constructions to argue for certain constraints.

An important difference between Vogel and my approach is the external-only language type. With the way things are set up, Vogel predicts that external-only languages exist, although he has not found one yet. I have not encountered such a language yet either, and I even predict (at least if the light head is monomorphemic) that it does not exist. Future language needs to show whether such a language does exist. If it does not, Vogel needs a way to exclude it. If it does, I need a way to include it.

With his analysis, Vogel captures not only the three language types that I distuinguished in my typology of languages that show case competition. Additionally, he included a always-external language Icelandic, always-internal language German A, languages that sometimes use resumptive pronouns, such as Modern Greek and languages that do not use headless relatives at all, such as Hindi. I do not have an explanation for this, and I even do not have a way to distinguish a language like Modern Greek and Icelandic, which I both called always-external languages in XXX. Vogel captures all of this. However, in setting up the analysis, Vogel overgenerates. In addition to the unattested external-only type, Vogel predicts two more language types: (1) the opposite of Modern Greek, in which a resumptive pronoun is inserted when the external case is more complex than the internal case, and (2) a language in which resumptive pronouns are always used. Ideally, a theory should generate the patterns that are attested and not the ones that are not.

10.2 Himmelreich 2017

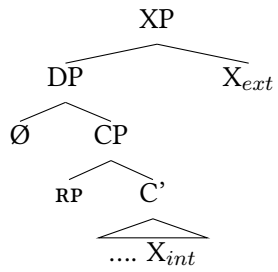
A second account that models the variation between different language types that exist in headless relatives is the one by Himmelreich (2017). Himmelreich (2017) assumes some sort of case hierarchy and the underlying syntactic structure she assumes is similar to what I assume in this dissertation. This accounts differs stands out with its crucial role for the operation Agree.

Just as Vogel (2001) and this dissertation, Himmelreich (2017) assumes that there is some sort of case hierarchy. In Himmelreich (2017)'s account, cases are represented as features can that bear sets of case feature values. Nominative case bears only {nom}, accusative bears {nom,acc}, and dative bears {nom,acc,dat}.

In terms of the larger syntactic structure of headless relatives, Himmelreich (2017) assumes that two elements are involved in case competition: the relative pronoun and a phonologically empty head in the main clause. Crucial in this account is the operation Agree. In all languages, there are three agree relations: (1) between the functional projection associated with the predicate in the relative clause and the relative pronoun (X_{INT} and RP in (1)), (2) between the functional projection associated with the predicate in the main clause and the phonologically empty element (X_{EXT} and Ø in (1)) and (3) between relative

pronoun and the phonologically empty element (RP and Ø in (1)).

(1)



Agree consists of two operations: Agree-Link, which establishes a syntactic relation the probe and the goal and Agree-Copy, which copies the case values from the probe onto the goal. Agree is successful when the case value of the goal is a subset of the case value of the probe. If this is not the case, the derivation crashes and there is no grammatical headless relative. Differences between languages arise from which types of elements (the functional projections, the relative pronoun and/or the phonologically empty element) are probes in the language.

Just as Vogel (2001) and this dissertation, Himmelreich (2017) includes Polish as a matching language and Modern German as an internal-only language in her typology.[2] These languages differ in situations in which the internal case is more complex than the external case: in Modern German these headless relatives are grammatical, in Polish they are not. I give the derivations of this situation for these two languages to illustrate how the account works.

I start with the derivation in Modern German. In the example, the internal case is dative and the external case is accusative. In Modern German, the relative pronoun (RP) and the phonologically empty head (Ø) are probes. Therefore, Agree-Link establishes four agree relations: (1) the relative pronoun (RP) links to the internal functional projection (X_{INT}), (2) the relative pronoun (RP) links to the phonologically empty head (Ø), (3) the phonologically empty head (Ø) links to the the relative pronoun, and (4) the phonologically empty head (Ø) links to the external functional projection (X_{EXT}).

Agree-Copy follows the ordering that has been established by Agree-Link. As Step 1, the relative pronoun (RP) receives dative case from the internal functional projection (X_{DAT}). In Step 2, the relative pronoun (now RP_{DAT}) probes for the unvalued case feature of the phonologically empty head (Ø). In Step 3, the phonologically empty head (Ø) receives dative case from the relative pronoun (RP). In Step 4, the phonologically empty head (now $Ø_{DAT}$) checks its case against the accusative case of the functional projection (X_{ACC}). Since the accusative case of the external functional projection is a subset of the dative case of the phonologically empty head, the derivation does not fail, making the headless relative grammatical.

[2]Himmelreich (2017) actually describes two varieties of Modern German: German 1 and German 2. German 1 is an internal-only type of language, German 2 is a matching type of language.

In Polish, this type of headless relative is ungrammatical. In this type of language not only the relative pronoun and the phonologically empty head are probes, but functional projections are too. Therefore, Agree-Link establishes six agree relations: (1) the internal functional projection (X_{INT}) links to the relative pronoun (RP), (2) the relative pronoun (RP) links to the internal functional projection (X_{INT}), (3) the relative pronoun (RP) links to the phonologically empty head (Ø), (4) the phonologically empty head (Ø) links to the the relative pronoun, (5) the phonologically empty head (Ø) links to the external functional projection (X_{EXT}), and (6) the external functional head (X_{EXT}) links to the phonologically empty head (Ø).

Agree-Copy follows the ordering that has been established by Agree-Link. As Step 1, the internal functional projection (X_{DAT}) checks its case features against the unvalued case feature of the relative pronoun (RP). In Step 2, the relative pronoun (RP) receives dative case from the internal functional projection (X_{DAT}). In Step 3, the relative pronoun (now RP_{DAT}) probes for the unvalued case feature of the phonologically empty head (Ø). In Step 4, the phonologically empty head (Ø) receives dative case from the relative pronoun (RP). In Step 5, the phonologically empty head (now $Ø_{DAT}$) checks its case against the accusative case of the functional projection (X_{ACC}). Since the accusative case of the external functional projection is a subset of the dative case of the phonologically empty head, the derivation proceeds. The derivation fails in Step 6. Here the external functional projection checks its accusative case (X_{ACC}) against the dative case of the phonologically empty head ($Ø_{DAT}$). As the dative case is not a subset of the accusative case, the derivation fails, making the headless relative ungrammatical.

Himmelreich (2017) shows that differences languages show in their headless relatives can be captured by differences in how languages agree. For instance, as illustrated above, the difference between internal-only languages such as German and matching languages such as Polish is that in Polish functional projections are probes and in Modern German they are not. In addition to internal-only languages and matching languages, Himmelreich (2017)'s analysis also accounts for the pattern in Modern Greek, which this dissertation does not. In the analysis of Modern Greek, the relative pronoun is a probe and the phonologically empty head is not, which differs from again from how Modern German and Polish agree.[3] This dissertation does not provide an account of the Modern Greek pattern. A language that Himmelreich (2017)'s analysis cannot account for is one of the unrestricted type, such as Gothic. As far as I can see, this type of language cannot be derived from the system she set up. In a language as Gothic, case competition happens in both directions, and not just the internal case can win the competition. Since the derivation in Himmelreich (2017)'s account always happens bottom-up and she has a subset requirement on matching, the external case can never win over the internal case.

In sum, the source of variation in headless relatives for Himmelreich (2017) is different

[3]Functional heads may or may not be probes: it does not matter for the analysis.

agree properties. Unfortunately, how a language agrees cannot be deducted independently from investigating the language on itself. However, Himmelreich (2017) shows that the agree properties of a language do not only account for the languages' behavior in headless relatives: at the same time they also account for how parasitic gaps in the languages behave. The account in this dissertation lets the difference between languages follow from the morphology of relative pronoun, which can be observed from investigating the langauge itself. However, it remains to be seen whether this can account for the behavior of languages in their parasitic gaps too.

10.3 Bergsma 2019

The last account I discuss is the one in Bergsma 2019. Just as the account in this dissertation, the account of Bergsma (2019) is embedded in Nanosyntax and adopts Caha 2009's case hierarchy: each case feature corresponds to its own head in the syntax and more complex cases syntactically contain less complex cases. The accounts differ in what they assume to be the underlying structure of headless relatives, how they model the difference between different languages and the languages they cover.

Bergsma (2019) assumes that in headless relatives there is only a single element involved in case competition, meaning there is no head present in the main clause, but only the relative pronoun in the relative clause. The idea is that a syntactic node within the relative pronoun is available for remerge, which I illustrate below with syntactic structures. The structures are not taken directly from Bergsma 2019 but they paraphrase what is in the paper and put details (mostly about the internal structure of the relative pronoun) aside for ease of explanation.

First I show a structure in which the internal case is more complex than the external case, here dative and accusative, given in (2). The relative clause on the right contains a predicate that takes dative case. The dative relative pronoun appears on the left edge of the relative clause. The predicate in the main clause takes accusative case. It is merged with the accusative case, which is a node embedded in the dative relative pronoun.

(2)