A (DISCOURSE) FUNCTIONAL ANALYSIS OF ASYMMETRIC COORDINATION

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Abstract

A long-standing puzzle in the analysis of coordination is the so-called SGF coordination (Subject Gap in Finite/Fronted constructions) in German, first discussed by Höhle (1983a). The syntactic analysis of SGF constructions is challenging for any type of syntactic framework, as they seem to violate basic assumptions of accessibility or distribution in coordination constructions.

SGF constructions have been analysed in terms of asymmetrically embedded constituents (Wunderlich 1988; Höhle 1990; Heycock and Kroch 1993; Büring and Hartmann 1998) or symmetric conjuncts (Steedman 1990; Kathol 1995, 1999). Asymmetric embedding is problematic as it involves extraction asymmetries, or an analysis of coordination as adjunction. Symmetric analyses need to assume special licensing conditions that are not independently motivated. In particular, we argue that the symmetric analysis of Kathol (1999) is lacking independent syntactic motivation, and fails to account for related asymmetric coordinations of verb-last and verb-fronted (VL/VF) sentences.

We present a multi-factorial LFG analysis of asymmetric coordination, building on independently motivated principles of correspondence between c–structure, f–structure, and i(nformation)–structure. SGF coordination is analysed as symmetric coordination in c–structure. Binding of the (prima facie) inaccessible subject of the first conjunct is enabled, at the level of f–structure, by asymmetric projection of a "grammaticalised discourse function (GDF)", a TOPIC, FOCUS or SUBJ function (Bresnan 2001). Asymmetric GDF projection is motivated by relating the semantic and discourse-functional properties of asymmetric coordination to well-known discourse subordination effects of modal subordination (Frank 1997; Frank and Kamp 1997). In conjunction with word order constraints in the optimality model of Choi (2001), our analysis explains the mysterious word order constraints of asymmetric coordination, and some puzzling scoping properties.

1 Introduction

Coordination for efficient and economic linguistic realisation

Coordination is a perfect syntactic means to support efficient and economic linguistic realisation. The contrasts in (1) and (2) exemplify that redundancy in overt linguistic expression is successfully avoided by use of an appropriate coordination construction.[1]

(1) a. The hunter went into the forest and *the hunter* caught a rabbit.

b. The hunter went into the forest and caught a rabbit.

(2) a. Fred knows Rome and *Fred* loves *Rome*.

b. Fred knows and loves Rome.

Coordinations (1) and (2) are instances of standard constituent coordination – VP and V coordination, respectively. As illustrated in (3), the subcategorisation requirements of the coordinated heads are not fulfilled within the coordinated constituents proper. Instead, the *unique* arguments realised outside the coordinate structure need somehow to be *distributed* over the conjuncts, in order to satisfy the subcategorisation requirements of the individual coordinated heads.

[1] Note that the (a.) and (b.) examples are truth-conditionally equivalent only with coreferent interpretation of the redundant phrases.

(3) a. The hunter [[$_{VP}$ went into the forest] and [$_{VP}$ caught a rabbit]].

b. Fred [[$_{V}$ knows] and [$_{V}$ loves]] Rome.

Thus, redundancies that are avoided in coordination constructions lead – prima facie – to violations of basic syntactic principles, most prominently, agreement and subcategorisation requirements. Theories of formal syntactic frameworks provide specific mechanisms to apply in coordination constructions that account for their special "reductionist" properties, while excluding ungrammatical constructs. Phenomena of "regular" constituent coordination are in this sense well understood, and successfully handled by all major syntactic formalisms.[2]

The challenge of asymmetric coordination

In this paper, we are concerned with a special case of *asymmetric coordination*, the so-called SGF coordination (Subject Gap in Finite/Fronted constructions) in German, first discussed by Höhle (1983a).[3] This construction, illustrated in (4), is very frequent,[4] and not restricted to specific registers or style. The syntactic properties of SGF coordination represent a challenge for modern syntactic theories, as they seem to violate the basic assumptions of accessibility (or distribution) as established for cases of regular constituent coordination: the subject of the left conjunct is realised in a middle field position, and is thus – under standard analyses of constituent coordination – not accessible from within the second conjunct, which is missing a subject (hence "subject gap").

(4) a. In den Wald ging der Jäger und fing einen Hasen.
Into the forest went the hunter and caught a rabbit
'The hunter went into the forest and caught a rabbit'

b. Nimmt man den Deckel ab und rührt die Füllung um , steigen Dämpfe auf.
Takes one the lid off and stirrs the contents round , rise fumes
'If one takes the lid off and stirrs the contents, fumes will rise'

SGF constructions have been analysed in terms of asymmetrically embedded constituents (Wunderlich 1988; Höhle 1990; Heycock and Kroch 1993; Büring and Hartmann 1998) or symmetric conjuncts (Steedman 1990; Kathol 1995, 1999). Asymmetric embedding is problematic as it involves extraction asymmetries, or an analysis of coordination as adjunction. Symmetric analyses need to assume special licensing conditions that are not independently motivated. Especially the word order conditions of Kathol (1999) are lacking independent syntactic motivation, and fail to account for related asymmetric coordinations of verb-last and verb-fronted (VL/VF) sentences (5).

(5) Wenn Du in ein Kaufhaus kommst und (Du) hast kein Geld, kannst Du nichts kaufen.
if you into a shop come and you have no money, can you nothing buy
'If you enter a shop and (you) don't have any money, you can't buy anything'

[2]This does not hold for the wide variety of so-called non-constituent coordinations: gapping, left or right conjunction reduction, ellipsis, etc. See Kehler (2002) for a recent overview and account of gapping and VP-ellipsis.

[3]We will most of the time stick to "classical" examples from previous work in Höhle (1983a), Wunderlich (1988), Büring and Hartmann (1998), Kathol (1999), and avoid repeated glossing.

[4]In a corpus study based on the NEGRA corpus, we determined 13.8% SGF coordinations, compared to 20.7% subject-initial verb-fronted sentence coordinations in an evaluation corpus consisting of 406 sentences involving sentential coordination (see Frank 2001).

A multi-factorial LFG analysis of asymmetric coordinations

In this paper we develop a multi-factorial LFG analysis of asymmetric coordination constructions (4) and (5), building on independently motivated principles of correspondence between c–structure, f–structure, and i(nformation)–structure (cf. Choi 2001). SGF coordination is analysed as symmetric coordination in c–structure. Binding of the (prima facie) inaccessible subject of the first conjunct is enabled, at the level of f–structure, by asymmetric projection of a "grammaticalised discourse function (GDF)", a TOPIC, FOCUS or SUBJ function (Bresnan, 2001). Asymmetric GDF projection is motivated by relating the semantic and discourse-functional properties of asymmetric coordination to well-known discourse subordination effects of modal subordination (Frank 1997; Frank and Kamp 1997). In conjunction with word order constraints in the optimality model of Choi (1999, 2001), our analysis explains the mysterious word order constraints of asymmetric coordination, as well as some puzzling scoping properties.

Overview

The paper is structured as follows. In Section 2 we give a brief introduction to the analysis of constituent coordination in Lexical-Functional Grammar. Section 3 characterises the challenge of asymmetric coordination constructions within the LFG treatment of coordination. We give an overview of the characteristic syntactic (and semantic) properties of SGF and VL/VF coordinations, to be accounted for by any successful analysis of asymmetric coordinations. Section 4 briefly reviews previous approaches to SGF coordination in German, focusing on the symmetric analysis of Kathol (1999). In Section 5 we develop our own symmetric analysis of asymmetric coordination. Section 6 concludes.

2 Coordination in LFG

Multi-level syntactic representation

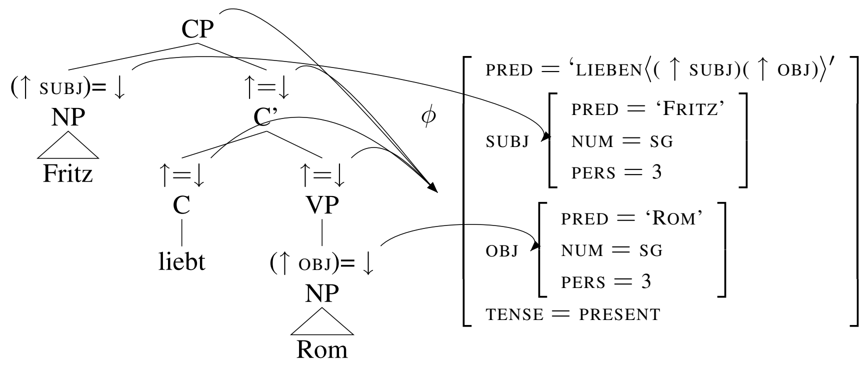
Lexical-Functional Grammar provides two main syntactic representation levels: c–structure and f–structure. C–structure is a tree representation that encodes constituency and word order, while f–structure is an attribute-value representation that encodes functional-syntactic properties, in particular grammatical functions and morpho-syntactic information.

C– and f–structure are set into correspondence by functional annotation of c–structure nodes. These define the correspondences between c–structure nodes and their associated functional representation in the f–structure, in terms of a functional mapping, the so-called the ϕ–correspondence. The familiar abbreviations $\uparrow$ and $\downarrow$ are defined as in (6).

(6) $\phi(n) =_{def} \downarrow$ — $\downarrow$ refers to the f–structure corresponding to the local c–structure node n.

$\phi(M(n)) =_{def} \uparrow$ — $\uparrow$ refers to the f–structure corresponding to the mother $M(n)$ of the local c–structure node n.

Thus, in (7), the annotation ($\uparrow$ OBJ)= $\downarrow$ on the VP-internal NP node defines that the f–structure projected by the NP node – containing PRED = 'ROM' – plays the role of OBJ within the f-structure corresponding to the VP.

(7) 

C–/f–structure correspondence for *Fritz liebt Rom. – Fritz loves Rome.*

Both representation levels are subject to principles of wellformedness: c–structure obeys principles of X-bar theory for lexical and functional categories. Grammatical functions in f–structure are classified as argument vs. non-argument functions. Argument functions need to be subcategorised by their local predicator (PRED) (Coherence Principle), and vice versa, all argument functions subcategorised by a predicator need to be realised (Completeness Principle). Finally, the Principle of Economy of Expression states that of all valid c–/f–structure representations only those are considered "optimal", and thus grammatical, that are maximally economic. In Bresnan (2001) Economy of Expression is measured in terms of the number of syntactic c–structure nodes.[5]

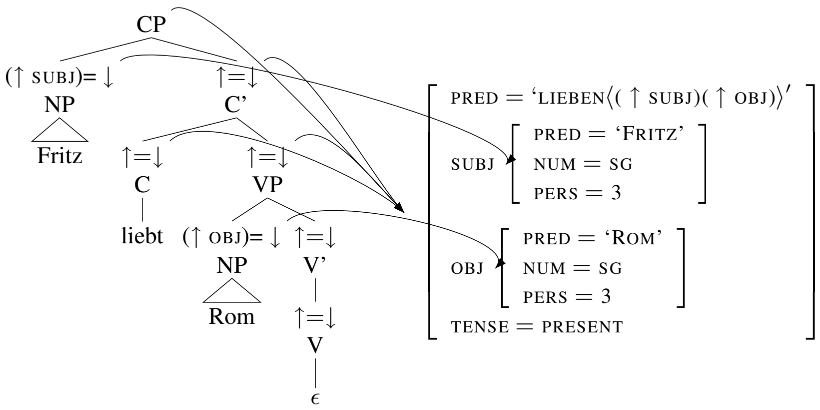
Coordination: Set-valued f–structures and distribution

In LFG, a special c–structure rule schema defines coordinated phrases of like constituents (8). In the associated f–structure, the coordinated phrase is represented as a set-valued f-structure. Each of the conjuncts is represented as an element within the set, by the functional annotations $\downarrow\in\uparrow$.

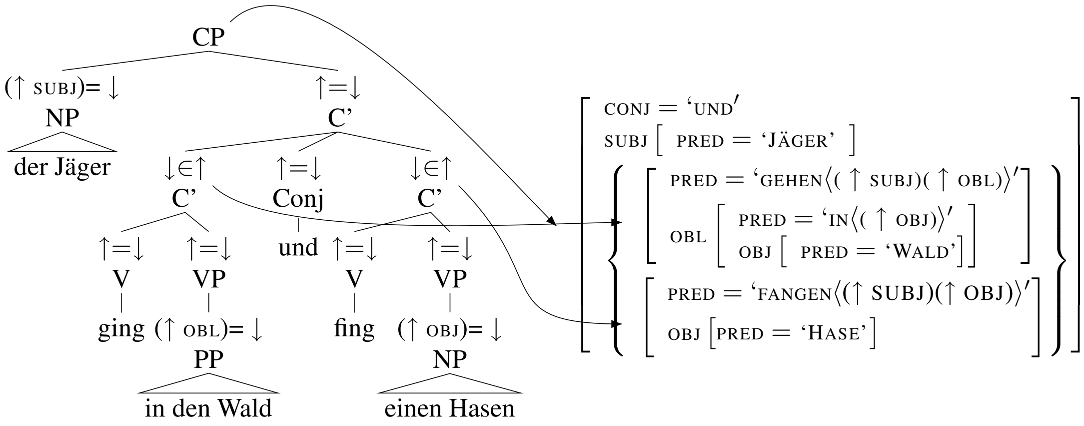
(8)
$$\begin{array}{llll} XP \rightarrow & XP & Conj & XP \\ & \downarrow\in\uparrow & \uparrow=\downarrow & \downarrow\in\uparrow \end{array}$$

(9) displays the resulting c–/f–structure pair for a coordination of C' constituents with a shared SUBJ outside the coordinated phrase. Without further assumptions, the f–structure is incomplete regarding the elements of the set, which are both missing a SUBJ.

[5]The Principle of Economy of Expression qualifies an analysis of verb-second (V2) involving an empty verbal head as in (i) as unoptimal – as opposed to (7) above, which does not assume an empty verb head, while projecting an identical f–structure. See Section 5.2.2 for more detail.

(i) 

(9)

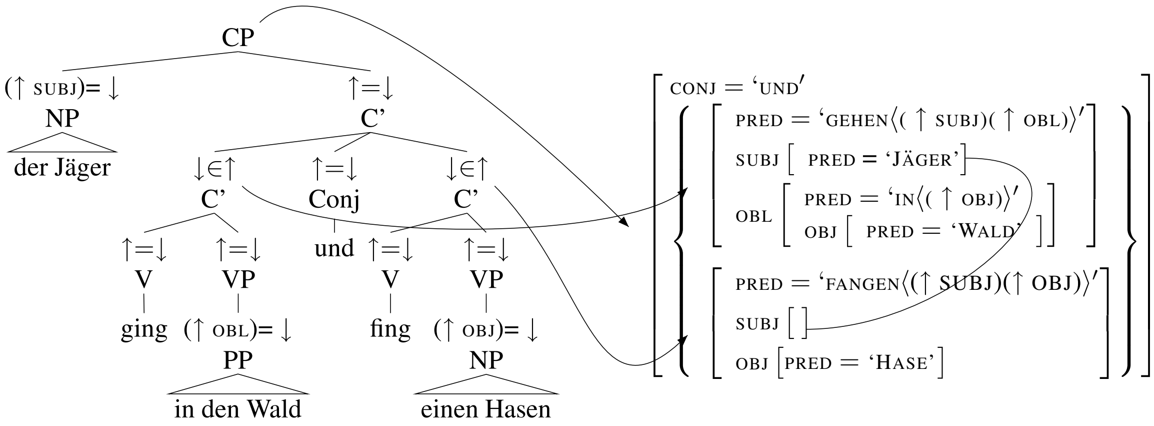


To account for shared arguments in coordinate structures (cf. (3)), the operation of *distribution* (10) is automatically applied to all features that are declared *distributive*. In particular, all grammatical functions are distributive features.

(10) **Distribution of features into set elements**
If a is a distributive feature and s is a set of f–structures, then $(s\ a) = v$ holds if and only if $(f\ a) = v$ for all f–structures f that are members of the set s. (Dalrymple 2001, p.158)

As a result, we obtain a wellformed f–structure in (11). The distributed SUBJ f–structure satisfies the completeness condition in both conjuncts.

(11)

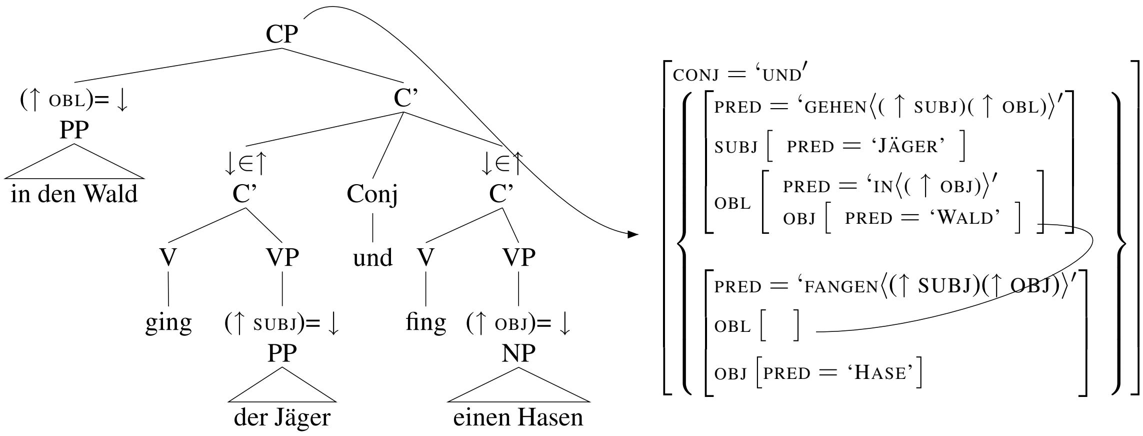


3 Asymmetric Coordination

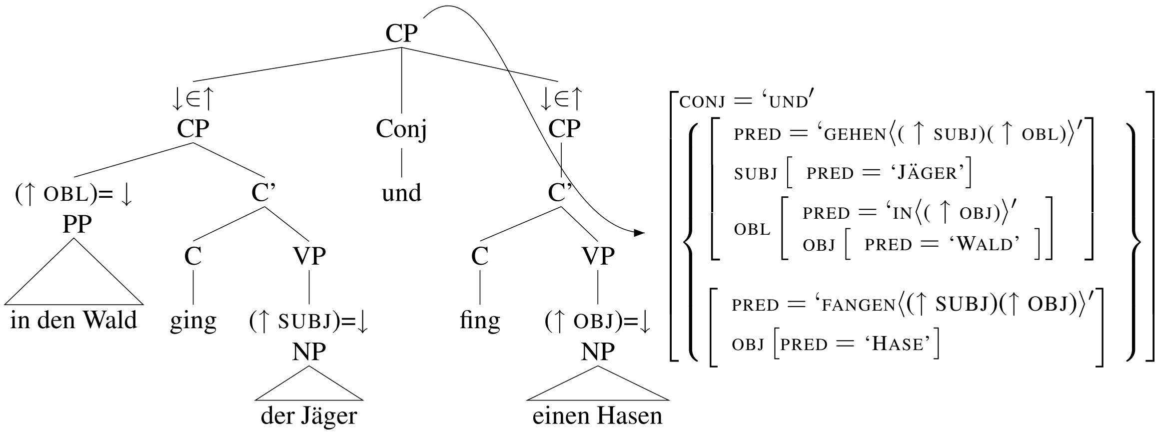
3.1 Problems of Standard Coordination Analysis

Let us now consider the problem of SGF coordination in view of the standard coordination analysis.

If we analyse (12) as a coordination of C' constituents, distribution applies to the topicalised OBLique PP *in den Wald*. While this yields a wellformed f–structure for the first conjunct, distribution into the second conjunct violates coherence: *fangen* (catch) does not subcategorise for an OBLique argument. Moreover, since the subject is realised within the first conjunct, it is not distributed to the second conjunct. That is, although we understand the second conjunct as a predication over the same subject as the first conjunct, it is missing a SUBJect function, violating Completeness.

(12) 

If we analyse SGF coordination as involving symmetric CP coordination as in (13), we avoid illicit distribution of the topicalised phrase into the second conjunct, but still encounter the problem of a conjunct internal subject that cannot distributed – the notorious "subject gap" problem.

(13) 

3.2 Syntactic Properties of Asymmetric Coordination

Having illustrated the problems we encounter when applying established principles of regular constituent coordination to SGF coordination constructions, we now review the major syntactic (and semantic) characteristics of SGF coordinations (see Kathol 1999, for concise overview). We can distinguish three types of basic syntactic (and semantic) properties that need to be accounted for by any successful analysis of SGF coordination.

Number and Type of Gaps Example (14) illustrates that SGF coordination does not license additional gaps in the right conjunct(s), besides the characteristic subject gap.

(14) * Einen Wagen$_j$ kaufte Hans$_i$ und meldete e$_i$ e$_j$ an.
A car$_j$ bought Hans$_i$ and registered e$_i$ e$_j$
'A car bought Hans and registered'

Only subjects can be "gapped" in asymmetric coordination constructions. Equivalent examples with a non-subject (here: object) gap are ungrammatical.

(15) * Gestern kaufte Hans den Wagen$_i$ und meldete sein Sohn e$_i$ an.
Yesterday bought Hans the car$_i$ and registered his son e$_i$
'Yesterday Hans bought the car and his son registered'

Word Order Properties SGF coordination shows a peculiar word order restriction, preventing the structural specifier position of CP in the right conjunct to be overtly realised: whereas (16.a) with a topicalised object in SpecCP is a perfectly grammatical sentence in German, the specifier position cannot be occupied in (16.b). Only the serialisation in (16.c) is acceptable.[6]

(16) a. Einen Hasen fing der Jäger.
A rabbit caught the hunter
'A rabbit, the hunter caught'

b. * In den Wald ging der Jäger und einen Hasen fing.
Into the forest went the hunter and a rabbit caught
'Into the forest went the hunter and a rabbit caught'

c. In den Wald ging der Jäger und fing einen Hasen.
Into the forest went the hunter and caught a rabbit
'Into the forest went the hunter and caught a rabbit'

Quantifier Scope As observed by Büring and Hartmann (1998) and Kathol (1999), the same interpretation is obtained for (17.a) and (17.b), irrespective of the position of the quantified subject: in both examples the quantified subject takes scope over both conjuncts: the interpretation is that for almost no one it is the case that he or she both buys a car and takes the bus. This is surprising for the SGF construction (17.b), as the quantified subject *die wenigsten Leute* occupies the middlefield position *within* the first conjunct, from where it does not structurally outscope the second conjunct.

(17.c), on the other hand, is problematic for analyses that assume an empty PRO subject in SGF constructions: (17.c) with an overt (repeated) quantified subject only allows for a narrow scope reading, where almost no one buys a car *and* almost no one takes the bus – that is, almost no one seems to need transportation.

(17) a. <u>Die wenigsten Leute</u> kaufen ein Auto und fahren mit dem Bus.
Almost no one buys a car and takes the bus
Almost no one buys a car and takes the bus.

b. Daher kaufen <u>die wenigsten Leute</u> ein Auto und fahren mit dem Bus.
Therefore buys almost no one a car and takes the bus
Therefore almost no one buys a car and takes the bus.

c. Daher kaufen <u>die wenigsten Leute</u> ein Auto und fahren <u>die wenigsten Leute</u> mit dem Bus.
Therefore buys almost no one a car and takes almost no one the bus
Therefore almost no one buys a car and almost no one takes the bus.

[6]Note that (16.b) is intended as a verb-fronted structure, not a verb-final construction. This is more evident in examples involving separable verb prefixes:

(i) * Gestern kaufte Fritz ein Auto und eine Ampel fuhr um.
Yesterday bought Fritz a car and a red light ran down
'Yesterday, Fritz bought a car and a red light ran down'

(ii) Gestern kaufte Fritz ein Auto und fuhr eine Ampel um.
Yesterday bought Fritz a car and ran a red light down
'Yesterday, Fritz bought a car and ran down a red light'

Asymmetric verb-last/verb-first (VL/VF) coordination constructions

Coordinations of verb-last/verb-first sentences were first brought to attention by Wunderlich (1988, p.312). Coordination of these clause types is only supported in the order order VL/VF (cf. (18.b)).

(18) a. [$_{CP}$ Wenn Du in ein Kaufhaus kommst] und [$_{CP}$ (Du) hast kein Geld],
if you into a shop come and you have no money,
'If you enter a shop and (you) don't have any money,

b. * [$_{CP}$ In ein Kaufhaus kommst Du und [$_{CP}$ wenn (Du) kein Geld hast],
into a shop come you and if you no money have,
'A shop you enter and if (you) don't have any money,

kannst Du nichts kaufen.
can you nothing buy
you can't buy anything'

Asymmetric VL/VF coordinations are closely related to SGF constructions: the subject of the right conjunct can be omitted, in which case we find a similar accessibility paradox, since the subject within the first conjunct cannot be distributed to the second conjunct (19.a). A gap in the second conjunct is only licensed for subjects (19.b), and as for SGF coordination, we cannot have multiple gaps (19.c). Finally, similar to SGF coordinations, the second conjunct's SpecCP position cannot be filled by a non-subject constituent (19.d).

(19) a. [$_{CP}$ Wenn <u>Du</u> in ein Kaufhaus kommst] und [$_{CP}$ (Du) hast kein Geld], ...
if you into a shop come and you have no money, ...
'If you enter a shop and (you) don't have any money, ...

b. * Wenn Du einen Kunden$_j$ hast und Du beleidigst e$_j$ / e$_j$ beleidigst Du , ...
if you a customer have and you offend / offend you,
'If you have a customer and you offend ,...'

c. * Wenn Du$_i$ ein Stück$_j$ übst und (Du$_i$) führst e$_j$ auf, ...
if you a play practice and (you) perform ,
'If you practice a play and (you) perform ,...'

d. * Wenn Du in ein Kaufhaus kommst und kein Geld hast (Du), ...
if you into a shop come and no money have (you),
'If you enter a shop and no money (you) have,...'

In Section 5, we will discuss special semantic and discourse-functional properties of asymmetric coordinations of both types: SGF and VL/VF coordination. This will lead us to a unified account of the functional and word order properties observed for both types of asymmetric coordination.

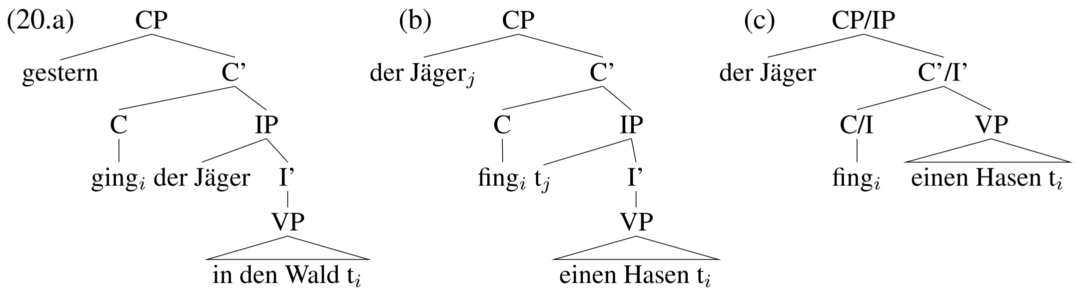
4 Previous Approaches

Before developing our own analysis of asymmetric coordination, we briefly review the two types of approaches that have been explored in previous work: analysis by asymmetrically embedded constituents, and coordination of symmetric conjuncts.

4.1 Asymmetric Analyses

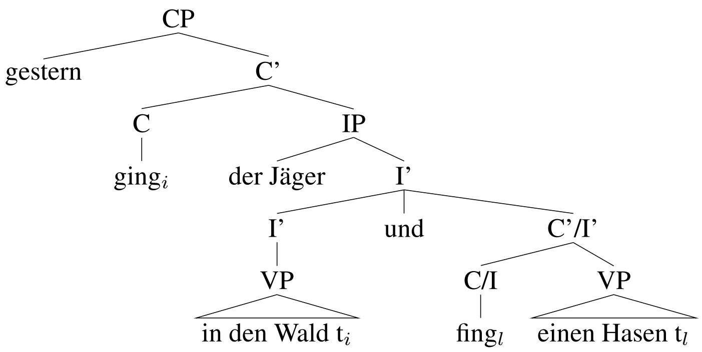
Heycock and Kroch (1993) proposed an analysis in the P&P model that is similar – at a conceptual level – to the early analyses of Wunderlich (1988) and Höhle (1990). It will be discussed here as representative of the class of analyses that admit coordination of unlike constituents to account for the observed asymmetry of SGF coordinations.

The analysis builds on independent assumptions about the phrase structure of verb second (V2) languages like German. V2 is analysed as I-to-C movement. The specifier of CP can be filled by a non-subject phrase, as in (20.a). In subject initial V2 sentences, however, the subject must move from the SpecIP position to SpecCP, leaving behind an empty I projection (20.b). Similar to Haider (1988), the empty I projection and the structurally isomorphic C projection are "folded" into a *matching projection* of a complex category C/I in (20.c).



Heycock and Kroch's analysis of SGF coordinations naturally emerges from this *matching projection* analysis of subject-initial V2 sentences: An SGF coordination – omitting redundant subject phrases *der Jäger* – can be constructed from (20.a) and (20.c) by coordination of I' and C'/I' constituents, which are unlike, but share the categorial features of I. The resulting SGF coordination structure is displayed in (21).

(21)



Due to low coordination at the level of I', the shared subject governs both conjuncts, accounting for the main syntactic properties of SGF constructions: the restriction to subject gaps and wide scope of quantified subjects. However, the analysis necessarily involves extraction asymmetries that are otherwise ungrammatical.

It is well-known that extraction from coordinated phrases is only possible "across-the-board". The structure assigned in (21), by contrast, involves head movement out of the first conjunct only. The analysis of (22), with a topicalised argument, clearly violates the ATB extraction constraint and results in a fully evacuated first conjunct. Finally, the analysis needs to explain why a topicalised adjunct does not necessarily take scope over the second conjunct (as discussed by Höhle).

(22) In den Wald$_j$ ging$_i$ der Jäger [[e$_i$ e$_j$] und [fing einen Hasen]].

Büring and Hartmann (1998) present an asymmetric analysis of SGF coordination that avoids extraction asymmetries by considering it as an instance of adjunction, rather than coordination. Their analysis accounts for new data on scope, but nevertheless suffers from two problems:[7] First, as opposed to classical adjunction constructions, SGF coordination does not admit topicalisation of the adjoined material (23) (cf. Kathol 1999, p.309).

(23) a. [Ohne sie anzuschauen]$_i$ hat Fritz Maria geküsst e$_i$.
Without her to.look.at has Fritz Maria kissed
'Fritz kissed Maria without looking at her'

b. [(Und) fing einen Hasen]$_i$ ging der Jäger in den Wald e$_i$.

More importantly, while Büring and Hartmann motivate their analysis by special binding and scoping phenomena to be found in SGF constructions, they must concede that the same type of data can be found in uncontroversial VP coordination structures. Our conclusion is therefore that instead of reanalysing classical VP coordinations as adjunction, we need to account for such special scoping and binding asymmetries in a different way.

4.2 Symmetric Analyses

Symmetric analyses of SGF coordination have been proposed by Steedman and Kathol.

Steedman (1990) accounts for SGF coordination within his general theory of gapping. He proposes special functional application rules for coordination in the CCG framework that operate in gapping and SGF coordination constructions alike. While the analysis is very general, it fails to explain important restrictions of the SGF construction, in particular the restriction to apply to a unique grammatical function, the subject.

Kathol (1995, 1999) developed a linearization-based model of German syntax that is extended to account for SGF coordination. In Kathol (1999) special licensing conditions are defined to account for word order constraints of SGF coordination. We discuss the analysis and the problems it encounters in more detail below.

Kathol: Symmetric constituents and asymmetric linearisation

Kathol starts from the observation that the two coordinations in (24) are merely linearisation variants of a unique underlying predicate coordination structure, with a shared subject.

(24) a. *Der Jäger* {*ging in den Wald*} *und* {*fing einen Hasen*}.

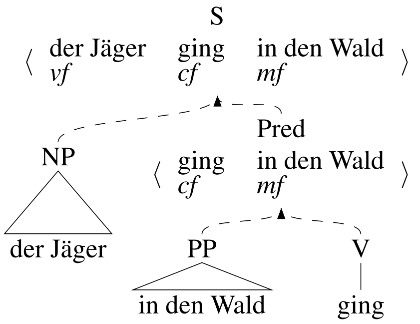
b. {*In den Wald ging*} *der Jäger und* {*fing einen Hasen*}.

This intuition, however, cannot be formalised in a phrase structure tree, which encodes constituency *and* word order at the same time. He therefore develops a "linearisation-based model of syntax" that provides a modular representation of constituency and (variable) linearisation.

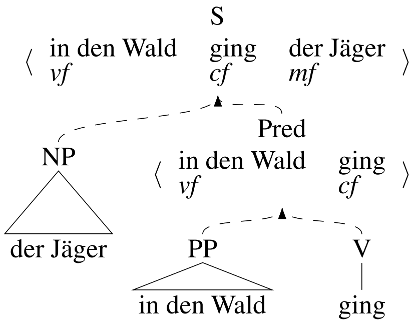
An illustration is given in (25.a,b), where the same constituent tree (represented by dotted arcs) is associated with different word orders (displayed in square brackets). Restrictions on possible linearisations are defined in terms of topological constraints (26) that need to be met by the assignment of topological labels *vf, cf, mf, vc, (nf)* in a sentential clause.[8] Both linearisations in (25) satisfy the topological linearisation constraints (26) that require, in particular, *vf* to precede *cf*, and *cf* to precede *mf*.

[7]The analysis of Büring and Hartmann (1998) is extremely interesting and thoroughly worked out, in particular for the new data on scoping facts it accommodates, but cannot be discussed here in detail, for reasons of space. We have to reserve detailed discussion to a later occasion.

(25) (a)



(b)



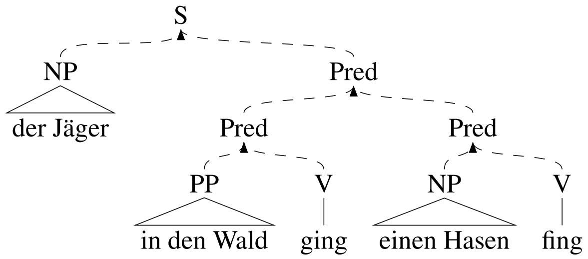
(26) *vf* < *cf* < *mf* < *vc*

Topological linearisation in coordination constructions

To account for coordination, the linearisation model needs to accommodate for the distributional behaviour of "shared" material outside the coordinated phrases.

Kathol introduces the notion of a *combinatorial factor* for phrases that are shared among coordinated phrases. Moreover, a combinatorial factor needs to be "linearised" to the second conjunct's tier. If this happens, it is called a *linear factor*. An example is given in (27). Here, the additional tabular representation represents the linearisation of the combinatorial factor (*der Jäger*) (in bold face) to the second conjunct's tier (indicated by brackets and underlining of the linearised phrase). Linearisation of the combinatorial factor preserves its topological label (here *vf*). The coordination structure is wellformed iff the Topological Construal Condition (28) is satisfied.

(27)

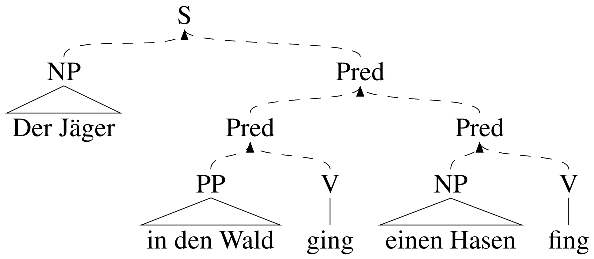


der Jäger	ging	in den Wald	‖	(und)	
vf	*cf*	*mf*	‖		
[der Jäger]			‖	fing	einen Hasen
vf			‖	*cf*	*mf*

(28) **Topological Construal Condition** (Kathol 1999, p.329)
A coordinated construction is well-formed if the linear factor's topological assignment yields a valid topological sequence on each conjunct tier.

However, if this model is applied to an SGF construction (here an interrogative V1 variant), linearisation of the combinatorial factor yields an *invalid* topological sequence (29).

(29)



Ging	**der Jäger**	in den Wald	‖	(und)	
cf	*mf*	*mf*	‖		
	[der Jäger]		‖	fing	einen Hasen
	* *mf*		‖	*cf*	*mf*

[8] The underlying topological field model of German syntax goes back to early descriptive grammarian work, and was introduced in formal syntactic theory by Höhle (1983b). The model gives a topological characterisation of German clausal syntax: Argument and adjunct phrases can occur in three phrasal fields: Vorfeld (*vf*), Mittelfeld (*mf*) or Nachfeld (*nf*). They are delimited by the complementizer field *cf* and the verbal complex *vc*, where *cf* can only host complementizers or the finite verb, while *vc* admits verbal and particle elements.

To account for the special type of *asymmetric* (SGF) coordination structures, Kathol introduces a Subject Functor Linearisation condition (clause A), which is later extended to clause B.

(30) **Subject Functor Linearization** (Kathol 1999, p.332,334)

A. The subject of a verb-initial conjoined predicate counts as a linear factor only if it occurs in the *Vorfeld*.

B. In the absence of any other linear factor, a constituent occurring in the *Vorfeld* counts as a linear factor (regardless of its status as combinatorial factor).

Clause A restricts linearisation of a *subject* combinatorial factor *in verb-initial coordination structures* to those subjects that occur in the vorfeld position. Since in verb-initial structures the subject is either in a vorfeld or a middle field position, clause A excludes linearisation of the combinatorial subject *exactly* in those – exceptional – cases that characterise the SGF coordination construction: if the subject is contained in the middle field of a verb-fronted coordination structure, but interpreted as the subject of both conjuncts.

Condition A adjusts the analysis of SGF coordination from (30) to (31): none of the combinatorial SGF subjects is linearised to the second tier. While this yields the correct results for (a) and (b) ($cf < mf$ is a valid topological sequence), it also admits the ungrammatical serialisation (c).

(31) a.

Ging *cf*	**der Jäger** *mf*	in den Wald *mf*	‖	(und)	
			‖	fing *cf*	einen Hasen *mf*

b.

In den Wald *vf*	ging *cf*	**der Jäger** *mf*	‖	(und)	
			‖	fing *cf*	einen Hasen *mf*

c.

*In den Wald *vf*	ging *cf*	**der Jäger** *mf*	‖	(und)	
			‖	einen Hasen *vf*	fing *cf*

Here then, clause B comes into being, positing that "In the absence of any other linear factor, [any] constituent occurring in the *Vorfeld* counts as a linear factor", i.e. disregarding its status as combinatorial factor. This further amendment does, in the end, account for the facts (32), but at a high price: linearisation of phrases to the second tier could be motivated for *combinatorial factors*, but is lacking any justification for phrases that are not shared with the second conjunct. As a consequence, clause B weakens the otherwise crucial notion of a *combinatorial factor*.

(32) b.

<u>In den Wald</u> *vf*	ging *cf*	**der Jäger** *mf*	‖	(und)	
[In den Wald] *vf*			‖	fing *cf*	einen Hasen *mf*

c.

*<u>In den Wald</u> *vf*	ging *cf*	**der Jäger** *mf*	‖	(und)	
[In den Wald] **vf*			‖	einen Hasen *vf*	fing *cf*

In sum, the *Subject Functor Linearisation* conditions – designed to account for the special properties of SGF coordination – are introduced without motivation or supporting evidence. They are far from being motivated by independent grammatical notions or observations, and considerably weaken the notion of a *combinatorial factor*.

5 A Multi-Factorial LFG Analysis of Asymmetric Coordination

In the remainder of this paper we develop a multi-factorial LFG analysis of asymmetric coordination. It builds on well-established grammatical principles of the LFG theory, in particular principles of correspondence between c–structure, f–structure, and i–structure, and the notion of *grammaticalised discourse functions* (GDF).

Our analysis of asymmetric coordination introduces a new concept – *asymmetic* GDF *projection* – that is motivated by relating the semantic and discourse-functional properties of asymmetric coordination to the well-known discourse subordination effects of modal subordination. In conjunction with word order constraints in the optimality model of Choi (2001), our analysis explains the mysterious word order restrictions of asymmetric coordination.

5.1 Symmetric Analysis with Asymmetric GDF-Projection

Grammatical functions can be classified according to properties of various dimensions, e.g., argument vs. non-argument functions, discourse functions vs. non-discourse functions (cf. Bresnan 2001, p.97f). (Bresnan 2001, p.98) further introduces the notion of a *grammaticalised discourse function* (GDF), covering the functions TOPIC, FOCUS, and SUBJ (33): “These functions are the most salient in discourse and often have c–structure properties that iconically express this prominence, such as preceding or c-commanding other constituents in the clause.”

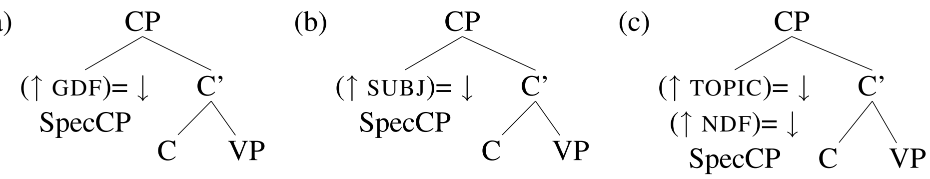
(33) *Grammaticalised Discourse Functions*

TOPIC FOCUS SUBJ OBJ OBJ$_\Theta$ OBL$_\Theta$ COMP ADJ

Discourse Functions *Argument Functions*

Within a verb second language like German, we can characterise the GDF functions as the class of functions that occupy the specifier position of CP. From the abstract functional annotation principle in (34.a) we can derive alternative GDF instantiations in (34.b) and (34.c).[9] This language-specific characterisation of GDF functions corresponds to Bresnan’s general characterisation: functions that occupy the specifier position of CP qualify as most salient in discourse (cf. Choi 2001), and are obviously c–structurally prominent, in terms of both precedence and c–command.

(34) (a) (b) (c)



Our formal analysis of asymmetric coordination can be summarised in the following (extended) definition of the CP coordination rule: (35) defines symmetric CP coordination in c–structure, with symmetric projection of the conjunct’s f–structures in terms of the classical ↓∈↑ annotations. As an extension to this classical *symmetric* coordination analysis we allow – at the level of f–structure – for *optional, asymmetric projection of a* GDF *function* of the left conjunct to the level of the coordination. As we shall see, this exten-

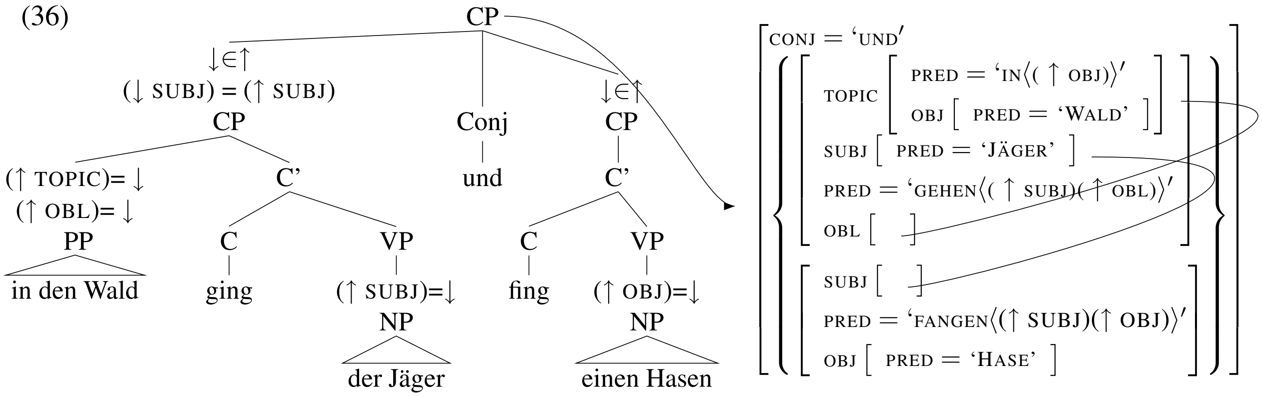
[9]Projection of a discourse function typically involves additional projection of a non-discourse function NDF (34.c).

sion accounts for the major syntactic properties of SGF coordination.

(35) $$\mathrm{CP} \longrightarrow \begin{array}{ccc} \mathrm{CP} & \mathrm{Conj} & \mathrm{CP} \\ \downarrow\in\uparrow & \uparrow=\downarrow & \downarrow\in\uparrow \\ (\ (\downarrow \text{GDF}) = (\uparrow \text{GDF})\ ) & & \end{array}$$

An example analysis is given in (36). Here, GDF is chosen to instantiate to SUBJ. The annotation (↓ SUBJ) = (↑ SUBJ) defines the first conjunct's SUBJ (*Jäger*) as the SUBJ of the coordination as a whole, i.e. the set-valued f–structure. Due to the distributional character of grammatical functions, the SUBJ defined for the set is distributed to *all* elements of the set. While it is already defined for the left conjunct, it is now introduced for the right conjunct, filling the notorious subject gap.

(36)



5.2 Syntactic Properties Revisited

We can now investigate the predictions of the analysis, reconsidering the syntactic and semantic properties of SGF coordinations discussed in Section 3.2.

5.2.1 Number and Type of Gaps

We had seen, in Section 3.2, that asymmetric SGF coordination is restricted to a *single* gap, and to *subject* gaps only. The examples are reproduced in (37) and (38), respectively. How does our analysis by asymmetric GDF-projection account for these restrictions?

(37) * Einen Wagen$_j$ kaufte Hans$_i$ und meldete e$_i$ e$_j$ an.
A car$_j$ bought Hans$_i$ and registered e$_i$ e$_j$
'A car bought Hans and registered'

(38) * Gestern kaufte Hans den Wagen$_i$ und meldete sein Sohn e$_i$ an.
Yesterday bought Hans the car$_i$ and registered his son e$_i$
'Yesterday Hans bought the car and his son registered'

We need to consider two cases: Instantiation of GDF to (i) SUBJ, or (ii) a discourse function DF.

(i) Instantiation of GDF to SUBJ: In (37) asymmetric projection of SUBJ enables distribution of the first conjunct's SUBJ (*Hans*) to the second conjunct, satisfying the completeness constraint of *anmelden* regarding its SUBJ. However, the obligatory OBJ function is not locally defined, and *cannot* be satisfied by alternative means: asymmetric GDF projection in (35) can only be instantiated once, and has been chosen to project the SUBJ. The sentence is ungrammatical due to the missing object.

As for (38), the ungrammaticality of non-subject gaps is explained as follows: Since the subjects of the first and second conjunct are distinct, asymmetric projection of SUBJ (by instantiation of GDF to SUBJ) leads to an inconsistency in f–structure regarding the definition of the SUBJ in the second conjunct. Moreover, due to SUBJ projection, the object gap cannot, at the same time, be asymmetrically projected from the first to the second conjunct.

(ii) Instantiation of GDF **to** TOPIC/FOCUS**:**[10] Our account of (37) and (38) is of course only valid if we can prove that the examples are equally ruled out in the alternative case, instantiation of GDF to a discourse function, e.g. TOPIC.

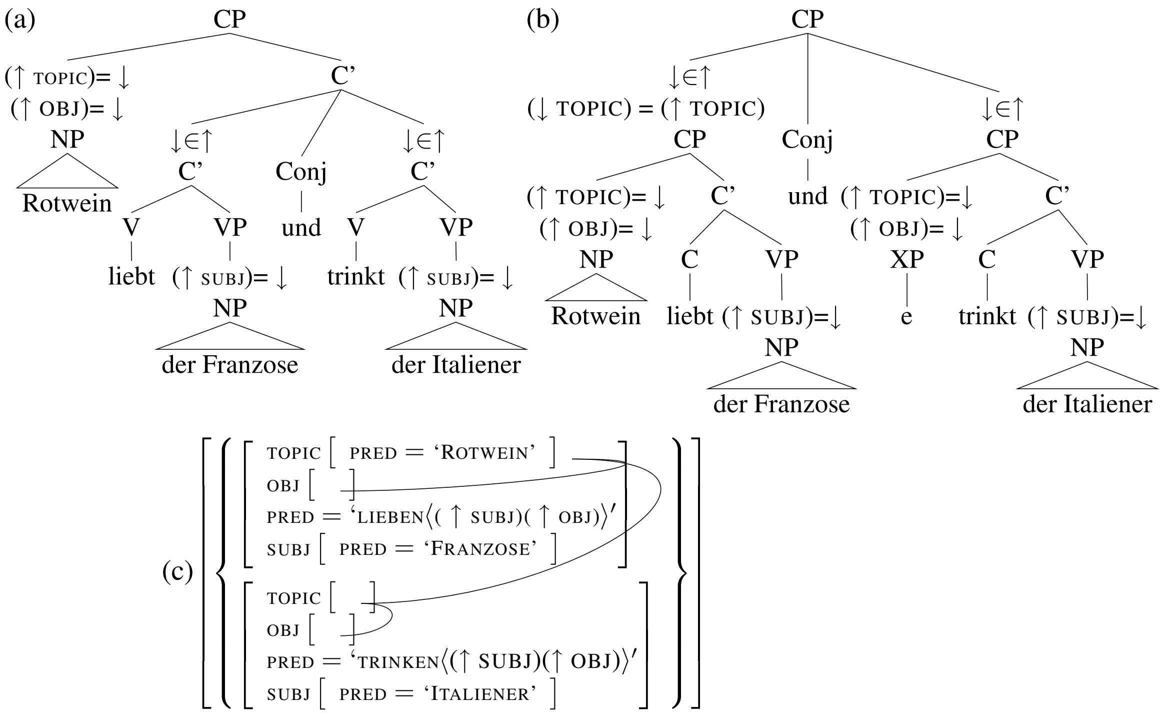
In (37) the TOPIC (*Wagen*) is identical to the first conjunct's OBJ (cf. (34.c)). Asymmetric projection of TOPIC leads to the distribution of the TOPIC to the second conjunct. The SUBJ function of the second conjunct, by contrast, remains unfilled; the structure is ruled out as ungrammatical.

In a similar way, (38) with a non-subject gap is ruled out if GDF is set to TOPIC. The structural TOPIC position is occupied by a non-OBJect function, here an adjunct. Its projection to the second conjunct does no harm, but leaves the crucial object gap unfilled, leading to ungrammaticality.

5.2.2 Principle of Economy of Expression

Asymmetric GDF projection as defined in (35) predicts the basic functional properties of SGF coordination. However, besides the cases discussed above, it predicts an asymmetric analysis of data such as (39), which are – however – cases of classical, symmetric ATB-extraction.

(39) Rotwein liebt der Franzose und trinkt auch der Italiener.
Red wine loves the Frenchman and drinks also the Italian.



The classical analysis of ATB extraction examples like (39) is given in (39.a). The topicalised OBJ is realised outside the C' coordination. The (coreferent) OBJ and TOPIC functions are distributed to both conjuncts, as displayed in (39.c).

[10] We restrict our discussion to the TOPIC function, the case of FOCUS being equivalent.

However, the same f-structure is now obtained by an alternative analysis, in terms of asymmetric GDF projection, as displayed in (39.b). In c–structure, the (shared) topic is now realised *within* the first CP conjunct. With GDF instantiated to TOPIC, the TOPIC is asymmetrically projected to the second conjunct. In addition, an empty SpecCP position is required within the second conjunct, to equate TOPIC and OBJ functions. The analysis projects the very same f–structure that we obtain for the regular ATB extraction analysis, namely (39.c).[11]

This unwarranted spurious ambiguity is, however, ruled out on the basis of the *Principle of Economy of Expression*. This principle basically requires the choice of the smallest c–structure that allows for the satisfaction of f–structure constraints and the expression of the intended meaning (cf. Dalrymple 2001, p.85).

(40) **Economy of expression** (Bresnan 2001, p.91)
All syntactic phrase structure nodes are optional and are not used unless required by independent principles (completeness, choherence, semantic expressivity).

The alternative analyses (39.a,b) yield in fact identical f-structure representations, on the basis of different c–structure representations. In particular, the structural complexity – measured in terms of the number of syntactic nodes employed, excluding lexical and preterminal nodes – is higher for the asymmetric coordination analysis (10 nonterminal nodes) as opposed to the regular ATB extraction analysis (9 syntactic nodes).

Following the Principle of Economy of Expression, then, the more "verbose" structural backbone, the asymmetric analysis in (39.b), is not admitted as an alternative grammatical analysis.

5.2.3 Quantifier Scope

Before discussing the more intricate word order properties, let us first review the scope phenomena discussed in Section 3.2. Example (17) – repeated below as (41) – shows the peculiar property of SGF coordination to allow wide scope of the quantified subject, from the middlefield position of the first conjunct. That is, the SGF coordination (41.b) is semantically equivalent to the regular VP coordination construction (41.a) (modulo the topicalised adverbial in (41.b)).

(41) a. <u>Die wenigsten Leute</u> [kaufen ein Auto] und [fahren mit dem Bus].
Almost no one buys a car and takes the bus
Almost no one buys a car and takes the bus.

b. [Daher kaufen <u>die wenigsten Leute</u> ein Auto] und [fahren mit dem Bus].
Therefore buys almost no one a car and takes the bus
Therefore, almost no one buys a car and takes the bus.

The key answer to this puzzling behaviour is already implied by our asymmetric GDF projection analysis, where the inherent asymmetry of the construction is captured in the c– to f–structure correspondence: by asymmetric projection of the SUBJ to the second conjunct we derive the very same f–structure representations for the symmetric and asymmetric coordination examples (again, modulo the causal adjunct in (41.b)).

Since in the LFG theory semantic interpretation, including quantificational scope, is computed on the basis of the f–structure representation, we predict the equivalent f–structures of symmetric and asymmetric coordinations in (41) to yield identical scopal interpretations.

[11] Equivalent examples can be constructed for symmetric coordination with a shared, topicalised SUBJ. These cases are similarly accounted for by consideration of the Principle of Economy.

In the *Glue Semantics* approach (see e.g. Dalrymple 1999), meaning is constructed compositionally, and in parallel to a linear logic derivation that assembles and consumes parts of the f–structure that contribute to the sentence meaning.

For coordination with shared arguments, such as the quantified subjects in (41), the semantics is built on exactly identical f–structure representations, schematically displayed in (42). Several proposals have been made for semantics construction for shared arguments in coordination (see Dalrymple 2001, p.376ff). An analysis attributed to Dick Crouch and Ash Asudeh is sketched in (42): the semantic contributions of the conjoined predicates (corresponding to $h_\sigma \multimap f1_\sigma$ and $h_\sigma \multimap f2_\sigma$ in the glue part) are consumed first, leading to an open, conjoined predicate in the corresponding meaning part: $\lambda X.[P(X) \wedge Q(X)]$. Quantifying in of the shared subject, referred to by h_σ in the glue part, then leads to a wide scope reading in case of a quantified subject subject.

The important steps of the derivation for example (41) are illustrated in (43).

(42) $$f \left[\begin{array}{l} \textsc{conj} \ \text{'und'} \\ \left\{ \begin{array}{l} f1 \left[\begin{array}{ll} \textsc{pred} = \ldots \\ \textsc{subj} & h \left[\ \right] \end{array} \right] \\ \\ f2 \left[\begin{array}{ll} \textsc{pred} = \ldots \\ \textsc{subj} & h \left[\ \right] \end{array} \right] \end{array} \right\} \end{array} \right] \quad \begin{array}{l} \lambda P.\lambda Q.\lambda X.[P(X) \wedge Q(X)] : \\ \ [h_\sigma \multimap f1_\sigma] \multimap [[h_\sigma \multimap f2_\sigma] \multimap [h_\sigma \multimap f_\sigma]] \end{array}$$

(Dalrymple 2001, p.379)

(43) $$\left[\begin{array}{l} \textsc{conj} = \text{‘und’} \\ \left\{ \begin{array}{ll} f1 & \left[\begin{array}{l} \textsc{subj}\ h \left[\ \textsc{pred} = \text{‘Leute’} \ \right] \\ \textsc{pred} = \text{‘kaufen}\langle(\uparrow \textsc{subj})(\uparrow \textsc{obj})\rangle\text{'} \\ \textsc{obj} \left[\ \textsc{pred} = \text{‘Wagen’} \ \right] \end{array} \right] \\ f2 & \left[\begin{array}{l} \textsc{subj}\ h \left[\ \right] \\ \textsc{pred} = \text{‘fahren}\langle(\uparrow \text{SUBJ}))\rangle\text{'} \\ \textsc{adj} \left\{ \left[\begin{array}{l} \textsc{pred} = \text{‘mit}\langle(\uparrow \textsc{obj})\rangle\text{'} \\ \textsc{obj} \left[\ \textsc{pred} = \text{‘Bus’} \ \right] \end{array} \right] \right\} \end{array} \right] \end{array} \right\} \end{array} \right]$$

$$\lambda X.[\lambda x.kaufen(x, wagen)(X) \wedge \lambda x.fahren\_mit(x, bus)(X)] : h_\sigma \multimap f_\sigma$$
$$wenige(x, leute(x), kaufen(x, wagen) \wedge fahren\_mit(x, bus)) : f_\sigma$$

5.2.4 The puzzle of word order asymmetry

We are left with the special word order restrictions observed for SGF coordination in Section 3.2. In particular, we need to explain why the specifier position of the right conjunct CP cannot be overtly realised. That is, why is (44.b) ungrammatical, as opposed to the general availability of topicalised non-subjects as in (44.c)?

These order restrictions are particularly challenging for a symmetric c–structure analysis, where the second conjunct offers a SpecCP position, and thus predicts (44.b) to be grammatical.

(44) a. In den Wald ging der Jäger und fing einen Hasen.

b. * In den Wald ging der Jäger und einen Hasen fing.

c. Einen Hasen fing der Jäger.

In discussion of Kathol's approach we have argued that his attempt to derive these word order restrictions from structural and/or functional constraints leads to rather ad-hoc conditions, lacking independent grammatical motivation.

In contrast, we will investigate these data within a broader perspective, by integration of well-established constraints on the interaction of *word order* and *discourse properties*. In particular, we build on the OT-based

LFG model of word order developed in Choi (1999, 2001). It derives word order properties observed in various, typologically distinct languages from a set of interacting constraints between different levels of grammatical description, in particular structural, functional-syntactic and discourse properties represented in c–structure, f–structure and i–structure (45).

(45)
syntax
f–structure
semantics — word order *c–structure* — prosody (Choi 1999)
discourse
i–structure

In the optimality-based model of Choi, word order is determined by interaction of – possibly conflicting – word order constraints that are imposed by the different levels of representation and their respective notions of "prominence". The optimality-based model is grounded on the principle of "harmonic alignment", i.e. the constraints are globally aimed at the most harmonic alignment of prominence hierarchies among the different levels of representation.

Choi (2001) assumes the following constraints to predict the word order patterns of various language (type)s: English, German, and Catalan. (46.a) predicts that word orders are most optimal if functional and word order prominence are harmonically aligned, e.g. if the most prominent grammatical function, the SUBJ is realised in the most prominent c–structure position, such as the SpecCP position in German. Concurrently, discourse properties need to be aligned with word order properties in such a way that discourse prominence is in harmonic alignment with structural (word order) prominence (46.b), where languages differ as to which direction (L/R) they choose to align the 'prominent' elements [+prom] or [+new]. In German, the constraints are set to constrain information that is already known in discourse, [-new], to precede [+new] information, and prominent elements [+prom] to precede non-prominent elements (see Choi 2001, for more detail).

(46) a. f–structure/c–structure constraints: (Choi 2001, p.29)
SBJ: The SUBJect aligns with most prominent c–structure position
CMPL: Complements align according to the 'grammatical prominence' hierarchy

b. i–structure/c–structure constraints: (Choi 2001, p.34)
PROM-L/R: [+prom] aligns left/right in the clause
NEW-L/R: [+new] aligns left/right in the clause

c. Optimality-based resolution of conflicts: e.g. [+prom]-LEFT >> SUBJ-LEFT

The model predicts, for a given i–structure representation, an optimal (most harmonic) word order. (47.a), e.g., is situated in a context where no element is discourse-prominent (e.g. focussed), and *Buch* is the only [+new] element in the discourse. The principles for German predict that prominent word order position of the subject yields the most harmonic, i.e. optimal serialisation.

(47) a. Context: *Was hast Du dem Kind geschenkt? – What did you give to the child?*
i–str: [ich]$_{[-prom,-new]}$ [dem Kind]$_{[-prom,-new]}$ [das Buch]$_{[-prom,+new]}$ [geschenkt]$_{[-prom,-new]}$
c–str: Ich$_{\mathrm{subj}}$ habe dem Kind das Buch geschenkt.

b. Context: *Was war mit dem Buch? Wem hast Du das Buch geschenkt?*
What happened to the book? To whom did you give the book?
i–str: [ich]$_{[-prom,-new]}$ [dem Kind]$_{[+prom,+new]}$ [das Buch]$_{[-prom,-new]}$ [geschenkt]$_{[-prom,-new]}$
c–str: Dem Kind$_{[+prom]}$ habe ich das Buch geschenkt.

In the optimality-based model, mismatches between the different word order constraints in (46.a,b) are resolved by language-specific constraint rankings. E.g., a language like German may define that precedence of discourse-prominent elements is more important (or more optimal) than precedence of a SUBJ function (46.c). In (47.b) this leads to an optimal serialisation where the prominent element *dem Kind* is left-aligned, while the competing subject takes a non-initial position.

However, if we apply this model to the word order properties of SGF coordination, it remains mysterious why the order in (48) should be ruled out as suboptimal. After all, we can imagine a discourse context where the object *Hase* (rabbit) is a discourse-prominent element, as rendered e.g. by emphatic stress. So, are we back to square one?

(48) Context: *Wohin ging der Jäger und was tat/fing er?*
Where did the hunter go and what did he do/catch?
i–str: [Jäger]$_{[-prom,-new]}$ [Wald]$_{[+prom,+new]}$ [Hase]$_{[+prom,+new]}$
c–str: * In den Wald$_{[+prom]}$ ging der Jäger und einen Hasen$_{[+prom]}$ fing.

5.3 A Discourse-Functional Analysis

What the previous section shows is that the general word order model of Choi (2001) fails to predict the special word order restrictions of SGF coordination. However, we argue that the analysis needs to accommodate special discourse-functional properties of asymmetric coordination. In what follows, we relate these properties to well-known discourse subordination effects of modal subordination. We establish general licensing conditions for this kind of discourse-functional subordination. In conjunction with the basic word order model of Choi (2001), these will explain the mysterious word order restrictions of both SGF and VL/VF coordination.

5.3.1 Discourse-functional properties of asymmetric coordination

The following set of examples gives pairwise contrasts between "regular" coordination or discourse sequences, as opposed to what we will call "discourse(-functional) subordination contexts" (see also Frank 1994).

For (49.a,a') we observe a striking contrast of interpretation between the symmetric (VL/VL) and the asymmetric (VL/VF) coordination:[12] the asymmetric variant only allows for a nonsensical interpretation where I like to go for walks if it is summer and winter at a time, whereas in the symmetrical (a) example I like to go for walks either way. (49.b,b') involving SGF coordination shows a related contrast: in the symmetrical case, the question focusses on possibly different points in times: the time when Peter calls the dog and the time he takes him for a walk. The SGF construction, though, can only be understood as a question about the time of a single, complex event or situation, when Peter calls the dog to take him for a walk.

(49) a. [[Wenn es Sommer ist] und [wenn es Winter ist]], gehe ich gerne spazieren.

a'. $\neq$ [[Wenn es Sommer ist] und [es ist Winter]], gehe ich gerne spazieren. VL/VF

'When it is summer and (# when) it is winter, I like to go for walks.'

b. [Wann ruft Peter den Hund] und [wann geht Peter mit ihm spazieren]?

b'. [Wann ruft Peter den Hund] und [geht mit ihm spazieren]? SGF

'When does Peter call the dog and (when does Peter) take him for a walk?'

[12]This example was brought up in discussion by Ellen Brandner about 10 years ago (see also Frank 1994).

c. Wenn Fritz ein Pferd <u>hätte</u>, <u>würde</u> er es lieben. # Er <u>reitet</u> *es* jeden Tag.

c'. Wenn Fritz ein Pferd <u>hätte</u>, <u>würde</u> er es lieben. Er <u>würde</u> *es* jeden Tag reiten. MS

If Fritz had a horse, he would love it. He (#rides | would ride) *it* every day.

The modal subordination examples in (49.c,c') show a related pattern: The first sentence of the sequence is – under standard analyses of the discourse semantics of conditionals – an island for the binding of anaphoric pronouns like *es*. However, in (49.c') the same syntactic configuration seems to allow for the extension of the conditional's scope, as indicated by the binding of *es* to *ein Pferd*.

While analyses of modal subordination differ in various aspects (cf. Frank 1997), an abstract characterisation of the crucial aspects involved can be stated as follows: modal subordination can occur in contexts of complex situations (or eventualities), by extension of the scope of a modal operator to otherwise inaccessible material. Domain extension is only licensed if the discourse-subordinated elements do not display *independent* domain marking. This condition is violated in (49.c), where indicative mood signals reference to the actual world; as opposed to (49.c'), where subjunctive mood accords with the context of hypothetical worlds set up by the subordinating modal operator.

We can generalise these conditions to a more abstract characterisation of generalised *discourse subordination*, involving (i) the subordinating *domain extension* of an *operator*, (ii) in a complex situation, (iii) lacking *independent* domain marking of the discourse-subordinated elements.

5.3.2 Licensing conditions for asymmetric GDF-projection

We consider asymmetric coordination as a syntactic instance of this general notion of *discourse subordination*. Unlike extension of a modal operator's scope, we encounter extension of a syntactic, discourse-functional domain, which is marked by a complementiser or a genuine discourse function, both typical elements of the clause's functional projection. This extension of the default discourse-functional domain is brought about and modeled by our notion of (asymmetric) projection of a grammaticalised discourse function GDF, and is subject to various constraints. In particular, extension of a discourse-functional domain is incompatible with *independent domain marking* of the subordinated elements, by complementisers or genuine discourse functions TOPIC or FOCUS.

The conditions summarised in (50) apply to the asymmetric examples (49.a',b'): the functional domain established by the first conjunct (by a complementiser or FOCUS phrase) is extended to the second conjunct, lacking independent domain marking by a complementiser or discourse function.

(50) Asymmetric Coordination as discourse-functional domain extension

- Complementisers (C) and genuine discourse functions TOPIC, FOCUS are syntactic markers of discourse functional domains.
- Extension of a discourse functional domain is modeled by (asymmetric) projection of a grammaticalised discourse function (GDF).
- It occurs in coordinated conjuncts, conceived or presented as a complex situation.
- Independent domain marking of functionally subordinated conjuncts by complementisers (C) or TOPIC/FOCUS marking is prohibited.

5.3.3 Word order properties explained

The assumptions summarised in (50) account for the word order properties of asymmetric coordination. In (51) we associate the different serialisations of both types of asymmetric coordinations with their respective discourse-functional domain markers: it is brought out that an introducing domain marked by a TOPIC or complementiser (COMPL) may be extended (by asymmetric GDF projection), provided the subordinated conjunct is not independently domain-marked by another complementiser or a genuine discourse function. A SUBJ function in the second conjunct is in this respect a neutral element for functional domain marking.

(51) a. In den Wald ging der Jäger und fing einen Hasen. TOPIC-OBL & SUBJ

* In den Wald ging der Jäger und einen Hasen fing. * TOPIC-OBL & TOPIC-OBJ

b. Wenn Du in ein Kaufhaus kommst und hast kein Geld, ... COMPL & SUBJ

Wenn Du in ein Kaufhaus kommst und Du hast kein Geld, ... COMPL & SUBJ

* Wenn Du in ein Kaufhaus kommst und kein Geld hast Du, ... COMPL & TOPIC-OBJ

Final support for relating asymmetric coordination to a general notion of discourse subordination is suggested by the general forward direction of domain extension to the right (cf. the ungrammatical backwards serialisations in (52)). Restriction of forward-directed scope extension is also observed for modal subordination.

(52) a. * Ging in den Wald und gestern fing der Jäger einen Hasen.
Went into the forest and yesterday caught the hunter a rabbit.

b. * Kommst in ein Kaufhaus und wenn Du kein Geld hast, kannst Du nichts kaufen.
Enter a shop and if you no money have, can you nothing buy

6 Conclusion

Our analysis of asymmetric coordination is built on a minimal extension of the classical LFG analysis of constituent coordination. Due to the flexible correspondence architecture of LFG theory, the asymmetry is captured in the c– to f–structure mapping, by asymmetric projection of a grammaticalised discourse function. This analysis predicts the basic functional syntactic and semantic properties of asymmetric coordinations.

We motivated asymmetric GDF projection by taking into account the discourse properties of asymmetric coordination. We argued that asymmetric coordination is a special instance of a more general notion of *discourse subordination*, by relating it to modal subordination. From this notion of discourse subordination we derived special licensing conditions for functional-syntactic discourse subordination that account for the peculiar word order restrictions of asymmetric coordination.

We conclude that our LFG account of asymmetric coordination makes a case for the projection architecture of LFG, where independent levels of representation constrain each other.

There are many open question that we wish to pursue in future work. An obvious question to ask is why asymmetric coordination (and thus GDF projection) is restricted to Germanic languages. Moreover, we need to investigate whether instantiation of GDF to a discourse function licenses asymmetric coordination in other languages, where FOCUS phrases can be clause internal.

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