Chapter 7

Case

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HPSG is not widely known for its approach to grammatical case. For example, it is only mentioned in passing in the 2006 monograph *Theories of Case* (Butt 2006: 225) and in the 2009 *Oxford Handbook of Case* (Malchukov & Spencer 2009: 43), which features separate articles on GB/Minimalism, LFG, Optimality Theory, and other grammatical frameworks. As most of the HPSG work on case was carried out in 1990s and early 2000s, this perception is unlikely to have changed since the publication of these 2 volumes.

The aim of this chapter is to provide an overview of HPSG work on grammatical case and to show that it does offer novel solutions to some of the problems related to case. Two main research areas are presented in the two ensuing sections: structural case assignment is discussed in Section 1 and case neutralisation ('indeterminacy') and underspecification – in Section 2. Some of the other HPSG work on case, including implementational work, is outlined in Section 3.

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1 Structural case assignment

Pollard & Sag (1994) did not envisage a separate theory of case:[1] "Nominative case assignment takes place directly within the lexical entry of the finite verb," while "the subject SUBCAT element of a nonfinite verb… does not have a case value specified" (30). However, they added in a footnote on the same page that "for languages with more complex case systems, some sort of distinction analogous to the one characterized in GB work as 'inherent' vs. 'structural' is required."

In the transformational Government and Binding theory of 1980s (GB; Chomsky 1981; 1986), *inherent* – or *lexical* – case is understood as rigidly assigned by the head and independent of syntactic environment, while 'structural' case varies with the structural context (e.g., Haider 1985: 70). This difference can be illustrated on the basis of the following examples from German (Przepiórkowski 1999a: 63, based on data from Heinz & Matiasek 1994):

(1) a. Der Mann unterstützt *den Installateur.*
the man.NOM supports the plumber.ACC
'The man is supporting the plumber.'

b. *Der Installateur* wird unterstützt.
the plumber.NOM AUX supported
'The plumber is supported.'

c. das Unterstützen *des Installateurs*
the supporting the plumber.GEN
'the support for/from the plumber'

(2) a. Der Mann hilft *dem Installateur.*
the man.NOM helps the plumber.DAT
'The man is helping the plumber.'

b. *Dem Installateur* wird geholfen.
the plumber.DAT AUX helped
'The plumber is helped.'

c. das Helfen *des Installateurs*
the helping the plumber.GEN
'the help from/*for the plumber'

[1] This section is to some extent based on Przepiórkowski 1999a, Section 3.4 and Chapter 4; see also Müller 2013, Chapter 14.

In (1), both arguments of the verb UNTERSTÜTZEN 'support' receive structural case: the patient argument occurs in the accusative in (1a), in the nominative in (1b), and in the genitive in (1c). Similarly, the agent argument is in the nominative in (1a), but it may only occur in the genitive in (1c); hence, the single argument marked as genitive in (1c) is ambiguous between the agent and the patient. In the case of (2), the agent argument of HELFEN 'help' is similarly assigned structural case, but the patient argument receives a rigid inherent case: it is always the dative, so, e.g., the genitive in (2c) may only be understood as marking the agent.

Examples such as above may still be handled without any general principles of case assignment. For example, lexical rules responsible for forming passive participles (as in the b. examples above) and gerunds (as in the c. examples) might be responsible for manipulating case values of arguments, e.g., for translating nominative and accusative – but not dative – to genitive in the case of gerunds. However, the interaction of the structural/inherent case dichotomy with raising (and – in some languages – with control) motivates a more comprehensive approach to case assignment.

Consider Icelandic raising verbs (all Icelandic data is taken from Sag et al. 1992: 304–305):

(3) a. *Hann* virðist elska hana.
he.NOM seems love.*inf* her.ACC
'He seems to love her.'

b. Þeir telja *Maríu* hafa skrifað ritgerðina.
they believe Mary.ACC have.*inf* written the-thesis
'They believe Mary to have written her thesis.'

As in other languages, the subject of the infinitival verb raised to the higher subject position, as in (3a), normally receives the nominative case there, while – in the case it is raised to the object position, as in (3b) – it normally receives the accusative case. This could be easily modelled in accordance with the suggestion of Pollard & Sag (1994: 30) that infinitival verbs do not assign case to their subjects, while finite verbs – in this case finite raising verbs – normally assign the nominative to their subjects and the accusative to their objects. But, as is well known (Andrews 1982; Zaenen & Maling 1983; Zaenen et al. 1985), some Icelandic verbs idiosyncratically assign specific "quirky" cases to their subjects, and when they do, the higher raising verbs must honour this assignment:

(4) a. *Hana* virðist vanta peninga.
her.ACC seems lack.*inf* money
'She seems to lack money.'

b. Hann telur *mig* vanta peninga.
he.NOM believes me.ACC lack.*inf* money
'He believes that I lack money.'

(5) a. *Barninu* virðist hafa batnað veikin.
the-child.DAT seems have.*inf* recovered-from the-disease
'The child seems to have recovered from the disease.'

b. Hann telur *barninu* hafa batnað veikin.
he believes the-child.DAT have.*inf* recovered-from the-disease
'He believes the child to have recovered from the disease.'

(6) a. *Verkjanna* virðist ekki gæta.
the-pains.GEN seems not be-noticeable.*inf*
'The pains don't seem to be noticeable.'

b. Hann telur *verkjanna* ekki gæta.
he believes the-pains.GEN not be-noticeable.*inf*
'He believes the pains to be not noticeable.'

Thus, in (4), the understood subject of the infinitival VANTA 'lack' must be in the accusative, whether it is raised the object position, as in (4b), where the accusative would be expected anyway, or to the subject position, as in (4a), where normally the nominative case would be expected. Similarly in the case of verbs idiosyncratically assigning their subject the dative case, as in (5), or the genitive case, as in (6).

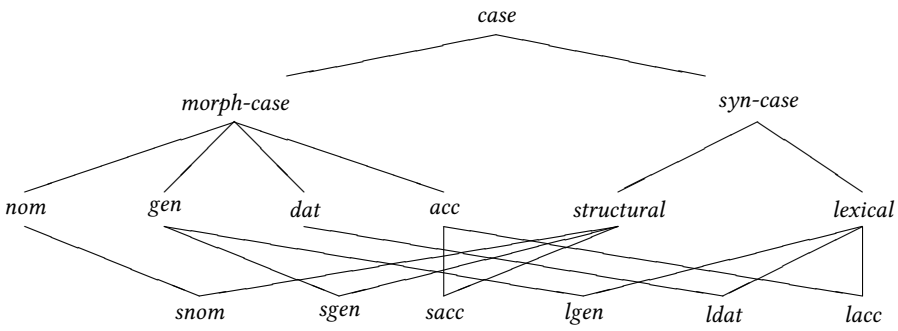
The difficulty presented by such examples is this. If the finite raising verbs were assumed to assign case to the raised subjects – nominative in the case of raising to subject and accusative in the case of raising to object – than this would clash with 'quirky' cases assigned to their subjects by some verbs: (4a), (5) and (6) would be predicted to be ungrammatical. If, on the other hand, such raising verbs did not assign case to the raised arguments, instead relying on the lower verbs to assign appropriate cases to their subjects, then it is not clear what case should be assigned to their subjects by the usual – not 'quirky' – verbs: it cannot always be the nominative, as the accusative case is witnessed when the subject is raised to the object position, as in (3b); similarly, it cannot always be the accusative, as

the nominative case surfaces when the subject is raised to the subject position, as in (3a).

The intuition of the analysis proposed in Sag et al. 1992 relies on the distinction between structural and inherent case assignment, although these terms do not appear in this paper. Verbs such as those in (4)–(6) assign their subjects specific inherent cases (accusative in (4), dative in (5) and genitive in (6)), while the usual verbs, as in (3), only mark their subjects as structural, to be assigned case elsewhere. Finite raising verbs are, in a way, sensitive to this distinction, and only assign the nominative (in the case of raising to subject) or accusative (in the case of raising to object) to such structural arguments. While Sag et al. (1992) represent this distinction between structural and inherent case implicitly, via the interaction of two attributes, CASE (realised case) and DCASE (default case), later HPSG work assumes explicit representation of the two kinds of case as two subtypes of *case* in the type hierarchy: *str*(uctural) and *lex*(ical). Such a *case* type hierarchy is, apparently independently, alluded to in Pollard 1994 and introduced in detail in Heinz & Matiasek 1994, to which we turn presently.

On the basis of German examples such as (1)–(2), Heinz & Matiasek (1994) argue that out of 4 morphological cases in German – nominative, accusative, genitive and dative — the first three (i.e., without the dative) may be assigned structurally, by general case assignment principles. Similarly, they argue that the last three (i.e., without the nominative) may also be assigned lexically, in which case they are stable across various syntactic environments. These empirical observations are translated into the following *case* hierarchy:

(7)



Particular verbs may assign specific lexical cases to their arguments, e.g., *ldat*.

They may also specify arguments as bearing structural case, in which case only the *str*(*uctural*) supertype is mentioned in the lexicon. For example, the lexical entries for UNTERSTÜTZEN 'support' and HELFEN 'help' contain the following subcategorisation requirements:

(8) a. UNTERSTÜTZEN: [SUBCAT ⟨ NP[*str*], NP[*str*] ⟩]
b. HELFEN: [SUBCAT ⟨ NP[*str*], NP[*ldat*] ⟩]

Assuming a similar *case* hierarchy for Icelandic, the difference between the usual verbs, such as ELSKA 'love' in (3a), and 'quirky' subject verbs, such as VANTA 'lack' in (4), could be represented as below (omitting non-initial arguments):

(9) a. ELSKA: [SUBCAT ⟨ NP[*str*], ...⟩]
b. VANTA: [SUBCAT ⟨ NP[*lacc*], ...⟩]

Since Pollard 1994 and Heinz & Matiasek 1994, such representations of case requirements are generally adopted in HPSG,[2] with the only difference that SUBCAT is currently replaced with ARG-ST. The point where different approaches diverge is how exactly structural case is resolved to a specific morphological case.

The simplest principle would resolve the case of the first *str* argument of a pure (non-gerundial) verb to nominative, i.e., to *snom*, the case of any subsequent *str* argument of a pure verb to accusative, i.e., to *sacc*, and the case of any *str* argument of a gerund to *sgen*. Unfortunately, this simple principle would not work in various cases of raising, e.g., in the case of the Icelandic data above. While the 'quirky' cases in (4)–(6) would be properly taken care of by this approach – once the subject is assigned a specific lexical case it is outside of the realm of a principle resolving structural cases – structural subjects raised to a higher verb would be assigned specific case twice (or more times, in the case of longer raising chains): on the SUBCAT (or ARG-ST) of the lower verb and on the SUBCAT (or ARG-ST) of the raising verb. This would not necessarily lead to problems in the case of raising to subject verbs, as in (3a), as the structural argument would be the subject in both subcategorisation frames, so it would be resolved to *snom* twice, but it would create a problem in the case of raising to object verbs, as in (3b), as the raised argument would be resolved to the nominative on the lower subcategorisation frame and to the accusative on the higher frame. So, the problem is not limited to Icelandic, but may be observed in any language with raising to object (also known as Exceptional Case Marking or Accusativus cum Infinitivo), including German (cf., e.g., Heinz & Matiasek 1994: 231). Obviously, even if a structural argument occurs on a number of SUBCAT or ARG-ST lists, it should be assigned

[2] A very recent example being Machicao y Priemer & Fritz-Huechante 2018.

specific morphological case according to its position on just one of them – the highest one.

Both Pollard 1994 and Heinz & Matiasek 1994 account for such facts via configurational case principles, e.g. (Heinz & Matiasek 1994: 209):

(10) Case Principle (for German):

In a *head-complement-structure* whose head has category
verb[*fin*] the external argument has a CASE value of *snom*,
verb the internal argument has a CASE value of *sacc*,
noun the internal argument has a CASE value of *sgen*.
These are the only saturated or almost saturated
*head-complement-structure*s with structural arguments.

(11) *Syntactically External Argument ('Subject')*:

If the first element of the SUBCAT list of a sign is an NP[*str*], it is called the *(syntactically) external argument* of that sign.

(12) *Syntactically Internal Argument ('Direct Object')*:

If the second element of the SUBCAT list of a sign is an NP[*str*], it is called the *(syntactically) internal argument* of that sign.

Heinz & Matiasek (1994: 209–210) formalize this Case Principle by giving the following constraints:

(13)
$$\left[\begin{array}{l} \textit{phrase} \\ \textsc{synsem|loc|cat}\left[\begin{array}{ll} \textsc{head} & \left[\begin{array}{l}\textit{verb}\\ \textsc{vform}\ \textit{fin}\end{array}\right] \\ \textsc{subcat} & \langle\rangle \end{array}\right] \\ \textsc{dtrs}\left[\begin{array}{l}\textit{h-c-str}\\ \textsc{head-dtr|...|subcat}\ \langle\ \mathrm{NP}[\textit{str}]\ \rangle\end{array}\right] \end{array}\right] \Rightarrow$$
$$\left[\textsc{dtrs|head-dtr|...|subcat}\ \langle\ \mathrm{NP}[\textit{snom}]\rangle, \ldots\right]$$

(14)
$$\left[\begin{array}{l}\textit{phrase}\\ \textsc{synsem|loc|cat}\left[\begin{array}{ll}\textsc{head} & \left[\begin{array}{l}\textit{verb}\\ \textsc{vform}\ \textit{fin}\end{array}\right]\\ \textsc{subcat} & \langle\rangle \vee \left\langle\ \textit{synsem}\ \right\rangle\end{array}\right]\\ \textsc{dtrs}\left[\begin{array}{l}\textit{h-c-str}\\ \textsc{head-dtr|...|subcat}\ \left\langle\ \textit{synsem}, \mathrm{NP}[\textit{str}], \ldots\right\rangle\end{array}\right]\end{array}\right] \Rightarrow$$
$$\left[\textsc{dtrs|head-dtr|...|subcat}\ \left\langle\ \textit{synsem}, \mathrm{NP}[\textit{sacc}]\right\rangle, \ldots\right]$$

(15)
$$\left[\begin{array}{l}\textit{phrase}\\ \textsc{synsem|loc|cat}\left[\begin{array}{ll}\textsc{head} & \textit{noun}\\ \textsc{subcat} & \langle\rangle \vee \left\langle\ \textit{synsem}\ \right\rangle\end{array}\right]\\ \textsc{dtrs}\left[\begin{array}{l}\textit{h-c-str}\\ \textsc{head-dtr|...|subcat}\ \left\langle\ \textit{synsem}, \mathrm{NP}[\textit{str}], \ldots\right\rangle\end{array}\right]\end{array}\right] \Rightarrow$$
$$\left[\textsc{dtrs|head-dtr|...|subcat}\ \left\langle\ \textit{synsem}, \mathrm{NP}[\textit{sgen}]\right\rangle, \ldots\right]$$

Note that the locus of this Case Principle is *phrase* and that it makes reference to *head-complement-structure* values of the daughters (dtrs) attribute. In this sense, this principle is configurational. Similar principles were proposed for Korean (Yoo 1993; Bratt 1996), English (Grover 1995) and Polish (Przepiórkowski 1996a), *inter alia*.

This configurational approach to case assignment is criticised in Przepiórkowski 1996b; 1999b,a on the basis of conceptual and theory-internal problems. The conceptual problem is that a configurational analysis is employed to what is usually considered an essentially local phenomenon, one concerned with the relation between a head and its dependents (Blake 1994). The – more immediate – theory-internal problem is that such configurational case principles are restricted to locally realised arguments, and are not directly compatible with those – dominant since Pollard & Sag 1994: Chapter 9 – HPSG analyses of extraction which do not assume traces and with those HPSG approaches to cliticisation in which the clitic is realised as an affix rather than a tree-configurational constituent (cf., e.g., Miller & Sag 1997 on French and Monachesi 1999 on Italian).

The solution proposed in Przepiórkowski 1996b; 1999b,a is to resolve structural cases directly within arg-st, via local principles operating at the level of *category* of a word (where both head information and argument structure infor-

mation – but not constituent structure – is available) rather than at the level of *phrase*. This seems to bring back the problem, discussed in the connection of Icelandic data above, of raised arguments, which occur on a number of ARG-ST lists. The innovation of Przepiórkowski 1996b; 1999b,a is the proposal to mark, within ARG-ST, whether a given argument is realised locally (either tree-configurationally, or as a gap to be extracted higher on, or as an affix) or not. If it is realised locally, it may be assigned appropriate case; if it is not (because it is raised), its structural case must be resolved higher up. On this setup, the above constraints (13)–(14) responsible for the assignment of structural nominative and accusative are replaced with the following two constraints (and similarly for the structural genitive):

(16)
$$\begin{bmatrix} \textit{cat} \\ \textsc{head} \quad \textit{verb} \\ \textsc{arg-st} \left\langle \begin{bmatrix} \textsc{arg} & \textsc{np}[\textit{str}] \\ \textsc{realized} & + \end{bmatrix} \right\rangle \oplus \boxed{2} \end{bmatrix} \Rightarrow \left[\textsc{arg-st} \left\langle \begin{bmatrix} \textsc{arg} & \textsc{np}[\textit{snom}] \end{bmatrix} \right\rangle \oplus \boxed{2} \right]$$

(17)
$$\begin{bmatrix} \textit{cat} \\ \textsc{head} \quad \textit{verb} \\ \textsc{arg-st} \ \boxed{1} \ \textit{nelist} \oplus \left\langle \begin{bmatrix} \textsc{arg} & \textsc{np}[\textit{str}] \\ \textsc{realized} & + \end{bmatrix} \right\rangle \oplus \boxed{2} \end{bmatrix} \Rightarrow$$
$$\left[\textsc{arg-st} \ \boxed{1} \oplus \left\langle \begin{bmatrix} \textsc{arg} & \textsc{np}[\textit{snom}] \end{bmatrix} \right\rangle \oplus \boxed{2} \right]$$

Obviously, for such constraints to work, values of ARG-ST must be lists of slightly more complex objects than *synsem* (these are now values of ARG within such more complex objects), and additional principles must make sure that values of REALIZED are instantiated properly (see Przepiórkowski 1999a: 78–79 for details).

While this approach seems to be sufficient to account for almost all known structural case phenomena, German presents additional difficulties, as discussed in Müller 1997a; 2001 and Meurers 1999a,b. In brief, Müller (1997a; 2001) recalls arguments from Höhle 1983; 2018 that in German controlled (not: raised) structural subjects bear the nominative case. Since such subjects are never realised locally (as such), the above case principle stated in terms of REALIZED would not resolve their case. The problem with the particular approach of Przepiórkowski 1996b; 1999b,a is the assumption that an argument is locally realised – and hence may be assigned structural case – if and only if it is not raised to a higher argument

structure. The kind of data discussed in Höhle 1983; 2018 and Müller 1997a; 2001 shows that this equivalence does not always hold and suggests that structural case should be assigned to arguments on the basis of whether they are raised or not, and not whether they are locally realised or not.

The same conclusion may be reached on the basis of different data, discussed in Meurers 1999a,b on the basis of empirical observations in Haider 1990, Grewendorf 1994 and Müller 1997b:

(18) a. [*Ein* *Außenseiter* gewinnen] wird hier nie.
an.NOM outsider win.*inf* will here never
'An outsider will never win here.'

b. [*Einen* *Außenseiter* gewinnen] läßt Gott hier nie.
an.ACC outsider win.*inf* lets god here never
'God never lets an outsider win here.'

Assuming that fronted fragments, marked with square brackets, are single constituents,[3] the subject of *gewinnen* 'win' forms a constituent with this verb, i.e., it has the same configurational realisation in both examples. Hence, configurational case assignment principles should assign it the same case in both instances, contrary to facts: *ein Außenseiter* occurs in the nominative in (18a) and *einen Außenseiter* bears the accusative case in (18b). As argued by Meurers 1999a,b, the reason is that – although the subject is realised locally to its infinitival head – it is in some sense raised further to the subject position of the auxiliary *wird* in (18a) and to the object position of the AcI verb *läßt* in (18b); hence, the difference in cases. This, again, suggests that structural case should be assigned not where the argument is realised, but on the highest ARG-ST on which it occurs. A corresponding modification of the non-configurational case assignment approach of Przepiórkowski 1996b; 1999b,a – replacing the [REALIZED +] with [RAISED −] in constraints such as (16)–(17) and providing appropriate constraints on values of RAISED – is proposed in Przepiórkowski 1999a: 93–95; see also Müller 2013, Section 17.4 (and references therein), for further improvements.

While this non-configurational approach to syntactic case assignment was motivated largely by theory-internal technical considerations, it turns out to formalise sometimes apparently contradictory intuitions expressed in various approaches to case. First of all, it preserves the common intuition that case is a local phenomenon, an intimate relation between a head and its dependents.

[3] This assumption is not completely uncontroversial; see Kiss (1994: 100–101) for potential counterexamples.

Second, it successfully formalises the distinction between structural and inherent/lexical case known from the transformational literature of 1980s, and non-configurationally encodes the apparently configurational principles of structural case assignment. Third, while most HPSG literature on case is concerned with syntactic phenomena in European languages, this approach has been extended to case stacking known, e.g., from languages of Australia and case attraction observed, e.g., in Classical Armenian and in Gothic (Malouf 2000). Fourth, by allowing antecedents of implicational constraints such as (16)–(17) to be *local* objects, not just syntactic *categories*, semantic factors influencing case assignment may also be taken into account, as in differential case marking, repeatedly considered in Lexical Functional Grammar (cf., e.g., Butt & King 2003 and references therein), but apparently not (so far) in HPSG. Fifth, as pointed out in Przepiórkowski 1999b,a, the above approach to case formalises the 'case tier' intuition of Zaenen et al. 1985, Yip et al. 1987 and Maling 1993 (see also Maling 2009).

Let us illustrate the last point with some Finnish data from Maling 1993:

(19) a. Liisa muisti matkan vuoden.
Liisa.NOM remembered trip.ACC year.ACC
'Liisa remembered the trip for a year.'

b. Lapsen täytyy lukea kirja kolmannen kerran.
child.GEN must read book.NOM [third time].ACC
'The child must read the book for a 3rd time.'

c. Kekkoseen luotettiin yksi kerta.
Kekkonen.ILL trust.PASSP [one time].NOM
'Kekkonen was trusted once.'

d. Kekkoseen luotettiin yhden kerran yksi vuosi.
Kekkonen.ILL trust.PASSP [one time].ACC [one year].NOM
'Kekkonen was trusted for one year once.'

Maling (1993) argues at length that some adjuncts (adverbials of measure, duration and frequency) behave just like objects with respect to case assignment and, in particular, notes the following generalization about syntactic case assignment: only one NP dependent of the verb receives the nominative, namely the one which has the highest grammatical function; other dependents receive the accusative.[4] Thus, if none of the arguments bears inherent case, the subject is in

[4] See also Zaenen & Maling 1983 and Zaenen et al. 1985 for a similar generalisation with respect to Icelandic.

the nominative and other dependents are in the accusative, cf. (19), but if the subject bears an idiosyncratic case, it is the object that gets the nominative, cf. (19b). Furthermore, if all arguments (if any) bear inherent case, the next 'available' grammatical function is that of an adjunct, thus one of the adjuncts receives the nominative, cf. (19c)–(19d).

Given such facts, Maling (1993) claims that syntactic case is assigned in Finnish on the basis of grammatical hierarchy and that (at least some) adjuncts belong to this hierarchy. Moreover, as evidenced by (19c)–(19d), adjuncts do not form a single class in this hierarchy: although the multiplicative adverbial *yksi kerta* is nominative in (19c), this case is won over by the duration adverbial in (19d). Taking into consideration also the partitive of negation facts (measure adverbials, but not duration or frequency adverbials, behave like direct objects in the sense that they take partitive case under sentential negation), Maling (1993) extends the grammatical function hierarchy for Finnish in the following way:

(20) SUBJ > OBJ > MEASURE > DURATION > FREQUENCY

While these generalisations are developed in the context of Lexical Functional Grammar, it is not clear how they could be encoded in LFG: there are no formal mechanisms for stating such a hierarchy of grammatical functions and, additionally, all adjuncts are assumed to be elements of an unordered set. On the other hand, given the 'adjuncts as complements' approach of Bouma et al. 2001 and others, upon which at least some adjuncts are added to ARG-ST (perhaps renamed to DEPS), and assuming – as standard in HPSG – that ARG-ST elements satisfy the obliqueness hierarchy, formalisation of the 'case tier' approach is easy and consists of two implicational principles similar to (16)–(17). The first principle resolves the first structurally-cased element of extended ARG-ST to nominative, whether this element is the first element of ARG-ST or not (it is not in the case of (19b)–(19d)), and whether it corresponds to the subject, the direct object or an adjunct. The second principle resolves the structural case of all subsequent elements, if any, to accusative.

2 Case syncretism

Another important strand of HPSG work on case concerns situations in which a single syncretic form seems to simultaneously bear two (or more) case values, as in the following examples involving coordination, free relatives and parasitic gaps:

(21) Polish coordination (Dyła 1984: 701–702):

a. Kogo Janek lubi a Jerzy
who.ACC/GEN Janek.NOM likes(OBJ.ACC) and Jerzy.NOM
nienawidzi?
hates(OBJ.GEN)
'Who does Janek (John) like and Jerzy (Jerry) hate?'

b. * Co Janek lubi a Jerzy
what.NOM/ACC Janek.NOM likes(OBJ.ACC) and Jerzy.NOM
nienawidzi?
hates(OBJ.GEN)
'What does Janek (John) like and Jerzy (Jerry) hate?' (putative)

(22) German coordination (Pullum & Zwicky 1986: 764–765):

a. Er findet und hilft
he.NOM finds(OBJ.ACC) and helps(OBJ.DAT)
Frauen.
women.NOM/ACC/GEN/DAT
'He finds and helps women.'

b. * Sie findet und hilft Männer.
she.NOM finds(OBJ.ACC) and helps(OBJ.DAT) men.NOM/ACC/GEN
'She finds and helps men.' (putative)

c. * Sie findet und hilft Männern.
she.NOM finds(OBJ.ACC) and helps(OBJ.DAT) men.DAT
'She finds and helps men.' (putative)

(23) German free relatives (Groos & van Riemsdijk 1981: 212):

Was du mir gegeben hast, ist
what.NOM/ACC you.NOM me.DAT given(OBJ.ACC) have is(SUBJ.NOM)
prächtig.
wonderful
'What you have given to me is wonderful.'

(24) English parasitic gaps (Hukari & Levine 1996: 482, Levine et al. 2001: 205):

Robin is someone who$_i$.NOM/ACC even good friends of e_i.ACC believe e_i.NOM should be closely watched.

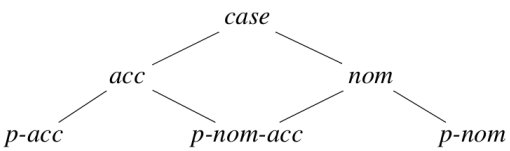
In (21a), the fronted syncretic accusative/genitive form *kogo* 'who' satisfies the requirements of the two coordinated verbal constituents: in one, *lubi* 'likes' requires an accusative object, and in the other, *nienawidzi* 'hates' expects a genitive

object. A form which is not syncretic between (at least) these two cases cannot occur in the place of *kogo*; this is illustrated in (21b), where the element putatively shared by the two verbal constituents is syncretic between accusative and nominative, rather than accusative and genitive. The well-known example (22) illustrates essentially the same phenomenon in German: the form *Frauen* 'women', which is fully syncretic with respect to case, simultaneously satisfies the accusative requirement of *findet* 'finds' and the dative requirement of *hilft* 'helps'. By contrast, this joint requirement is not satisfied either by *Männer*, which is accusative (among other cases) but not dative, or by *Männern*, which is dative but not accusative. The other two examples show that this phenomenon is not restricted to coordination. In (23), the syncretic form *was* 'what' simultaneously satisfies the constraint that the object of *gegeben* 'given' is accusative and that the subject of *ist* 'is' is nominative. Similarly, the extracted *who* in (24) seems to simultaneously bear the accusative case assigned by the preposition *of* and the nominative case of the subject of *should*.

Such examples were at one point considered as problematic not only for HPSG, but for unification-based theories in general (Ingria 1990). The reason is that, on the straightforward approach to case, they should all be ungrammatical. For example, in the case of (22a), the assignment of the accusative to the object of *findet* 'finds' should clash with the assignment of the dative to the object of *hilft* 'helps', as both objects are realised by the same noun *Frauen* 'women'. In other words, the attempt to unify accusative and dative should fail.

The solution first proposed by Levine et al. (2001: 207–208) is to enrich the *case* hierarchy in such a way that the unification of two different morphological cases does not necessarily result in failure. Specifically, assuming that nominative and accusative are structural cases in English, they propose the following part of the structural case hierarchy:[5]

(25)



Particular nominal forms are specified in the lexicon as either pure accusative (*p-acc*), pure nominative (*p-nom*) or syncretic between the two (*p-nom-acc*):

[5]Type names follow the convention in Daniels 2002, for increased uniformity with the remainder of this section.

(26) *he* [CASE *p-nom*]
him [CASE *p-acc*]
whom [CASE *p-acc*]
who [CASE *p-nom-acc*]
Robin [CASE *p-nom-acc*]

On the other hand, heads – or constraints of a case principle of the kind presented in the previous section – specify particular arguments as *nom* or *acc*. So, in the case of the parasitic gap example (24), the *acc* requirement associated with the preposition *of* and the *nom* requirement on the subject of *should* are not incompatible: their unification results in *p-nom-acc* and the shared dependent may be any form compatible with this case value, e.g., *who* (but not *whom*). Examples (21)–(23) can be handled in a similar way.

A situation often perceived as dual to such case neutrality, sometimes called 'case underspecification', occurs when a head specifies the case of its dependent disjunctively and may combine with a coordinate structure containing phrases in both cases, e.g.:

(27) Polish (Przepiórkowski 1999a: 175):

Dajcie wina i całą świnię!
give wine.GEN and whole.ACC pig.ACC
'Serve (some) wine and a whole pig!'

(28) Russian (Levy 2001: 11):

Včera vec' den' on proždal svoju podrugu Irinu i
yesterday all day he expected self's.ACC girlfriend.ACC Irina.ACC and
zvonka ot svoego brata Grigorija.
call.GEN from self's brother Grigory
'Yesterday he waited all day for his girlfriend Irina and for a call from his brother Grigory.'

In Polish, the object of the verb *dajcie* 'give' is normally in the accusative, but may also be realised as the genitive, when its meaning is partitive; in (27), the object is a coordination of such a genitive noun *wina* '(some) wine' and the accusative *całą świnię* 'whole pig'. Similarly, according to Levy 2001, the Russian verb *proždal* 'awaited' may combine with accusative or genitive, and in (28) it happily combines with a coordinate phrase containing both.

If such 'accusative and genitive' coordinate phrases bear case at all, the value of this grammatical category must be something like *acc+gen*. Note that this

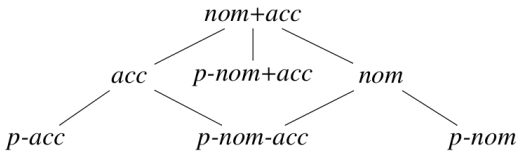
situation differs from case neutrality discussed above: a neutral case such as *p-acc-gen* intuitively corresponds to intersection: a nominal bearing this case is accusative and genitive at the same time. On the other hand, the intuition behind *acc+gen* is that of union: a (coordinated) nominal with this case value has accusative elements (perhaps purely accusative) and genitive elements (perhaps purely genitive). In particular, *acc+gen* coordinate phrases cannot fill either purely accusative position, or purely genitive positions, or positions in which both the accusative and the genitive is expected, as in (21) above.[6]

This duality is a feature of the categorial grammar approach to case and coordination of Bayer 1996 (see also Bayer & Johnson 1995) and the corresponding HPSG analyses were presented in Levy 2001 and Levy & Pollard 2002, as well as in Daniels 2002. As noted in Levy & Pollard 2002: 233, the two approaches are isomorphic. The main technical difference is that the relevant case hierarchies are construed outside of the usual HPSG type hierarchy in the approach of Levy 2001 and Levy & Pollard 2002, but they are fully integrated in the approach of Daniels 2002. For this reason, and also because it is the basis of some further HPSG work (e.g., Crysmann 2005), this latter approach is presented below.

Intuitively, just as the common subtype of *acc* and *nom*, i.e., *p-nom-acc* in (25), represents forms which are simultaneously accusative and nominative, the common supertype, i.e., *case*, which should perhaps be renamed to *nom+acc*, should represent coordinate structures involving nominative and accusative conjuncts. However, given that all objects are assumed to be sort-resolved in standard HPSG, saying that the case of a coordinate structure is *case* (or *nom+acc*) is paramount to saying that it is either *p-acc* (pure accusative), or *p-nom-acc* (syncretic nominative/accusative), or *p-nom* (pure nominative). One solution is to "make a simple change to the framework's foundational assumptions" (Sag 2003: 268) and to allow linguistic objects to bear non-maximal types. This is proposed and illustrated in detail in Sag 2003. A more conservative solution, proposed in Daniels 2002, is to add dedicated maximal types to all such non-maximal types; for example, the above hierarchy (25) becomes (29):

[6]To the extent that coordinate phrases may fill such a neutralised accusative/genitive position, all conjuncts – and, hence, also the whole coordinate structure – should bear the neutralised *p-acc-gen* case.

(29)



Apart from the trivial renaming of *case* to the more explicit *nom+acc*, a maximal type corresponding to this renamed non-maximal type is added here, namely, *p-nom+acc*.

Let us illustrate this approach with the two Polish examples (21a) and (27), repeated below as (30a) and (30b):

(30) a. Kogo Janek lubi a Jerzy nienawidzi?
who.ACC/GEN Janek.NOM likes(OBJ.ACC) and Jerzy.NOM hates(OBJ.GEN)
'Who does Janek like and Jerzy hate?'

b. Dajcie wina i całą świnię!
give wine.GEN and whole.ACC pig.ACC
'Serve (some) wine and a whole pig!'

As these examples involve accusative and genitive, we will assume that the complete case hierarchy contains a subhierarchy such as (29) above, with all occurrences of *nom* replaced by *gen*.

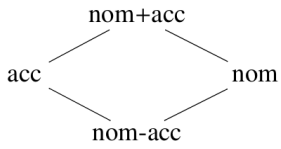
First of all, heads subcategorise for (or relevant case principles specify) 'non-pure' cases, i.e., *acc*, *gen*, *gen+acc*, etc., but not *p-acc*, *p-gen*, *p-gen+acc*, etc. For example, *lubi* 'likes' and *nienawidzi* 'hates' in (30a) expect their objects to have the case values: *acc* and *gen*, respectively. Moreover, *dajcie* 'give' in (30b) specifies the case of its object as *gen+acc*. On the other hand, nominal dependents bear 'pure' cases. For example, *kogo* 'who' in (30a) is lexically specified as *p-gen-acc*. Similarly to the analysis of the English parasitic gap example above, this neutralised case is compatible with both specifications: *acc* and *gen*.

The analysis of (30b) is a little more complicated, as a new principle is needed to determine the case of a coordinate structure. The two conjuncts, *wina* 'wine' and *całą świnię* 'whole pig', have — by virtue of lexical specifications of their head nouns – the case values: *p-gen* and *p-acc*, respectively. Now, the case value of the coordination is determined as follows: take the 'non-pure' versions of the cases of all conjuncts (here: *gen* and *acc*), find their (lowest) common supertype (here: *gen+acc*), and assign to the coordinate structure the 'pure' type corresponding to this common supertype (here: *p-gen+acc*). This way the coordinate structure in (30b) ends up with the case value *p-gen+acc*, which is compatible with the

gen+acc requirement posited by the verb *dajcie* (or by an appropriate principle of structural case assignment). Obviously, a purely accusative, purely genitive or accusative/genitive neutralised object would also satisfy this requirement.

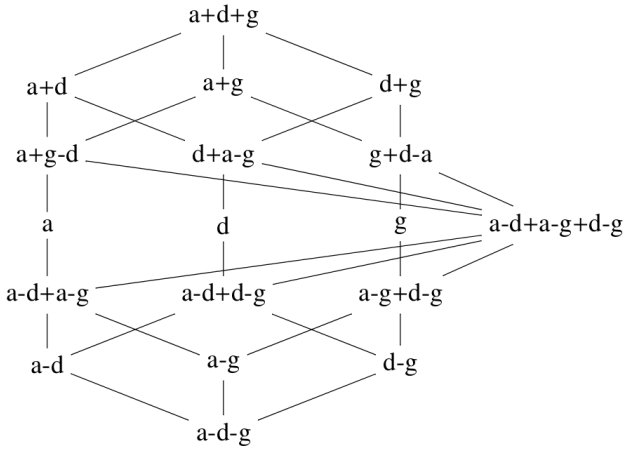
One often perceived – both within and outside of HPSG – problem with this approach is that it leads to very complex type hierarchies for *case* and rather inelegant constraints (Sag 2003: 272, Dalrymple et al. 2009: 63–66). Let us, following Daniels 2002, simplify the presentation of type hierarchies such as (29) in the following way, by removing all those 'pure' types which are only needed to represent some non-maximal types as maximal:

(31)



Hence, the above representation corresponds to 7 types shown explicitly in (29) (each non-maximal type in (31) has an additional *p-* type, while the maximal *nom-acc* in (31) is the same as *p-nom-acc* in (29)). What would a similar hierarchy for three morphological cases look like? Daniels 2002: 143 provides the following visualisation, involving 18 nodes, corresponding to 35 types in the full type hierarchy:

(32)



As mentioned in Levy & Pollard 2002: 225, the size of such a type hierarchy grows double exponentially with the number of grammatical cases, so it would

already be next to impossible to visualise such a hierarchy for German, with its four cases, not to mention Polish with its 7 cases or Finno-Ugric languages with around 15 cases. And matters are further complicated by the fact that sometimes form syncretism simultaneously involves a number of grammatical categories, so perhaps such type hierarchies should combine case information with person, gender and number (Daniels 2002: 145, Crysmann 2005), and by the fact that coordinated elements may be specified for different categories (e.g., an NP specified for case may be coordinated with a sentence), in which case it is not clear what categories should be borne by the coordinate structure as a whole (see, e.g., the inconclusive fn.10 in Sag 2003: 277).

After early 2000s, such complex *case* hierarchies seem to have been abandoned in HPSG. A possible reason for this is the increasing popularity of 'conjunction reduction', i.e., ellipsis-based, accounts of various coordinate constructions, including unlike category coordination cases, of which the 'case underspecification' examples (27)–(28) may be seen as special cases.[7] Such 'conjunction reduction' accounts are usually formulated within the linearisation approach of Reape 1992; 1994 and Kathol 1995, and they have been claimed to deal with some of the cases discussed in this section, e.g., by Crysmann 2008, Beavers & Sag 2004, and Chaves 2006; 2008. However, such linearisation-based approaches to coordination have more recently come under attack: see Levine 2011 and Kubota & Levine 2015, as well as Yatabe 2012; 2016 and, especially, Yatabe & Tam 2018 for a defence. Hence, it is difficult to predict at the moment whether 'conjunction reduction' analyses will permanently remove the need for complex type hierarchies modelling neutralisation and underspecification. But even if they do, some of the examples given at the beginning of this section, namely, (23)–(24), demonstrated that feature neutrality is not limited to coordinate structures, but also occurs at least in free relatives and multiple gapping, so case hierarchies of the kind illustrated in (25), with separate types representing syncretic cases, are still needed in contemporary HPSG, regardless of the analysis of coordination; an example of a more recent analysis which does assume such a case hierarchy (to account for gapping and resumptive pronouns in Modern Standard Arabic) is Alotaibi & Borsley 2013.[8]

[7] Another HPSG approach to unlike category coordination which obviates the need for such complex hierarchies is that of Yatabe 2004, according to which the – perhaps disjunctive or underspecified – requirements of the head independently distribute to all conjuncts, in a manner similar to distributivity within coordinate structures assumed in LFG (Dalrymple & Kaplan 2000; Dalrymple et al. 2009; Przepiórkowski & Patejuk 2012).

[8] But see Crysmann 2017 for a reanalysis which does not need to refer to such a case hierarchy.

3 Other HPSG work on case

Apart from the two clearly identifiable strands of HPSG work described in the two preceding sections, there are also single papers concerned with various theoretical and implementational aspects of grammatical case. Of these, the report by Drellishak 2008 on modelling complex case phenomena in the Grammar Matrix (Bender et al. 2002) has the widest typological scope. It describes the treatment of various case systems in the multilingual platform for implementing HPSG grammars: not only the pure nominative-accusative, ergative-absolutive and tripartite systems, but also systems with various types of split ergativitity, systems – known from Austronesian languages, including Tagalog – in which case marking interact with focus marking, and so-called 'direct-inverse' systems, exemplified by Algonquian languages, in which case marking partially depends on the hierarchies – or scales – of nominal phrases, e.g., based on person and/or animacy. Similarly to the non-configurational case assignment principles discussed in Section (1) above, such systems are described – via constraints on specific lexical types – by specifying case values of elements on ARG-ST.

Two other works mentioned here are concerned with two very different aspects of case systems of particular languages. Ryu 2013 investigates the issue of case spreading from an argument of a verb to certain nominal dependents of this argument. He investigates the semantic relations that must hold between the two nominals for such 'case copying' to occur and proposes a repertoire of 16 semantic relations (collected in five coherent groups, further classified into two general classes) which make the spreading of the nominative possible, 10 of which (three of the five groups, one of the two classes) license the spreading of the accusative. On the syntactic side, the dependents of such nominal arguments are raised to become valency elements of the governing verbs. In particular, dependents of the subject are raised to the VAR|SUBJ list, resulting in multiple valency subjects. Configurational case assignment rules constrain the value of case of each valency subject to nominative, and of each valency complement – to accusative. The paper does not discuss the (im)possibility of formulating such case assignment rules non-configurationally, within local ARG-ST (or DEPS), but the challenge for the non-configurational case assignment seems to be the fact that multiple argument structure elements may correspond to valency subjects (and multiple – to valency complements), so – looking at the argument structure alone – it is not immediately clear how many initial elements of this list should be assigned the nominative case, and which final elements should get the accusative.

Finally, a very different aspect of Hungarian case is investigated in Thuilier 2011, namely, whether case affixes should be distinguished from postpositions and, if so, where to draw the line. In Hungarian, postpositions behave in some respect just like case affixes (e.g., they do not allow any intervening material between them and the nominal phrase) which led some researches to deny the existence of this distinction. Thuilier 2011 shows that, in this case, the traditional received wisdom is right, and that case affixes and postpositions differ in a number of morphological and syntactic ways. The proposed tests suggest that the essive element *ként*, normally considered to be a case affix, should be reanalysed as a postposition, thus establishing the number of Hungarian cases as 16. The resulting analysis of Hungarian case affixes and postpositions is couched within Sign-based Construction Grammar (Boas & Sag 2012).

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