:dat∗]
	or	α[∗c:_∗] ⟶ ∅[c:_]: α[c:_]
Step II:		α[∗c:dat∗] ⟶ ∅[c:_]: α[c:dat]
	or	α[c:_] ⟶ Appl[c:dat]: α[c:dat]
Step III:		∅[c:_] ⟶ v[c:acc]: ∅[c:acc]

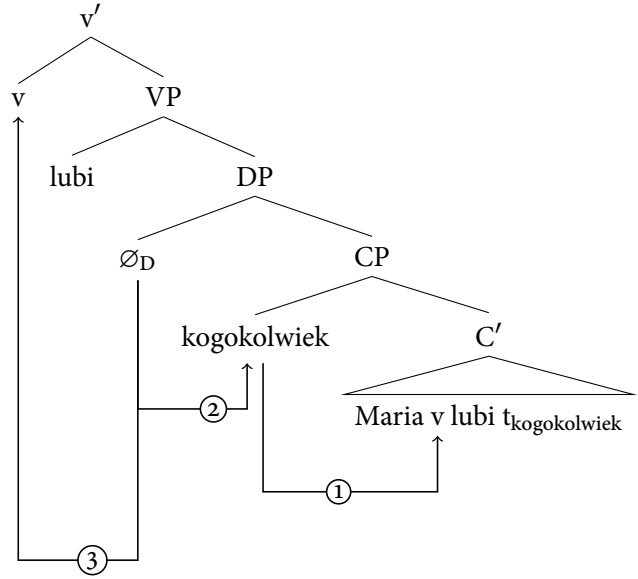
3.5.4. Polish free relatives

Finally, looking at Polish free relatives, it can be seen that the derivation is close to the derivation of German parasitic gaps.

(33) Jan lubi_{ACC} *$\text{kogokolwiek}_{\text{ACC}}$* Maria lubi_{ACC}.
Jan likes whoever Maria likes

In contrast to German FRs, the probe of the additional case agreement relation is the covert D head, which is higher than the wh-phrase. The structure, as well as the Agree-Link relations are shown in (34).

(34) *Syntactic Agree-Link*



The derivation in (34) is identical to the one in (29). The only difference is that we have a downward Agree relation between the empty D head and the wh-phrase *kogokolwiek* in (34). This leads to difference in Agree-Copy, as shown in (35).

(35)

Step I:		α[c:_] ⟶ v[c:acc]: α[c:acc]
Step II:		∅[∗c:_∗] ⟶ α[c:acc]: ∅[∗c:acc∗]
	or	∅[∗c:_∗] ⟶ v[c:acc]: ∅[∗c:acc∗]
Step III:		∅[∗c:acc∗] ⟶ v[c:acc]: ∅[c:acc]
	or	∅[∗c:acc∗] ⟶ α[c:acc]: ∅[c:acc]

In (36), *kogokolwiek* receives accusative from the embedded v first. Afterwards, the empty D head gets case values from *kogokolwiek* and the matrix v. This is unproblematic as all the case values are the same.

However, if the cases differ, as shown in (36), the matching condition is violated.

(36) Jan lubi$_{\text{ACC}}$ **kogokolwiek$_{ACC}$/?*komukolwiek$_{DAT}$* dokucza$_{\text{DAT}}$.
Jan likes whoever teases

The derivation in (37) shows why this is the case. First, *komukolwiek* receives dative case from the embedded applicative head. Then, the D head, being a double probe, has to decide whether its first value comes from *komukolwiek* or from matrix v. If the first option is chosen, the D head receives dative case from *komukolwiek*, but cannot receive accusative case from matrix v anymore, due to a mismatch. On the other hand, if it receives accusative first, it cannot match against the dative case of *komukolwiek*.

(37)

Step I:		α[c:_] ⟶ Appl[c:dat]: α[c:dat]
Step II:		∅[∗c:_∗] ⟶ α[c:dat]: ∅[∗c:dat∗]
	or	∅[∗c:_∗] ⟶ v[c:acc]: ∅[∗c:acc∗]
Step III:		∅[∗c:dat∗] ⟶ v[c:acc]: ↯
	or	∅[∗c:acc∗] ⟶ α[c:dat]: ↯

This is reminiscent of the derivation of parasitic gaps in German.

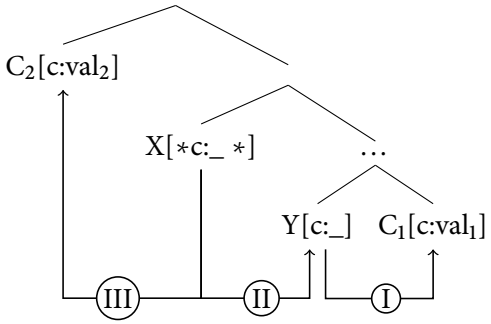
3.6. Interim summary

So far, we have seen that the case matching condition is subject to variation between constructions and between languages. Concretely, we have seen that German parasitic gap constructions and Polish free relative constructions adhere to the matching condition, while German free relatives and Polish parasitic gaps do not require matching. This twofold mirror image pattern can be derived if case matching is reduced to the matching condition of Agree and if Agree applies in two steps and is bidirectional: Variation between the constructions determines whether the overt or the covert category is higher in the structure. Variation between the languages determines whether the overt or the covert category triggers Agree. Thus, in German parasitic gap constructions, the overt category is higher in the structure and triggers Agree. This downward Agree requires strict matching between probe and goal. In German free relatives, on the other hand, the overt category is lower in the structure and triggers upward Agree with the higher covert category. Since the matching condition is trivially fulfilled in cases of upward Agree, mismatches are allowed in German free relatives. In Polish, parasitic gaps and free relatives are derived in the same way, the only difference being that it is the covert category that triggers Agree. Therefore, we have upward Agree in Polish parasitic gaps and downward Agree in Polish free relatives, leading to the mirror image of German.

4. Bidirectional Agree and opacity

At the surface, both the overt category and the covert category bear case feature values. But only in some of the examples, conflicting case values cause a violation of case matching. These structures are therefore opaque. In the analysis above, the opacity was resolved by ordering the Agree-Copy operations. In all derivations there are three Agree-Copy relations that are important: (i) the relation between the lower element Y and a case assigning head C_1, (ii) the relation between the higher element X and another case assigning head C_2 and (iii) the relation between X and Y. If the first two Agree-Copy relations result in feature valuation, the third relation is only successful if the two case values are identical. Otherwise, the matching condition on Agree would be violated. Thus, Agree between X/Y and the C_1/C_2 can bleed Agree between X and Y. This bleeding configuration is illustrated in (38).

(38)

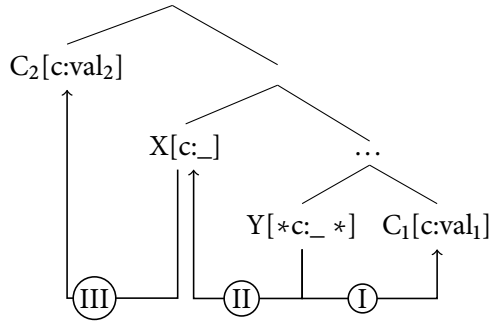


(39)

Step I:	$Y[c:\_] \longrightarrow C_1[c:val_1]$: $Y[c:val_1]$
Step II:	$X[*c:\_*] \longrightarrow C_2[c:val_2]$: $X[*c:val_2*]$
Step III:	$X[*c:val_2*] \longrightarrow Y[c:val_1]$: $\lightning$

In the first two steps, X and Y receive case values indepedently from each other. Afterwards, X and Y cannot agree because the matching condition is violated. In the counter-bleeding configuration in (40), X and Y agree, before both have a case value. Thus matching is trivially fulfilled for Agree between X and Y.

(40)



(41)

Step I:	$Y[*c:\_*] \longrightarrow C_1[c:val_1]$: $Y[*c:val_1*]$
Step II:	$Y[*c:val_1*] \longrightarrow X[c:\_]$: $Y[*c:val_1*]$
Step III:	$X[c:\_] \longrightarrow C_2[c:val_2]$: $X[c:val_2]$

The order of Agree-Copy operations is determined by the position of the Agree probes with lower probes being valued before higher probes due to the bottom-up nature of the post-syntactic derivation. Hence, Y will receive its case feature value first because it is lower in the structure than X. The timing of Agree between X and Y depends on whether Y is the probe or X is the probe: If Y is the probe, it copies the case from X before X actually receives a value, which results in empty feature valuation and trivially fulfills the matching condition independent from the case value X receives later. We thus have a counter-bleeding interaction if Y probes for X, or to put differently, upward Agree leads to counter-bleeding (cf. Georgi 2014).

5. Complicating the pattern

5.1. More patterns

Not every speaker of Polish or German allows non-syncretic case mismatches in parasitic gap constructions (Bondaruk 1996) or free relatives respectively (Riemsdijk 2006). For these speakers, mismatching forms are ungrammatical in general. Such varieties can be derived under the assumption that, for these speakers, Agree between the overt and the covert and ∅ is symmetric: both α and ∅ are probes. Put differently, the strict varieties have both the Polish and the German property. Importantly, Agree being symmetric means that these varieties will always have downward Agree between α and ∅. Therefore, the

lower of the two items already bears a case value when the higher one probes for its value. Consequently, the values of both α and $\varnothing$ count for matching and have to be identical. An example that illustrates the variation is given in (42).

(42) Hans mag_{ACC}, *wen_{ACC}/(*)wem_{DAT} Maria $\text{vertraut}_{\text{DAT}}$.
Hans likes who Maria trusts
'Hans likes whomever Maria trusts.'

In (42), the wh-phrase has to match the dative case of the embedded verb *vertrauen* as well as the accusative case of the matrix verb *mögen*. While some speakers can resolve the conflict by inserting the dative form *wem*, the strict variety does not allow this resolution.

A derivation for (42) that captures the strict variety of German is shown in (44). Note that the syntactic structures in both varieties is identical (see (29)). The only difference concerns the post-syntactic Agree-Copy operations. The derivation in (43) is repeated from (32). In this derivation, Agree between the covert D head and the wh-phrase takes place before the D head receives its case value from matrix v. Thus, the matrix case value does not count for matching.

(43) *Mismatch allowed*

Step I:		α[∗c:_∗] ⟶ Appl[c:dat]: α[∗c:dat∗]
	or	α[∗c:_∗] ⟶ ∅[c:_]: α[c:_]
Step II:		α[∗c:dat∗] ⟶ ∅[c:_]: α[c:dat]
	or	α[c:_] ⟶ Appl[c:dat]: α[c:dat]
Step III:		∅[c:_] ⟶ v[c:acc]: ∅[c:acc]

In contrast to (43), the derivation in (44) enforces strict matching between the D head and the wh-phrase because both categories probe for each other.

(44) *Speakers that do not allow mismatches*

Step I:		α[∗c:_∗] ⟶ Appl[c:dat]: α[∗c:dat∗]
	or	α[∗c:_∗] ⟶ ∅[∗c:_∗]: α[c:_]
Step II:		α[∗c:dat∗] ⟶ ∅[∗c:_∗]: α[c:dat]
	or	α[c:_] ⟶ Appl[c:dat]: α[c:dat]
Step III:		∅[∗c:_∗] ⟶ v[c:acc]: ∅[∗c:acc∗]
	or	∅[∗c:_∗] ⟶ α[c:dat]: ∅[∗c:dat∗]
Step IV:		∅[∗c:acc∗] ⟶ α[c:dat]: ↯
	or	∅[∗c:dat∗] ⟶ v[c:acc]: ↯

The difference between (44) and (43) is that in (44) there is an additional downward Agree relation between ∅ and α. This results in a configuration where both the dative case from the embedded clause and the accusative case from the matrix clause count for matching (Step IV in (44)).

Turning to Polish, speaker variation concerns parasitic gaps. The relevant example is repeated in (45).

(45) To jest dziewczyna, *którą*$_{ACC}$/ **której*$_{DAT}$ Jan lubił$_{ACC}$ zanim zaczął pomagać$_{DAT}$.
this is girl which Jan liked before started help.

For some speakers, the mismatch between accusative and dative case can be repaired by inserting an accusative case form *którą* as the antecedent of the parasitic gap. The derivation that yields this structure is repeated in (46).

(46) *Speakers that allow mismatch*

Step I:		∅[∗c:_∗] ⟶ Appl[c:dat]: ∅[∗c:dat∗]
	or	∅[∗c:_∗] ⟶ α[c:_]: ∅[c:_]
Step II:		∅[∗c:dat∗] ⟶ α[c:_]: ∅[c:dat]
	or	∅[c:_] ⟶ Appl[c:dat]: ∅[c:dat]
Step III:		α[c:_] ⟶ v[c:acc]: α[c:acc]

Similar to the derivation in (43), Agree between the covert and the overt category takes place before the higher category (in this case the overt wh-antecedent) receives its case feature. Therefore the matrix accusative case does not count for matching and a case mismatch should be allowed.

In contrast, if the wh-antecedent triggers an additional Agree relation with the covert operator, this Agree operation takes place later in the derivation, making both case values count for matching (Step IV in (47)).

(47) *Speakers that do not allow mismatch*

Step I:		∅[∗c:_∗] ⟶ Appl[c:dat]: ∅[∗c:dat∗]
	or	∅[∗c:_∗] ⟶ α[∗c:_∗]: ∅[c:_]
Step II:		∅[∗c:dat∗] ⟶ α[∗c:_∗]: ∅[c:dat]
	or	∅[c:_] ⟶ Appl[c:dat]: ∅[c:dat]
Step III:		α[∗c:_∗] ⟶ v[c:acc]: α[∗c:acc∗]
	or	α[∗c:_∗] ⟶ ∅[c:dat]: α[∗c:dat∗]
Step IV:		α[∗c:acc∗] ⟶ ∅[c:dat]: ↯
	or	α[∗c:dat∗] ⟶ v[c:acc]: ↯

In sum, altering the Agree relations does not only derive variation between languages but also within languages. The tables in (48) summarize all patterns we have seen so far and their corresponding patterns of Agree relations.

(48)

	Mismatch allowed?			
	German I	German II	Polish I	Polish II
Free relatives	✓	*	*	*
Parasitic Gaps	*	*	✓	*
	Agree			
	German I	German II	Polish I	Polish II
∅	goal	probe	probe	probe
α	probe	probe	goal	probe

Finally, it should be noted that, assuming that the agreement relation between α and ∅ is an essential property of FR and PG constructions, no language can be derived in which both constructions allow case mismatches. In fact, such a distribution of case matching effects has not been reported in the literature.

5.2. Syncretisms

In all four configurations discussed above, syncretic forms can remedy a violation of case matching. Thus, it seems that it is the morphological form and not the abstract case feature that is crucial for the matching effects. The split of Agree into two operations, one of them being post-syntactic, can nicely capture this fact.

The examples in (49) repeat the syncretism effects in Polish. The free relative clause in (49b) should be ungrammatical due to a mismatch between accusative and genitive case. But since the wh-phrase has a case form that matches both the accusative and the genitive, the matching violation is repaired.

(49) a. To jest dziewczyna, *której*$_{GEN/DAT}$ Jan się bał$_{GEN}$ zanim zaczął
this is girl which Jan REFL fear before started
pomagać$_{DAT}$.
help.
'This is the girl Jan was afraid of before he started to help.'

b. Jan lubi$_{ACC}$ *kogokolwiek*$_{ACC/GEN}$ Maria nienawidzi$_{GEN}$.
Jan likes whoever Maria hates
'Jan likes whoever Maria hates.'

Following standard assumptions, syncretic forms result from special morphological rules. For the sake of concreteness, I assume that syncretisms are due to language-specific feature changing syncretism rules (cf. Noyer (1992: 129)). Alternatively, impoverishment rules can be used. The rules in (50) specify two syncretism rules in Polish that are relevant for the examples in (49).

(50) *Syncretism rules in Polish*

a. [c:acc] → [c:gen]/[anim:+]

b. [c:dat] → [c:gen]/[rel:+], [gen:fem]

Furthermore, the condition under which agreement fails must be refined: Agree-Copy always adds a value to a probe feature. Syncretism rules apply to the feature values as soon as their contexts are given. Thus, only if a mismatch between two values cannot be repaired by a syncretism rule, the derivation fails. The consequence of these assumptions is that the syncretism rules apply early before the final Agree-Copy operation applies (cf. Trommer 2002, Keine 2010) and can therefore feed Agree-Copy.

The derivation in (51) shows the interaction of Agree-Copy and syncretism rule (50a).

(51) *Derivation of (49b)*

Step I:		α[c:_][anim:+] ⟶ Appl[c:gen]: α[c:gen][anim:+]
Step II:		∅[∗c:_∗][anim:_] ⟶ α[c:gen][anim:+]: ∅[∗c:gen∗][anim:+]
	or	∅[∗c:_∗][anim:_] ⟶ v[c:acc]: ∅[∗c:acc∗][anim:_]
Step III:		∅[∗c:gen∗][anim:+] ⟶ v[c:acc]: ∅[c:gen,acc][anim:+]
		[c:acc] → [c:gen]/[anim:+]: ∅[c:gen,gen] = ∅[c:gen]
	or	∅[∗c:acc∗][anim:_] ⟶ α[c:gen][anim:+]: ∅[c:acc,gen][anim:+]
		[c:acc] → [c:gen]/[anim:+]: ∅[c:gen,gen] = ∅[c:gen]

Being a single probe, the overt wh-phrase receives genitive case first. Afterwards, the covert D head agrees with either the wh-phrase or the matrix v. If it agrees with the wh-phrase, it receives genitive case as well as being marked as animate.[4] Thus, when receiving the accusative case feature from matrix v in Step III, the context for the syncretism rule is given and the accusative value is changed into genitive, which prevents a conflict on the case feature.

The other possibility is that the D head first receives accusative case from matrix v. The context for the syncretism rule is not given at this point, but as soon as D agrees with the wh-phrase in Step III, the syncretism rule can apply.

In sum, the syncretism effects of case matching can be derived because there is a morphological component of Agree. A purely syntactic approach to Agree would have to invoke an additional mechanism to capture these effects, cf. Hein & Murphy (this volume).

6. Alternatives

The final question I want to discuss is whether there are any alternatives to the present account. The number of possibilities to analyze structures where one item seems to be a dependent of two verbs is limited. In principle, there are three strategies: First, there are agreement approaches like the present account. The main idea is to postulate a covert category additional to the overt category and let the covert and the overt category communicate in some way – usually by some form of agreement (Kuroda 1968, Bresnan & Grimshaw 1978, Groos & Riemsdijk 1981, Hirschbühler & Rivero 1981, Chomsky 1982, Engdahl 1983,

[4] By assumption, ∅ and α agree in other features such as animacy as well.

Harbert 1983, Suñer 1984, Chomsky 1986, Cinque 1990, Grosu & Landman 1998, Nissenbaum 2000, Caponigro 2002, Grosu 2003, Gračanin-Yuksek 2008). The second type of approach are identity approaches: Here, the overt category is the only category and the additional syntactic dependendency is modeled differently. Such approaches can be multidominance accounts à la Citko (2005, 2013), Riemsdijk (2006), Kasai (2008) or movement accounts (Bennis & Hoekstra 1985, Huybregts & van Riemsdijk 1985, Williams 1990, Rooryck 1994, Caponigro 2003, Nunes 2004, Donati & Cecchetto 2011, Ott 2011). Finally, the third possible type of approach are reanalyses. The core idea in this type of approach is to treat FRs and PGs differently in different languages. For example, the presence of a covert category varies between constructions and languages.

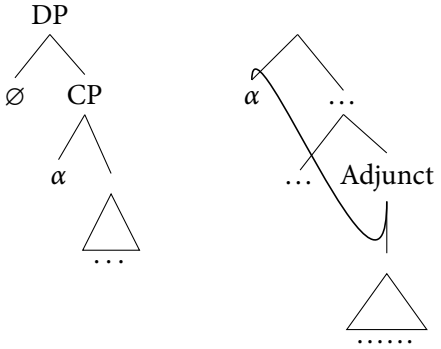
The present analysis of case matching effects is an example for how agreement approaches can deal with the pattern discussed in section 2. In the rest of this section, I will discuss how the alternative types of approaches could handle the data.

6.1. Reanalysis

A possible reanalysis strategy for case matching effects could be to assume that strict matching is due to identity: there is only one element that has to satisfy the case requirements of two verbs. The absence of matching effects arises if a second, covert, category is involved. The structures in (52) sketch this idea for the German and the Polish patterns.

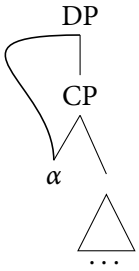
(52) *German*

a. *Free Relatives* b. *Parasitic Gaps*

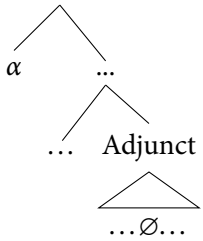


(53) *Polish*

a. *Free Relatives*



b. *Parasitic Gaps*



The solution is very simple but requires additional evidence that the two constructions really have different derivations in different languages. As for Polish and German, there are no major differences concerning parasitic gaps (see Bondaruk 1996 on PGs in Polish) and free relatives. The tables in (54) and (55) summarize the behaviour concerning some of the core properties of the two constructions. Judging from the similarities between German and Polish, there seems to be no motivation for analyzing the two constructions differently.

(54) *Parasitic gaps*

	German	*Polish*
island sensitivity	✓	✓
categorial restrictions	✓	✓
ban against licensing in-situ	✓	?
ban on A-movement licensing	✓	✓
tensed environments	*	✓

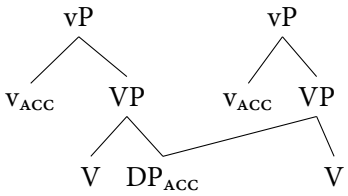
(55) *Free relatives*

	German	*Polish*
lack of overt nominal head	✓	✓
wh-phrase instead of relative pronoun	✓	✓
clause with gap	✓	✓
replaceable with truth-conditionally equivalent DP or PP	✓	✓

6.1.1. Citko (2013)

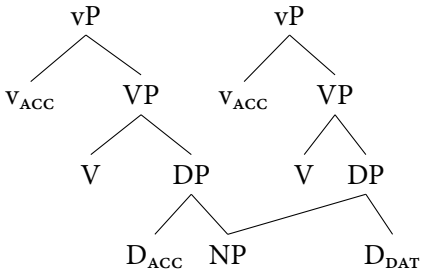
A different kind of reanalysis approach is presented in Citko (2013) for Polish sharing constructions. The main idea of this account builds on multidominance: strict matching occurs when a DP is subject to multidominance. The case feature that is located on D is shared between two verbs. Thus, it has to match the requirements of both verbs. This configuration is sketched in (56).

(56)



Mismatching occurs if an NP is dominated by two DPs with one case feature each. Consequently, the two case features can receive two different values and the absence of matching effects is predicted. This is shown in (57).

(57)



The analysis faces problems with cross-linguistic variation since German PGs and FRs must be different from Polish PGs and FRs: In Polish parasitic gaps structures, only an NP is shared between two clauses, while in free relative contexts, the entire DP with only one case feature is shared. In German, PGs requires sharing of a DP and FRs require sharing of an NP. Again, there is no independent evidence that confirms these major structural differences.

A further problem concerns case concord inside the DP. Morphologically, case is also realized on nouns. Thus, NPs must also bear a case feature. If the NP is shared between two D heads with conflicting case features, the single case feature on the NP cannot meet the requirements of both D heads, that is, the violation of matching is expected to occur on the NP level.

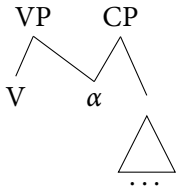
6.2. Identity

There are two kinds of identity approaches: multidominance approaches and movement approaches.

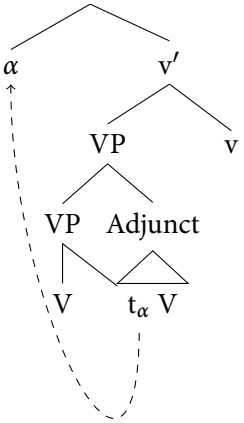
6.2.1. Multidominance

Multidominance can be depicted as in (58) and (59), where the overt category is shared between two verbs and is, thus, dependent on the case requirements of both verbs.

(58) *Free relatives*



(59) *Parasitic gaps*

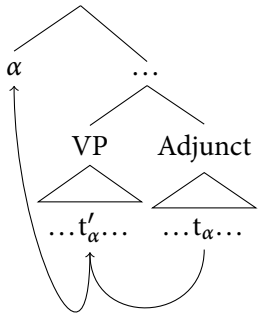


Such grafting approaches have a problem explaining variation. The cross-linguistic variation can be handled by assuming that in one language a matching condition holds while in the other language, there is no matching condition. However, since abstractly, FRs and PGs have the same derivation, both constructions in one language are predicted to either show case matching effects or not. The only way out would be that the matching condition is construction-specific which predicts that there should be languages which do not show matching effects in any of the two constructions, contrary to what is reported in the literature.

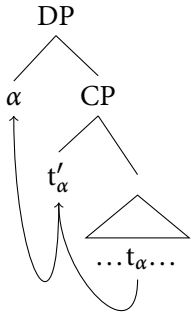
6.2.2. Movement

In movement approaches, the overt category is merged in the embedded clause, where it receives case. Afterwards, it moves to the respective argument position in the superordinate clause, before it reaches its target position. In the higher clause, the case features received in the embedded clause have to match the new case requirements. The abstract derivation is shown in (60) and (61).

(60) *Parasitic gaps*



(61) *Free relatives*



The account faces the same problems as the multidominance account when it comes to the matching effects because the abstract derivation of the two constructions is the same.

6.3. Unidirectional Agree

So far, we have seen that reanalysis and identity approaches have difficulties deriving the variation introduced by the patterns in section 2. The following discusses two further alternatives to the bidirectional Agree account developed in the present paper. Both alternatives are based on a unidirectional Agree operation. That is, only upward or only downward Agree is possible.

6.3.1. Only upward Agree

The main assumptions in such an approach would be that case assignment is Agree between a probing argument and a case assigning head (Pesetsky & Torrego 2007). Since there is evidence that case assigning heads are higher than the case probe, this case Agree must be upwards. In a unidirectional approach to Agree, upward can be the only possible direction of Agree (Zeijlstra 2012).

But then, downward case agreement, as e.g. in German parasitic gaps must be a genuinely different syntactic process. Having excluded movement and multidominance since these processes are to rigid to account for variation, it is unclear which syntactic process is responsible.

Furthermore, case matching shows some of the core properties of the Agree operation. First, Agree relations and case assignment are subject to certain locality restrictions. For example, they do not cross a finite clause boundary.[5] This also applies to parasitic gap configurations in German (62). Examples where the empty operator and the antecedent are separated by a finite clause boundary are ungrammatical despite case matching (62b). This follows if Agree cannot apply across finite clause boundaries.[6] Since the probing features on the antecedent cannot be checked, the derivation crashes.

(62) a. weil Hans *die*$_{\text{ACC}}$ *Frau* [Op$_{\text{DAT}}$ anstatt t$_{\text{Op}}$ zu
because Hans the woman instead.of to
unterstützen$_{\text{ACC}}$] behinderte$_{\text{ACC}}$
support hampered
'because Hans hampered the woman instead of supporting her'

b. *weil Hans *die*$_{\text{ACC}}$ *Frau* [anstatt einen Freund zu treffen
because Hans the woman instead.of a friend to meet
[Op$_{\text{ACC}}$ der t$_{\text{Op}}$ unterstützen$_{\text{ACC}}$ könnte]] behinderte$_{\text{ACC}}$
who support could hampered
'because Hans hampered the woman instead of meeting a friend who could help her'

The second property that points to Agree being responsible for downward case agreement is intervention. Such intervention effects can be observed in parasitic gap configurations as shown in (63) (Heck & Himmelreich to appear).[7]

(63) *wenn jemand der Anette$_2$[∗c:dat∗] das Buch[∗c:acc∗] [Op[c:dat]
if someone the Anette the book
ohne zu vertrauen] ausleiht
without to trust lends
'if someone lends Anette the book without trusting her'

[5] Vainikka & Brattico (2014) argue that Agree cannot cross a finite clause boundary.

[6] Note that locality is also a property of other syntactic operations such as movement. Still the data fit very well with the present Agree analysis.

[7] Note that the picture is more complicated than shown here. See Heck & Himmelreich (to appear) for discussion.

In (63), Agree between the antecedent *der Anette* and the empty operator is blocked by another potential antecedent *das Buch*, even though the cases between probe and goal match.

In sum, an account based on upward Agree being the only possible direction of Agree leaves open the problem of what operation is responsible for case matching effects.

6.3.2. Only downward Agree

If Agree can only apply downwards, case assignment must be a process different from Agree (see e.g. Chomsky 2001). Under this assumption, the variation in matching effects could be derived if all cases of upward Agree in the present account are simply missing and if unchecked Agree features do not lead to a crash of the derivation (Bošković 2009, Preminger 2010).

But if unchecked features can be deleted without successful Agree, the explanation for the ungrammaticality of mismatches is lost. Consequently, such an analysis is not suited for deriving strict case matching.

7. Conclusion

In summary, we have seen that Polish and German are mirror images of each other when it comes to case matching effects with free relatives and parasitic gaps: Polish free relatives and German parasitic gaps require strict matching, while German free relatives and Polish parasitic gaps allow case mismatches.

The analysis developed above essentially builds on the order of post-syntactic Agree operations and the bidirectionality of Agree. Both in FRs and PGs, there is an overt item and a covert item which have to Agree in case features additionally to their normal case agreement relation with case assigning heads. If Agree between the two items is upward agreement, it applies early and will not have an effect on other case assignment relations. If it applies late, it can potentially bleed other case assignment relations.

I have tried to show that an analysis based on the existence of a two-step bidirectional Agree operation can capture a kind of variation that other types of approaches potentially face difficulties deriving them. Furthermore, the analysis is an argument for a derivational view on post-syntactic operations since certain output representations are opaque. The opacity is resolved by making use of ordering of operations.

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