Constituent Coordination in Polish: An Attempt at an HPSG Account

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The aim of this paper is to provide an account of constituent coordination in Polish couched within the framework of HPSG (Head-driven Phrase Structure Grammar, Pollard and Sag (1994)). So far, HPSG has been lacking an overall principled account of coordination. It should be stressed that we do not aim here to fill in this gap. We do not pretend to provide a rudimentary linguistic analysis of coordination in HPSG, either. This paper should be considered as stemming from the language engineering field rather than pure linguistics.[1]

Although coordinated structures are widespread in natural languages, their formal analysis presents many problems. In addition to coordination of phrases of the same category, different categories can be conjoined as well. Although it is often assumed that only constituents may be coordinated, coordination of non-constituents or partial constituents (phrases which share arguments) is not uncommon in natural languages. Moreover, in languages with rich morphological systems, such as Polish, agreement patterns in coordinated structures create additional problems. All of the above mentioned complications can be found in Polish coordinated structures.

The separate issue which does not make a formal treatment of coordination any easier is the status of conjuncts and the conjunction, e.g., which element (if any) should be considered the head, see e.g., Sag *et al.* (1985) or Cooper (1990) for different views. In this paper, we restrict ourselves only to constituent coordination and our approach is based on the HPSG account of constituent coordination presented in Paritong (1992). Following Paritong (1992), we treat the conjunction as the functional head of the coordinated phrase. Such an approach allows us to apply general HPSG grammatical principles both to coordination and other types of phrases.

The organization of the paper is as follows. First, we present Polish data which illustrate various kinds of coordinated structures and agreement patterns. Then, we propose an account based on Paritong (1992). Although our analysis is limited to constituent coordination, it captures coordination of partial (unsaturated) constituents as well. We deal with coordination of unlike categories but only in the case of (verbal) modifiers. Finally, we provide an account of some aspects of agreement in coordinated phrases and a treatment of discontinuous conjunctions.

1 Polish Data

1.1 Coordination vs. Syntactic Category

Coordination is usually considered to be possible only when all conjuncts have the same category, e.g., Chomsky (1957). In Polish, as in other languages, coordination of NPs, (1), VPs, (2), AdjPs, (3), etc., is possible.

[1]We wish to thank for the comments the audience of the first GLiP conference, November 1999, where the paper was presented. Special thanks are due to Adam Przepiórkowski who actively participated in the work reported in this paper and who was one of the co-authors of the conference presentation. He decided, however, not to be listed as the co-author of the paper. Krzysztof Czuba proved again that he is a very reliable proofreader. Of course, all remaining errors and omissions are our responsibility.

(1) Jan i Maria przyszli. 'John and Mary came.'
John$_{nom}$ and Mary$_{nom}$ came

(2) Jan przyszedł, ale już wyszedł. 'John came but he already left.'
John came but already left-he

(3) Kupił duży i wygodny rower. 'He bought a big and comfortable bike.'
bought-he big and comfortable bike

Coordination of unlike categories also occurs, e.g., Kallas (1993). In (4) and (8), NP is conjoined with PP, in (5) and (6) NP and PP, respectively, are conjoined with a subordinate sentential phrase, while in (7), AdvP and PP occur in a single coordinated structure.

(4) Kupił książki i po zeszycie.
bought-he books and po exercise-book
'He bought books and one exercise book of every kind.'

(5) Doradził mu wyjazd i żeby nie wracał.
advised-he him departure and COMP not came-he-back
'He advised him to leave and never come back.'

(6) Wie o wypadku i że wszystko się dobrze skończyło.
knows-(s)he about accident and COMP everything SELF well ended
'He knows about the accident and that everything ended up well.'

(7) Odpowiadał szybko i bez zastanowienia.
answered-he quickly and without thinking
'He was answering quickly and without thinking.'

(8) Przyjedzie jesienią lub na wiosnę.
will.come-he autumn or on spring
'He'll come in autumn or in spring.'

Note that heterogeneous coordination is possible both for arguments, (4)–(6), and adjuncts, (7)–(8). In the paper, we concentrate mostly on homogeneous coordination, i.e., (1)–(3), whereas heterogeneous coordination will be considered only in the case of adjuncts, i.e., (7) and (8).

1.2 Coordination vs. Constituency

A long generativist tradition, dating back to Chomsky (1957), assumes that only constituents can be coordinated. Examples in (9)–(12) illustrate constituent coordination of sentences, verb phrases, nominal phrases and adjective phrases, respectively.

(9) Jan kupił Marysi książkę, a Marysia pożyczyła ją Zosi.
John bought Mary book and Mary lent her to-Sophia
'John bought Mary a book and Mary lent it to Sophia.'

(10) Jan pisał książki, ale ich nie czytał.
John wrote books but them not read
'John was writing books but he never read them.'

(11) Książki Zosi i gazeta leżały na stole.
books of-Sophia and newspaper laid on table

'A newspaper and Sophia's books laid on the table.'

(12) Dom był dużo większy i bardziej przestronny niż poprzedni.
house was much bigger and more spacious than previous

'The house was much bigger and more spacious than the previous one.'

Cross-linguistically, however, cases of non-constituent coordination can be easily found, e.g., Sag *et al.* (1985), Dowty (1988). (13) and (14) exemplify non-constituent coordination in Polish (see Kallas (1993) for more examples), which (as indicated by the glosses) is not absent in English, either.

(13) Jan kupił Marysi książkę, a Zosi płytę.
John bought Mary book and Sophia record

'John bought Mary a book and Sophia a record.'

(14) Zażądał od Marysi wyjaśnień, a od Zosi by wyszła z pokoju.
demanded-he from Mary explanations and from Sophia COMP left from room

'He asked Mary to explain herself and Sophia to leave the room.'

As the title of this paper suggests, we will deal only with constituent coordination, i.e., (9)–(12), while sentences such as (13)–(14) will not be considered.

1.3 Coordination vs. Saturation

Although we restrict our discussion to constituent coordination, we do not exclude coordination of partial constituents, i.e., words or phrases which share arguments. This phenomenon, often referred to as Right Node Raising, is illustrated in (15)–(17). (15) and (16) show conjoined verbs sharing one and two arguments, respectively, while in (17), there are two nouns which share an argument.

(15) Jan przeczytał i zrecenzował artykuł.
John read and reviewed paper

'John has read and reviewed the paper.'

(16) Jan dał i zaraz odebrał Tomkowi książkę.
John gave and immediately took Tom book

'John gave to and then immediately took the book from Tom.'

(17) Jego rodzice pamiętali upadek i odbudowę Warszawy.
his parents remembered fall and reconstruction of-Warsaw

'His parents remembered the fall and reconstruction of Warsaw.'

Conjoined elements which share arguments should have the same governing properties with respect to these arguments. For example, if conjoined verbs assign distinct case values to the shared argument, the sentence is normally ungrammatical, see (18).

(18) * Jan kocha$_{acc}$ i nienawidzi$_{gen}$ Marysię$_{acc}$ / Marysi$_{gen}$.
John loves$_{acc}$ and hates$_{gen}$ Mary$_{acc}$ Mary$_{gen}$

'John loves and hates Mary.' (putatively)

However, as noted, e.g., in Borsley (1983), if the two case forms have the same morphological shape, sharing of an argument becomes possible in spite of the case mismatch:

(19) Marysia kocha i nienawidzi Tomka. 'Mary loves and hates Tom.'
Mary loves_{acc} and hates_{gen} $\text{Tom}_{acc/gen}$

In the paper, we will assume that shared arguments must have the same morphosyntactic features, i.e., only (15)–(17) will be considered.

1.4 Coordination vs. Agreement

As we mentioned at the very beginning, in languages with rich morphological systems agreement patterns in coordinated structures may be quite complicated. In this section, we illustrate the complexity of the phenomenon with some aspects of agreement patterns in Polish coordinated NPs.

1.4.1 Number

The coordinated subject NP usually agrees with the verb in a plural form, e.g., (1) or (20).

(20) Ja i ty przyszliśmy / *przyszedłeś. 'I and you came.'
I_{sg} and you_{sg} came_{pl} came_{sg}

In Polish, a relatively free word order language, the subject does not have to occur in the initial or preverbal position. If the (coordinated) subject NP follows the verb, the verb can occur in a singular form as well, see (21)–(22).

(21) Przyszedł / przyszli Jan i Maria. 'John and Mary came.'
came_{sg}-he came_{pl}-they John and Mary

(22) Przyszedłeś / przyszliśmy ty i ja. 'I and you came.'
came_{sg}-you came_{pl}-we you and I

In the paper, we will take into account only agreement with a plural form of the verb, i.e., (20).

1.4.2 Gender

Usually, the presence of a masculine NP determines the gender of a coordinated NP to be masculine-human, (23); otherwise, the gender of the coordinated NP is normally non-masculine-human, (24).

(23) Chłopiec i dziewczynka biegali po parku.
boy_{masc} and girl_{fem} run_{mhum} in park
'A boy and a girl were running in the park.'

(24) Książka i pióro leżały na stole.
book_{fem} and pen_{neut} $\text{laid}_{non-mhum}$ on table
'A book and a pen laid on the table.'

These patterns of gender assignment, based on morphological gender, do not always hold. In both (25) and (26), the conjoined elements are feminine and neuter NPs. In (25), the conjoined NP agrees with the non-masculine-human verb, as expected, whereas in (26), the NP requires the verb to be in the masculine-human form.

(25) Kobieta i dziewczę przyszły. 'A woman and a girl came.'
woman$_{fem}$ and girl$_{neut}$ came$_{non-mhum}$

(26) Kobieta i dziecko przyszli. 'A woman and a child came.'
woman$_{fem}$ and child$_{neut}$ came$_{mhum}$

In this paper, we will consider only gender assignment based on the morphological pattern, i.e., only examples such as (23)–(25).

1.4.3 Person

If the conjoined subject NP occurs with the plural verb, as in §1.4.1, the verb has the person value which is the minimum of person specifications of NP constituents. Thus, if the subject consists of the first person and the second person conjoined NPs, as in (27), the verb appears in the first person (plural) form.

(27) Ja i ty przyszliśmy / *przyszliście. 'I and you came.'
I$_{1st}$ and you$_{2nd}$ came$_{1st}$-we came$_{2nd}$-you

This pattern may not apply if a singular form of the verb is used. In (22), the singular verb has the second person form although the 'minimum' of the subject's components is the first rather than the second person form. At present, we account only for agreement with a plural verb, hence, we account for (27) and only for the first person form *przyszliśmy* in (22).

1.4.4 Case

The conjoined NPs usually must have the same case value assigned. (1) shows case identity in the coordinated subject NP while in (28), both complements must be accusative NPs, as required by the verb.

(28) Lubi Marysię i Zosię / *Zosi. '(S)he likes Mary and Sophie.'
likes-(s)he Mary$_{acc}$ and Sophie$_{acc}$ Sophie$_{gen}$

In certain cases, however, coordination of NPs bearing different cases is possible, both in the case of coordination of arguments, (29), and adjuncts, (30).

(29) Dajcie wina i całą świnię. 'Bring wine and the whole pig.'
give wine$_{gen}$ and whole pig$_{acc}$

(30) Skończę ten tekst późnym wieczorem albo następnego ranka.
finish-I this text late evening$_{inst}$ or next morning$_{gen}$
'I'll finish this text late in the evening or the next morning.'

In the case of coordination of arguments, we will assume that both conjuncts must have the same case value, as in (1) or (28); therefore, we leave (29) unaccounted for. On the other hand, we make coordination of adjuncts free from this requirement and the case mismatch in (30) will be predicted by our analysis.

1.5 Summary

In this section, we have presented Polish data emphasising its complexity. Obviously, the list of phenomena involved in coordination has not been exhausted in this paper. For space reasons, we leave the general discussion here and proceed to the analysis of the presented data.

2 An HPSG Account

In order to account for constituent coordination in Polish, we roughly follow an HPSG treatment of constituent coordination presented in Paritong (1992). In this approach, the conjunction is the (functional) head of a coordinated phrase whereas conjuncts are subcategorized for complements. Such an analysis makes general principles of the grammar, e.g., the Head Feature Principle (HFP) or the Valence Principle, straightforwardly applicable also to coordinated phrases.

2.1 Conjunction as the Head

In Paritong (1992), the conjunction is treated as the head of a coordinated structure. Both from the syntactic and semantic point of view, the conjunction clearly differs from lexical heads, e.g., nouns or verbs, since its inherent properties are very weak. Thus, the conjunction is treated as a functional (rather than a lexical) head. Its inherent syntactic and semantic properties are incorporated from conjuncts and then passed to the phrase level via the Head Feature Principle, in the same way as, e.g., NP inherits certain morphosyntactic properties of its head, i.e., the noun.

2.1.1 Lexical vs. Functional Head

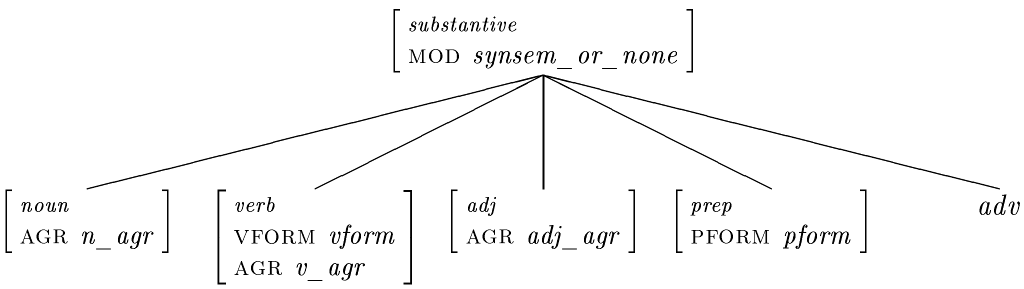
As in Netter (1994), we distinguish lexical and functional aspects of syntactic categories by two attributes appropriate for the type *head*: MAJOR and MINOR, cf. (31).

(31) $\begin{bmatrix} \textit{head} \\ \text{MAJOR } \textit{substantive} \\ \text{MINOR } \textit{functional} \end{bmatrix}$

For example, the sentence ‘John loves Mary’ would be specified as [MINOR *null*] (no functional elements are present) whereas ‘that John loves Mary’ would be [MINOR *complementizer*] (due to the presence of the complementizer ‘that’). In both cases, however, the MAJOR value of the sentence is *verb*. The types *null*, *complementizer* and also *conjunction* are immediate subtypes of the type *functional*. Thus, they are possible values of MINOR in (31).

The *substantive* type comprises lexical categories such as *noun*, *verb*, *adjective*, *preposition*, *adverb*. The relevant part of the signature, i.e., the type hierarchy with attributes appropriate for each type, is given in (32).

(32)



As (32) indicates, the attribute MOD is introduced for all objects of the type *substantive*. This attribute is used to distinguish modifiers from arguments, i.e., objects which modify other objects, i.e., [MOD *synsem*], from objects that do not modify anything, i.e., [MOD *none*]. In HPSG, all attributes introduced for a supertype are also present on all its subtypes. Therefore, e.g., *noun* or *verb* in (32) have the attribute MOD as well. As (32) shows, subtypes may introduce their own attributes, see e.g., *adj* or *prep*. Note also that different (sub)types may have the same attribute introduced but the value of this attribute may be distinct for each type, e.g., compare AGR values of *noun*, *verb* and *adj*.

2.1.2 The Attributes of *head*

According to (31), every syntactic element has both MAJOR and MINOR attributes present. In (33), we give a general description of all non-functional *word*s.

(33)
$$\begin{bmatrix} \textit{word} \\ \text{SYNSEM}|\text{LOC}|\text{CAT}|\text{HEAD} \begin{bmatrix} \text{MINOR } \textit{null} \\ \text{MAJOR } \textit{substantive} \end{bmatrix} \end{bmatrix}$$

As (33) indicates, all 'standard' syntactic categories, i.e., nouns, verbs, prepositions, adjectives, or adverbs, are always specified as [MINOR *null*] in their lexical entries. Therefore, they are treated as lexical rather than functional heads.

As stated in §2.1, a conjunction is a functional element. Its HEAD|MINOR value is *conjunction* (*conj*), while the HEAD|MAJOR value depends on syntactic properties of the conjuncts. Roughly, in the case of coordination of (homogeneous) arguments, the same syntactic category is assigned to the conjunction. For example, if both conjuncts are nominal arguments, i.e., $\begin{bmatrix} \textit{noun} \\ \text{MOD } \textit{none} \end{bmatrix}$, the conjunction's MAJOR is *noun* as well. On the other hand, if conjuncts are (verbal) modifiers, i.e., [MOD *synsem*], their syntactic categories can be different, see (7) and (8). We treat coordination of verbal modifiers as an adverbial phrase, i.e., MAJOR of the conjunction is *adv*. The MAJOR value of the conjunction is encoded via the function f in (34).[2]

(34)
$$\begin{bmatrix} \textit{word} \\ \text{SS}|\text{LOC}|\text{CAT}|\text{HEAD}|\text{MINOR } \textit{conj} \end{bmatrix} \rightarrow$$
$$\begin{bmatrix} \text{SS}|\text{LOC}|\text{CAT} \begin{bmatrix} \text{HEAD}|\text{MAJOR } f(\boxed{1},\boxed{2}) \\ \text{SUBJ } \boxed{4} \\ \text{COMPS } \langle [\text{L}|\text{C} \begin{bmatrix} \text{H}|\text{MAJOR } \boxed{1} \\ \text{COMPS } \boxed{3} \\ \text{SUBJ } \boxed{4} \end{bmatrix}], [\text{L}|\text{C} \begin{bmatrix} \text{H}|\text{MAJOR } \boxed{2} \\ \text{COMPS } \boxed{3} \\ \text{SUBJ } \boxed{4} \end{bmatrix}] \rangle \oplus \boxed{3} \end{bmatrix} \end{bmatrix}$$

The implication in (34) says that all conjunctions, i.e., *word*s specified as [MINOR *conj*], must satisfy the conditions given in the consequent. Let us discuss these conditions.

The conjunction is the head of coordination and we treat conjuncts as subcategorized for complements.[3] This is indicated as the COMPS value of the conjunction, i.e., a non-empty list of syntactic requirements. On the basis of §1.3, we assume that constituents must have the same number (possibly zero) of unrealized arguments (constituents must be equally unsaturated) and share unrealized arguments. This is indicated via token identity of SUBJ and COMPS values of conjuncts.

Unrealized arguments of constituents, $\boxed{3}$ and $\boxed{4}$, are shared by the conjunction via the argument composition mechanism of Hinrichs and Nakazawa (1990). The (possibly empty) list of unrealized complements, $\boxed{3}$, is added to the COMPS value of the conjunction. Similarly, the shared SUBJ value of the conjuncts is also shared by the conjunction.

Note that values of SUBJ and COMPS lists are left unspecified in (34). This allows us to account for coordination of fully saturated phrases, e.g., (1), (3), (9) and (11), partial (unsaturated) phrases, e.g., VPs, (2), (10), or lexical heads which share arguments, (15)–(17).

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[2]For space reasons, we do not provide the formal specification of this function here. See, however, Kupść *et al.* (2000) for details.

[3]All conjuncts must either be arguments, i.e., [MOD none], or be modifiers, [MOD synsem], and modify the same element. This condition is encoded as a general constraint satisfied by all conjunctions, see Kupść *et al.* (2000) for technicalities.

2.2 Syntactic Structure of Coordinated Phrases

So far, we have considered properties of the conjunction as a *word*. At present, we pass to the *phrase* level and discuss the syntactic structure of coordination we assume here.

2.2.1 Types of Phrases

In HPSG, syntactic objects which have an internal structure are represented by the type *phrase*. The type with the appropriate attributes is given in (35).

(35) $$\begin{bmatrix} \textit{phrase} \\ \text{HEAD-DTR } \textit{sign} \\ \text{NON-HD-DTRS } \textit{list(sign)} \end{bmatrix}$$

The HEAD-DTR attribute is used to encode the head of the phrase while NON-HD-DTRS is a list of non-head daughters.

We assume that (headed) phrases form a type hierarchy, as in Sag (1997) (for English) or Mykowiecka (1998) (for Polish). In particular, we distinguish two subtypes of *phrase*: *hd_subj_ph*, for phrases which have the subject as the only element of the NON-HEAD-DTRS list, and *hd_comp_ph* for phrases which combine the head which is a lexical item, i.e., *word*, with its complements.

Unlike Paritong (1992), we do not introduce a separate subtype to represent coordinated phrases and we treat them as instances of the *hd_comp_ph* type. We assume that the HEAD-DTR of *hd_comp_ph* is either a lexical category or a conjunction which allows us to treat coordinated phrases on a par with usual head-complement phrases, (36).

(36) $$\textit{hd\_comp\_ph} \rightarrow \begin{bmatrix} \text{SS}|\text{LOC}|\text{CAT}|\text{COMPS } \langle\rangle \\ \text{HEAD-DTR} \begin{bmatrix} \textit{word} \\ \text{SS}|\text{LOC}|\text{CAT}|\text{HEAD}|\text{MINOR } \textit{null} \vee \textit{conj} \end{bmatrix} \end{bmatrix}$$

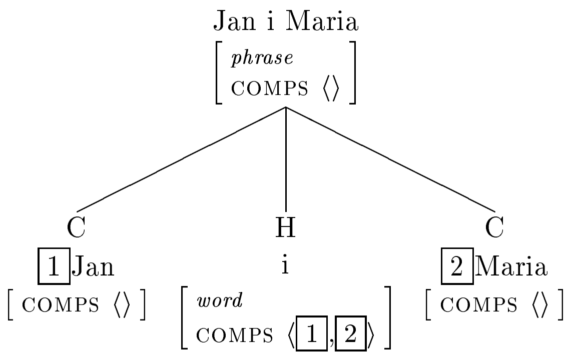
As in Pollard and Sag (1994), we require that all complements of the head (if any) are realized at once. Thus, the COMPS value of the resulting phrase is empty, see (36).

The Valence Principle operates on *hd_comp_ph* (*hd_subj_ph*) and ensures the elements of the NON-HD-DTRS list are realized as complements (the subject), i.e., they are identified with the elements of the head's COMPS (SUBJ), and cancelled off from the list of syntactic requirements of the phrase.

2.2.2 Coordinated Phrases

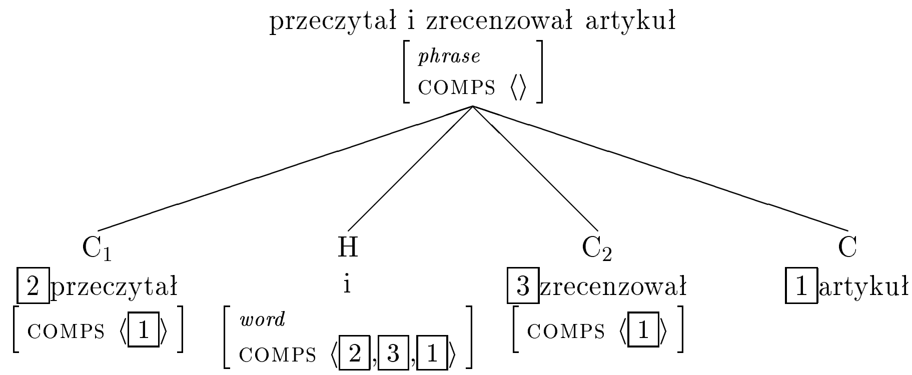
According to (36), a conjunction can be the head of *hd_comp_ph*. Thus, all its complements (i.e., conjuncts) must be realized at once and the structure of the coordinated phrase is flat. A schematic analysis of the coordinated subject NP *Jan i Maria* 'John and Mary' in (1) is given in (37).

(37)



Apart from applying to coordination of full phrases, e.g., (1)–(3) or (9), the schema in (36) accounts also for coordination of elements that share arguments, e.g., (15)–(17). Due to (34), unrealized arguments of conjuncts are 'inherited' by the conjunction. A schematic analysis of (15) is given in (38).

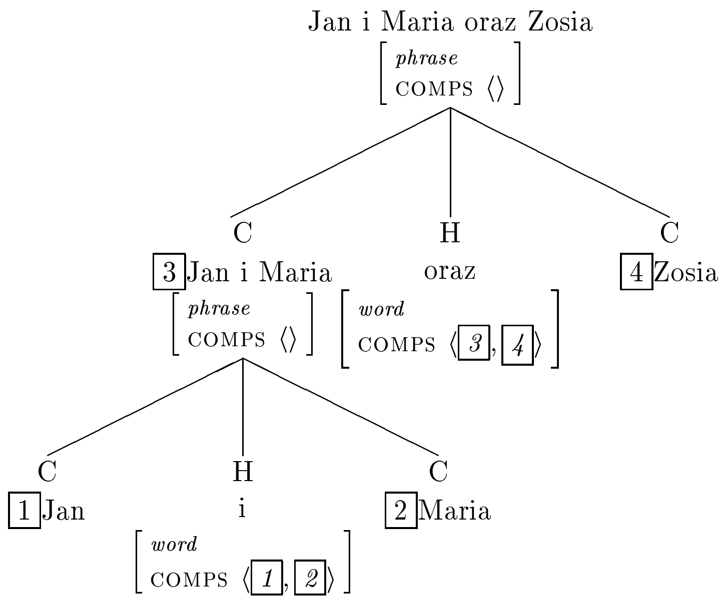
(38)



Note, that the only difference between (37) and (38) is just the number of complements. In (37), the conjoined elements are full constituents and, thus, no extra arguments are added to the conjunction. In (38), however, the (main) complements of the conjunction, i.e., C_1 and C_2, are not saturated phrases. Their unrealized shared complement, $\boxed{1}$, is treated as an (additional) argument of the conjunction as well.

The schema in (36) can be used to account also for multiple coordination. Nothing prevents that in (34) a complement of the conjunction is a coordinated phrase itself. Therefore, the phrase with two conjunctions *Jan i Maria oraz Zosia* 'John and Mary and Sophia' can be analysed as in (39).

(39)



2.3 Agreement

In this section, we discuss person, number, gender and case agreement which hold between NP conjuncts and the coordinated NP as described in §1.4. We encode these agreement patterns as a condition which must be fulfilled by all coordinated noun phrases.[4]

[4]Also other agreement patterns are encoded as constraints on specific types of coordinated phrases, see Kupść *et al.* (2000).

The AGR value for nouns, as introduced in (32), is given in its full form in (40).

(40) $$\begin{bmatrix} \textit{n\_agr} \\ \textsc{case} \ \textit{case} \\ \textsc{gender} \ \textit{gender} \end{bmatrix}$$

We follow Czuba (1997) (and Saloni and Świdziński (1985)) and assume that categories of number and gender can be combined into one morphosyntactic category represented as *gender* which has the following (basic) subtypes:

(41) *gender*: *fem*, *neut*, *masc*, *mhum*, *non-mhum*

The types *fem*, *neut* and *masc* are specific for singular forms while *mhum* (masculine human) and *non-mhum* (non-masculine human) are used only with plural forms. Therefore, the number information is hidden in gender types.

As stated in §1.4.1, we assume that a coordinated (subject) NP agrees with a plural verb, i.e., we consider only examples such as (20). In the current setup, this means that only 'plural' genders, i.e., *mhum* and *non-mhum*, are considered as the value of GENDER in a coordinated NP. As said in §1.4.2, we account only for data such as (23)–(24). We assume that the masculine NP, i.e., *masc* or *mhum*, is dominant in a coordinated NP and requires the phrase to have the *mhum* gender value, (23). If none of the component NPs is masculine, the phrase is assigned the *non-mhum* gender value, see (24). As for the person value, we assume that the category of person in a coordinated NP equals the minimum of person values of both conjuncts, see §1.4.3. In (42), we encode conditions which a coordinated noun phrase and its NP components should meet. Gender and person values of the phrase are computed via the functions g and min, respectively.[5]

(42) $$\begin{bmatrix} \textit{hd\_comp\_ph} \\ \textsc{ss}|\textsc{loc}|\textsc{cat}|\textsc{head} \begin{bmatrix} \textsc{minor} \ \textit{conj} \\ \textsc{major} \ \textit{noun} \end{bmatrix} \end{bmatrix} \rightarrow$$

$$\begin{bmatrix} \textsc{ss}|\textsc{loc} \begin{bmatrix} \textsc{cat}|\textsc{hd}|\textsc{maj}|\textsc{agr} \begin{bmatrix} \textsc{gend} \ g(\boxed{1},\boxed{2}) \\ \textsc{case} \ \boxed{5} \end{bmatrix} \\ \textsc{cont}|\textsc{index}|\textsc{pers} \ \textit{min}(\boxed{3},\boxed{4}) \end{bmatrix} \\ \textsc{nhd} \ \left\langle \begin{bmatrix} \textsc{ss}|\textsc{loc} \begin{bmatrix} \textsc{cat}|\textsc{hd}|\textsc{maj}|\textsc{agr} \begin{bmatrix} \textsc{gend} \ \boxed{1} \\ \textsc{case} \ \boxed{5} \end{bmatrix} \\ \textsc{cont}|\textsc{index}|\textsc{pers} \ \boxed{3} \end{bmatrix} \end{bmatrix}, \begin{bmatrix} \textsc{ss}|\textsc{loc} \begin{bmatrix} \textsc{cat}|\textsc{hd}|\textsc{maj}|\textsc{agr} \begin{bmatrix} \textsc{gend} \ \boxed{2} \\ \textsc{case} \ \boxed{5} \end{bmatrix} \\ \textsc{cont}|\textsc{index}|\textsc{pers} \ \boxed{4} \end{bmatrix} \end{bmatrix} \right\rangle \oplus \textit{list} \end{bmatrix}$$

The implication in (42) has a coordinated NP as the antecedent. (36) and the Head Feature Principle ensure that the conjunction is the head of the phrase. According to (34), the MAJOR value of the conjunction is a noun only if its complements are also nouns.

The consequent of (42) says that the phrase has the same CASE value as both complements, $\boxed{5}$. This correctly captures, e.g., (1) and (28). The PERSON and GENDER values of the phrase depend on the corresponding values of constituents, as specified above.

Note that (42) applies only to (homogeneous) coordination of arguments (according to (34), [MAJOR *noun*] can be obtained only if both conjuncts are nominal arguments). As stated in (34), conjoined adjuncts, e.g., (7)–(8) and (30), are treated as an adverbial phrase. Thus, (42) does not apply to conjoined adjunct NPs in (30) and the case mismatch is correctly predicted by our analysis.

[5]The precise definitions of these functions are given in Kupść *et al.* (2000).

2.4 Discontinuous Conjunctions

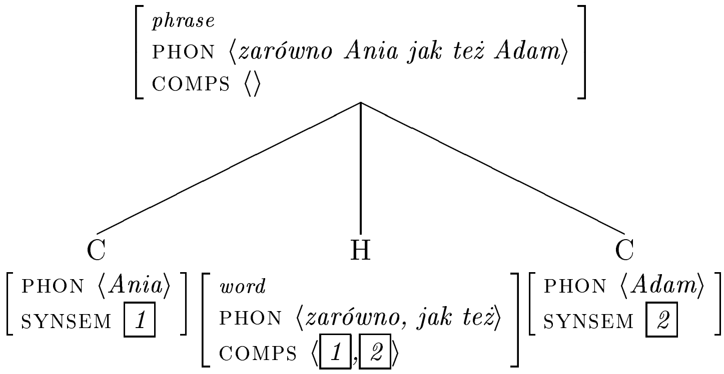
Our account allows us to deal with different kinds of conjunctions. In addition to ‘monosegmental’ conjunctions, e.g., *i* ‘and’, *lub* ‘or’, etc., we consider also discontinuous conjunctions, such as *zarówno…jak też* ‘both …and’, *nie tylko…lecz również* ‘not only…but also’.

Discontinuous conjunctions are usually treated as consisting of two syntactic elements. In the paper, we analyse such conjunctions as single syntactic items which are, nevertheless, phonologically discontinuous. The lexical entry for *zarówno…jak też* ‘both…and’ is given in (43).

(43) $$\begin{bmatrix} \textit{word} \\ \textsc{phon}\ \langle \textit{zarówno, jak też} \rangle \\ \textsc{ss}|\textsc{loc}|\textsc{cat}|\textsc{head}|\textsc{minor}\ \textit{conj} \end{bmatrix}$$

Therefore, the difference between the discontinuous conjunction *zarówno…jak też* ‘both…and’ and conjunctions such as *i* ‘and’ would be the length of the PHON list. In (43), the PHON list consists of two elements, i.e., *zarówno* and *jak też*, while in the case of *i* in (37), PHON is one-element list. We assume that syntactic properties of both conjunctions are equal. Hence, the phrase *zarówno Ania jak też Adam* ‘both Ania and Adam’, (44), has the same syntactic structure as the phrase ‘John and Mary’ in (37). Both phrases are obtained by the same syntactic principle, i.e., (36).

(44)



The correct order of conjuncts and the conjunction in (37), (39) and (44) is obtained via a general constraint which adds the first (possibly empty, as in the case of *i*) phonological ‘segment’ of the conjunction to the phonology of the first conjunct while the second (always non-empty) phonological ‘segment’ of the conjunction precedes the second conjunct, see Kupść *et al.* (2000) for the HPSG encoding.

3 Conclusions

In this paper, we have presented an attempt at a formal treatment of constituent coordination in Polish. It is apparently the first such an account encoded within a generativist framework.

In this account, we follow Paritong (1992) and assume that the conjunction is the functional head of the phrase. This allows us to apply general HPSG principles and schemata also to coordinated phrases. Due to complexity of Polish data we have to limit our analysis in certain ways. Even with these restrictions, however, we go beyond homogeneous coordination of arguments. We account for heterogeneous coordination of (verbal) modifiers and capture the fact that coordination of adjuncts is more relaxed than that of arguments. Our analysis accounts for coordination of saturated (full) and unsaturated (partial) constituents as well as multiple coordination applying the same general mechanism. In our account, discontinuous conjunctions are treated as single syntactic items whereas the discontinuity is encoded at the phonological level. In such a treatment, the same syntactic structure is assigned to coordinated phrases based on all types of conjunctions.

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