Phrasal constructions, derivational morphology, constituent structure and (cross-linguistic) generalizations: A discussion of template-based phrasal LFG approaches and a lexical HPSG alternative

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This paper is a contribution to the general discussion of the question whether argument structure constructions should be treated with reference to phrasal patterns as suggested by Goldberg (1995, 2006), Culicover and Jackendoff (2005) and others or whether lexical approaches like Categorial Grammar (Ajdukiewicz, 1935; Steedman, 2000), LFG (Bresnan, 1982), HPSG (Pollard and Sag, 1994; Sag, 1997) and Sign-based Construction Grammar (Sag et al., 2012; Sag, 2012) are more appropriate. In the absence of any fully worked out formalized phrasal proposals in Construction Grammar many arguments against phrasal approaches have a hypothetical character (see for instance Müller, 2006). This paper discusses recent approaches by Asudeh, Dalrymple, and Toivonen (2008, 2013), Christie (2010) and Asudeh, Giorgolo, and Toivonen (2014) in the framework of LFG, which can be seen as formalizations of phrasal constructionist approaches. The authors argue that certain arguments in resultative and benefactive constructions in English are licensed in phrasal constructions rather than lexically. Applying an old argument by Dowty and Bresnan to resultative constructions, I show that data involving derivational morphology suggests that valence information is visible at the lexical level and hence should not be introduced at the phrasal level. The conclusion is that analyses like the classical lexical analysis of resultative constructions by Simpson (1983) are the only option for lexicalist theories like LFG and HPSG.

A second part of the paper discusses active/passive alternations in template-based approaches and points out that generalizations regarding c-structure are missing in the same way as they are missing in simple phrase structure grammar. Such missing generalizations motivated Harris and Chomsky to introduce transformations, but transformations are not used in LFG and hence the generalizations regarding active/passive c-structure pairs cannot be captured. Furthermore, I show that
cross-linguistic generalizations cannot be captured with reference to phrasal configurations since languages differ in the way they actually realize resultative and benefactive constructions. It is shown that languages like German that allow much freer constituent order than English and partial verbal phrases are incompatible with phrasal views of argument structure.

In a third part I develop a lexical account of German and English resultatives and benefactives in the framework of HPSG and show how this account captures the commonalities between German and English despite the superficial dissimilarities between the two languages.

1 Introduction

Goldberg (1995, 2006), Tomasello (2003) and others argue for a phrasal view on argument structure constructions: lexical entries for verbs come with minimal specifications as to which arguments are required by a verb but they come with a specification of argument roles. Verbs can be inserted into phrasal constructions and these constructions may express the arguments that belong to a verb semantically or even add further arguments. A frequently discussed example is the one in (1):

(1) He runs his sneakers threadbare.

run is an intransitive verb, but in (1) it enters the resultative construction, which licenses an additional argument (his sneakers) and a result predicate (threadbare). The resultative semantics is said to be contributed by the whole phrasal pattern rather than by one of its elements. The lexical approach assumes that there are several lexical items for verbs like run. There is the lexical item that is needed to analyze simple sentences with the intransitive verb and its subject and there is a further lexical item that is used in the analysis of sentences like (1). The latter lexical item selects for a subject, an object and a result predicate and contributes the resultative semantics. Both lexical items are related by a lexical rule. See Simpson, 1983, Verspoor, 1997, Wechsler, 1997, Wechsler and Noh, 2001, Wunderlich 1992, p. 45; 1997, p. 120–126, Kaufmann and Wunderlich, 1998, Müller, 2002, Chapter 5, and Kay, 2005 for lexical analyses in several frameworks.

The question whether constructions like (1) should be treated as lexical or as phrasal constructions has been discussed in the literature in several papers (Goldberg and Jackendoff, 2004; Müller, 2006; Müller and Wechsler, 2014a; Goldberg, 2013) but since most Construction Grammar publications (intentionally, see Goldberg, 2006) are not formalized the discussion was rather hypothetical. There have been Construction Grammar-inspired proposals in HPSG (Haugereid, 2007, 2009) and Simpler Syntax (Culicover and Jackendoff, 2005) and these were shown to have empirical problems, to make wrong predictions or to be not extendable to other languages (Müller, 2013b, 2016c). Recently, several articles have been published suggesting a template-based phrasal approach in LFG that makes use of glue-semantics, a resource-driven semantic theory (Christie, 2010; Asudeh et al., 2013). While these proposals seem to avoid many of the challenges that earlier proposals faced, they in fact have many of the problems that were discussed with respect to hypothetical proposals in Construction Grammar. Fortunately, the LFG
proposals are worked out in detail and are embedded in a formal theory that provides formalized analyses of the languages and phenomena under discussion. It is therefore possible to show what the new template-based theories predict and to pin down exactly the phenomena where they fail. So, this paper discusses recent LFG proposals, shows where they fail, sketches a lexical alternative in LFG and finally provides a fully worked out and implemented lexical analysis in the framework of HPSG.

The traditional analysis of the resultative construction in the framework of LFG is a lexical one (Simpson, 1983) but, recently, several researchers have suggested a different view on argument structure constructions in the framework of LFG. For instance, Alsina (1996) and Christie (2010) suggest analyzing resultative constructions as phrasal constructions and Asudeh, Dalrymple, and Toivonen (2008, 2013) argue for a phrasal analysis of the (Swedish) caused motion construction.1 Toivonen (2013) discusses benefactive constructions of the type in (2b).

(2) a. The performer sang a song.
   b. The performer sang the children a song.

Toivonen notices that the benefactive NP cannot be fronted in questions (3) and that passivization is excluded in certain dialects of English (4).

(3) a. I baked Linda cookies.
   b. * Who did I bake cookies?
   c. The kids drew their teacher a picture.
   d. * Which teacher did the kids draw a picture?

(4) * My sister was carved a soap statue of Bugs Bunny (by a famous sculptor).

While she provides a lexical rule-based analysis of benefactives in her 2013 paper, she states that “a construction-specific phrase structure rule” as was assumed by Asudeh, Dalrymple, and Toivonen (2008, 2013) may be more appropriate (p. 516). Asudeh, Giorgolo, and Toivonen (2014) develop such a phrasal analysis of the benefactive construction.

This paper will address two issues with phrasal approaches: first, there are the old level ordering arguments from Dowty (1978, p. 412) and Bresnan (1982, p. 21); and second, there are problems with cross-linguistic generalizations that can be captured with reference to f-structures of lexical items but which cannot be captured on a phrasal level since languages may have radically different c-structures despite the fact that the phenomenon under discussion is basically the same. Hence, I will argue that we should stick to the traditional approaches relying on f-structure specifications of lexical items. The remaining paper is structured as follows: I explain the template-based analyses of the benefactive and the resultative construction in Section 2. I then discuss requirements of morphological processes in Section 3. Section 4 deals with Lexical

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1Asudeh and Toivonen (2014, Section 2.3), replying to a critique of Asudeh, Dalrymple, and Toivonen (2008, 2013) by Müller and Wechsler (2014a), argue that their account is not constructional. But if a construction is a form-meaning pair, their account is constructional, since a certain c-structure is paired with a semantic contribution. Asudeh and Toivonen (2014, Section 2.2) compare their approach with approaches in Constructional HPSG (Sag, 1997) and Sign-Based Construction Grammar (Sag, 2012), which they term constructional. The only difference between these approaches and the approach by Asudeh, Dalrymple & Toivonen is that the constructions in the HPSG-based theories are modeled using types and hence have a name.
Integrity and what kind of generalizations have to be captured in morphology and syntax. Missing generalizations regarding active and passive variants of c-structure rules are pointed out in Section 5 and Section 6 discusses various areas in German grammar that cannot be accounted for with phrasal approaches given current assumptions in LFG. Section 7 develops a lexical account in HPSG and shows how generalizations regarding constituent structure and argument structure in English and German can be captured. Finally, I draw a conclusion in Section 8.

2 The template-based approach

In what follows, I want to examine two phrasal approaches in more detail. Both approaches are based on templates (Dalrymple et al., 2004), glue semantics (Dalrymple, 1999), and a version of the Lexical Mapping Theory (Bresnan and Kanerva, 1989; Kibort, 2008). Glue semantics is interesting since logical formulae are resource sensitive; that is, certain items have to be consumed during a semantic combination. This sort of consumption can be used to model valence. I start with the treatment of benefactives in Asudeh et al. (2014) in the following subsection and then turn to Christie’s treatment of resultatives (2010).

2.1 Benefactive constructions

This subsection consists of two parts: I first explain the general assumptions made by template-based approaches using glue semantics and then comment on why this is different from earlier inheritance-based proposals and explain why certain problems do not arise and which problems are left.

2.1.1 General assumptions and the BENEFACTIVE template

Figure 1 shows the analysis of (5) that is assumed by Asudeh et al. (2014, p. 75):

(5) Kim ate at noon.

There is a constituent structure (c-structure) that is related via the function $\phi$ to a functional structure (f-structure), which is in turn related to a semantic structure (s-structure) via a further function $\sigma$. The s-structure is a new semantic level that is supposed to fulfill the function of the argument structure representation (a-structure) that is usually assumed in versions of LFG that rely on Lexical Mapping Theory (Bresnan and Zaenen 1990; Bresnan et al. 2015, Chapter 14).

The authors follow a neo-Davidsonian approach, that is, verbs introduce a one-place predicate that takes an event as sole argument. Further argument roles can be added as also predicking of the event. For instance, the meaning of Kim ate in (5) is represented as (6), ignoring tense information.

(6) $\text{eat}(e) \land \text{agent}(e) = x$

Agents and patients are introduced by the templates given in (7):

(7) a. $\text{AGENT} =$
These templates call further templates called ARG1 and ARG2, respectively and provide a meaning constructor that consists of a lambda expression (line two) and a glue expression (line three). The lambda expression in both templates is looking for a $P$. This $P$ can only be combined with the lambda expression if it simultaneously provides the resource $\langle \sigma EVENT \rangle \to \sigma ARG_1$. After the consumption of this resource the formula $\langle \sigma ARG_1 \rangle \to \langle \sigma EVENT \rangle \to \sigma$ results. This formula states that an ARG_1 has to be found. After combination with ARG_1, the resource $\langle \sigma EVENT \rangle \to \sigma$ can be consumed by a tense predicate resulting in $\sigma$. That is, we arrive at a complete semantic proof that has used all resources. The actual proof involving the templates above is given in Figure 2 on page 9 and will be discussed in more detail below.

The templates ARG1 and ARG2 are defined as shown in (8a) and (8b), respectively. For completeness I also give the definitions of ARG3 and ARG4.

(8) a. ARG1 = 
{ @MAP(MINUSO,ARG_j) | @NOMAP(ARG_j) }

b. ARG2 =
\{ @MAP(MINUSR,\text{ARG}_2) \mid @NOMAP(\text{ARG}_2) \} \\
c. \text{ARG}_3 = \\
\{ @MAP(PLUSO,\text{ARG}_3) \mid @NOMAP(\text{ARG}_3) \} \\
d. \text{ARG}_4 = \\
\{ @MAP(MINUSO,\text{ARG}_4) \mid @NOMAP(\text{ARG}_4) \} \\

The templates MAP and NOMAP are used in (8) to either map the arguments to a disjunction of grammatical functions or to declare that they are not mapped to f-structure items at all. The disjunctions of grammatical functions correspond to disjunctions that are assumed in Lexical Mapping Theory and are given in (9):

\begin{align*}
\text{(9)} \quad & \text{MINUSR} \equiv \{ \text{SUBJ}|\text{OBJ} \} \\
& \text{MINUSO} \equiv \{ \text{SUBJ}|\text{OBL}_0 \} \\
& \text{PLUSR} \equiv \{ \text{OBL}_0|\text{OBJ}_0 \} \\
& \text{PLUSO} \equiv \{ \text{OBJ}|\text{OBJ}_0 \} \\
\end{align*}

The templates MAP and NOMAP are defined as follows:

\begin{align*}
\text{(10)} \quad & \text{MAP}(F,A) = \\
& (\uparrow F)_\sigma = (\uparrow A) \\
& \text{NOMAP}(A) = \\
& (\uparrow A)_{\sigma^{-1}} = \emptyset \\
\end{align*}

The template MAP takes its first argument F and states that the value of the \( \sigma \) function of the value of F in the f-structure of the mother equals the A value in the \( \sigma \) structure of the mother.

The template NOMAP says that the element A in a \( \sigma \) structure is not mapped to a grammatical function in the f-structure that belongs to the A feature (identified via an inverse function from the semantic structure to the f-structure (\( \sigma^{-1} \)).

If we expand the templates for \text{ARG}1, \text{ARG}2, and \text{ARG}3, we get:

\begin{align*}
\text{(11)} \quad & \text{ARG}_1 = \\
& \{ (\uparrow \{ \text{SUBJ}|\text{OBL}_0 \})_\sigma = (\uparrow \text{ARG}_1) \mid (\uparrow \text{ARG}_1)_{\sigma^{-1}} = \emptyset \} \\
& \text{ARG}_2 = \\
& \{ (\uparrow \{ \text{SUBJ}|\text{OBJ} \})_\sigma = (\uparrow \text{ARG}_2) \mid (\uparrow \text{ARG}_2)_{\sigma^{-1}} = \emptyset \} \\
& \text{ARG}_3 = \\
& \{ (\uparrow \{ \text{OBJ}|\text{OBJ}_0 \})_\sigma = (\uparrow \text{ARG}_3) \mid (\uparrow \text{ARG}_3)_{\sigma^{-1}} = \emptyset \} \\
\end{align*}

(11a) says that either the \( \sigma \) value of the \text{SUBJ} is \text{ARG}1 or the \( \sigma \) value of the \text{OBL}_0 is \text{ARG}1 or \text{ARG}1 is not realized in the f-structure at all. (11b) says that \text{ARG}2 is mapped to \text{SUBJ} or \text{OBJ} or to nothing at all and (11c) says that \text{ARG}3 is mapped to \text{OBJ} or \text{OBJ}_0 or to nothing at all.

For verbs like \textit{draw}, which have both an agent and a patient, the templates for agent and patient can be combined into one template as in (12):

\begin{align*}
\text{(12)} \quad & \text{AGENT-PATIENT} = \\
& \@\text{AGENT} \\
& \@\text{PATIENT} \\
\end{align*}
Finally we need the template PAST in (13):

(13) \[
\text{PAST} =
\begin{align*}
\lambda P \exists e. [P(e) \land \text{past}(e);]
\end{align*}
\]

\[
\sigma P[\exists e. (P(e) \land \text{past}(e);)]
\]

This template adds the TENSE feature and the value PAST to the f-structure, adds the past semantics to an event and states a glue term that requires something that takes an event and licenses a complete \(\sigma\) structure\([\{\text{EVENT}\}_\sigma \rightarrow \uparrow_\sigma]\). If this resource is found, a complete \(\sigma\) structure \(\uparrow_\sigma\) results.

With the template for PAST in place, we can now have a look at the lexical entry for \textit{drew} in (15).

(14) \[
\text{drew V}
\begin{align*}
(\uparrow \text{PRED}) &= \text{‘draw’} \\
@ \text{PAST} \\
@ \text{AGENT-PATIENT}
\end{align*}
\]

\[
\lambda e. \text{draw}(e) : (\sigma \text{EVENT}) \rightarrow \uparrow_\sigma
\]

The specification of the PRED value in (14) is unusual for LFG. Usually PRED values come with a specification of grammatical functions that have to be realized together with a predicate. The PRED value is the representation of valence information in LFG. This function is taken over by glue terms in proposals that use glue-semantics. Since glue-semantics is resource sensitive one can set things up in a way to make sure that all the grammatical functions that are required to fill semantic roles are realized in an utterance.

If we expand the template calls, we get the f-structure constraints and semantic constructors in (15).

(15) \[
\text{drew V}
\begin{align*}
(\uparrow \text{PRED}) &= \text{‘draw’} \\
(\uparrow \text{TENSE}) &= \text{PAST}
\end{align*}
\]

\[
\sigma
\begin{align*}
\{ (\uparrow \text{SUBJ}[\text{OBL}_\sigma])_\sigma = (\sigma \text{ARG}_1) | (\sigma \text{ARG}_1)_{\sigma^{-1}} = \varnothing \} \\
\{ (\uparrow \text{SUBJ}[\text{OBJ}])_\sigma = (\sigma \text{ARG}_2) | (\sigma \text{ARG}_2)_{\sigma^{-1}} = \varnothing \}
\end{align*}
\]

\[
\lambda P \exists e. [P(e) \land \text{past}(e);]
\]

\[
\sigma
\begin{align*}
[(\sigma \text{EVENT}) \rightarrow \uparrow_\sigma] \rightarrow \uparrow_\sigma
\end{align*}
\]

\[
\lambda P \chi \chi e. P(e) \land \text{agent}(e) = x :
\sigma
\begin{align*}
[(\sigma \text{EVENT}) \rightarrow \uparrow_\sigma] \rightarrow (\uparrow_\sigma \text{ARG}_1) \rightarrow (\sigma \text{EVENT}) \rightarrow \uparrow_\sigma
\end{align*}
\]

\[
\lambda P \chi \chi e. P(e) \land \text{patient}(e) = x :
\sigma
\begin{align*}
[(\sigma \text{EVENT}) \rightarrow \uparrow_\sigma] \rightarrow (\uparrow_\sigma \text{ARG}_2) \rightarrow (\sigma \text{EVENT}) \rightarrow \uparrow_\sigma
\end{align*}
\]

\[
\lambda e. \text{draw}(e) : (\sigma \text{EVENT}) \rightarrow \uparrow_\sigma
\]

The glue terms can be used in a proof as is shown in the box for \textit{draw}’ in Figure 2 on page 9.

The proofs are basically lambda reductions with the additional condition that resources that are paired with the lambda expression (the material to the right of the colon) have to be used. So, for instance, when \@\text{PATIENT} is combined with \textit{drew} the resource \((\text{ev} \rightarrow d) \rightarrow s \rightarrow \text{ev}\)
$d$ has to be used. Since $\textit{drew}$ provides $\text{event} \rightarrow d$, the combination of the two items results in $s \rightarrow \text{event} 
rightarrow d$. In the next step an $x:s$ is hypothesized, lambda reduction takes place and the resource $s$ is consumed yielding $\text{event} \rightarrow d$. This expression is combined with $\textit{AGENT}$. $\textit{AGENT}$ contains the glue term ($\text{event} \rightarrow d) \rightarrow k \rightarrow \text{event} \rightarrow d$ and since $\text{PATIENT} + \textit{drew}$ was $\text{event} \rightarrow d$, a combination is possible and the result is $k \rightarrow \text{event} \rightarrow d$. Now the $x:s$ that was hypothesized earlier is reintroduced into the formula resulting in $s \rightarrow k \rightarrow \text{event} \rightarrow d$.

Asudeh, Giorgolo, and Toivonen (2014, p. 81) assume that information about benefactive arguments is introduced by the c-structure rule in (16):

$$ V' \rightarrow V \quad \text{DP} \quad \text{DP} \\
\uparrow = \downarrow \\
(\uparrow \text{OBJ}) = \downarrow \\
(\uparrow \text{OBJ}_0) = \downarrow \\
(\ @\text{BENEFACTIVE} )$$

The $\text{BENEFACTIVE}$ template is specified in brackets, which – in the context of template calls – marks optionality. So the c-structure rule can be used with normal ditransitive verbs or with transitive verbs and in this case the $\text{BENEFACTIVE}$ template would apply and license a further argument.

The $\text{BENEFACTIVE}$ template is defined as follows:

$$ \lambda x \lambda y \lambda P \lambda e. P(y)(e) \land \text{beneficiary}(e) = x : \\
(\uparrow \sigma \text{ARG}_2) \rightarrow o (\uparrow \sigma \text{ARG}_3) \rightarrow o ([\uparrow \sigma \text{EVENT}) \rightarrow o \uparrow \sigma] \rightarrow o (\uparrow \sigma \text{EVENT}) \rightarrow o \uparrow \sigma$$

As Asudeh et al. (2014, p. 78) state, the template uses a trick. It first looks for $\text{ARG}_2$ and $\text{ARG}_3$ and then combines with a verb looking for an $\text{ARG}_2$. In this way the resource logic basically maps a two-place predicate to a three-place predicate.

If we expand the call to the $\text{ARG}_3$ template, we get (18):

$$ \lambda x \lambda y \lambda P \lambda e. P(y)(e) \land \text{beneficiary}(e) = x : \\
(\uparrow \sigma \text{ARG}_2) \rightarrow o (\uparrow \sigma \text{ARG}_3) \rightarrow o ([\uparrow \sigma \text{EVENT}) \rightarrow o \uparrow \sigma] \rightarrow o (\uparrow \sigma \text{EVENT}) \rightarrow o \uparrow \sigma$$

In an analysis of (19), we would hence have the constraints on the lexical item for $\textit{drew}$ given in (12) and the constraints in (18).

(19) Kim drew Sandy Godzilla.

This means that the grammatical functions of the arguments are underspecified in the c-structure annotations of the lexical item and the benefactive template. What we have so far is the set of constraints given in (9). In order to get these disjunctions resolved and in order to exclude the option of $\text{ARG}_1$, $\text{ARG}_2$ and $\text{ARG}_3$ being mapped to $\emptyset$, we need c-structure rules. In the case at hand we have the c-structure rule in (14) that licenses the objects and we have an IP rule that combines the VP with an NP/DP. This c-structure rule ensures that there is a SUBJ. Without these additional constraints from c-structure configurations the approach would vastly overgenerate.

As I will show in Section 5 this is problematic since the assignment of grammatical functions in passives is not taken care of.
2.1.2 Inheritance-based analyses: Why does it work and where are the limits

Müller (2010) argued that semantics needs embedding and cannot be done in inheritance networks. Müller (2007b), Müller (2013b) and Müller and Wechsler (2014a) argued that argument structure changing phenomena cannot be treated via inheritance but need formal means that map representations to other representations. The analysis of Asudeh et al. (2014) seems to falsify these claims.

Traditional a-structure-based LFG approaches assume that sentences with different argument realizations have different lexical items with different argument structure representations. The argument structures are mapped to grammatical functions and these are realized according to the syntax of the respective languages. For instance, Bresnan et al. (2015, Section 14.4.5) assume the following a-structures for the transitive and the ditransitive use of cook:

\[ \lambda \text{draw}(\text{Sandy}) \vdash \exists e . \text{draw}(\text{Sandy} \land \text{agent}(e) = \text{Sandy} \land \text{past}(e)) : d \]

\[ \lambda \text{draw}(\text{Sandy} \land \text{agent}(e) = \text{Sandy} \land \text{past}(e)) : d \]

Figure 2: Proof for Kim drew Sandy Godzilla.

a. Transitive:
   - a-structure: `cook` { agent patient }
     \[-o \quad [-r] \]
   - f-structure: SUBJ OBJ

b. Ditransitive:
   - a-structure: `cook-for` { agent beneficiary patient }
     \[-o \quad [-r] \quad [+o] \]
   - f-structure: SUBJ OBJ OBJb

Lexical Mapping Theory makes sure that the arguments that are labeled with \(-o\), \(-r\) and \(+o\) are
mapped to the respective grammatical functions. The important point about this analysis is that
there are two lexemes: one for transitive \textit{cook} with an a-structure that contains two elements and
one for the ditransitive version with an a-structure that contains three elements. The a-structures
are ordered lists and it is impossible to add an element into the middle of a list by a monotonic
gathering of constraints (e.g., inheritance).\footnote{It is possible to extend lists at the end if defaults and overriding are permitted. See Müller, 2016a for discussion.} The template-based approach circumvents this problem by not stipulating an order of elements in a list. Rather than using an ordered representation like lists it assumes an s-structure into which features can be added by simple unification. These features are not ordered. The feature names have numbers as part of the names but this is just
mnemonic and if order effects are desired they have to be modeled elsewhere. Asudeh \textit{et al.}
(2014) do this in the glue part of their semantic expressions. For instance the \textit{BENEFACTIVE}
template refers to ARG$_2$ and ARG$_3$ and consumes respective resources in a specified order.

Turning to semantics, the claims regarding inheritance and embedding are true for frameworks
in which the semantic contribution is represented as a value of a feature (HPSG, Pollard and Sag
1994; Sag 1997; BCG, Kay and Fillmore 1999; SBCG, Sag 2012; FCG, Steels 2011). If two
different semantic values are inherited from supertypes, a conflict arises. To take an example,
consider the AGENT and the PATIENT template. If we assumed that the meaning-constructor
is the value of a feature, say SEM, we would have two conflicting values:

\begin{align}
(21) \quad \text{a.} & \quad \lambda P \pi \lambda x.\pi. P(e) \land \text{agent}(e) = x : \\
& \quad \quad [(\langle \text{EVENT} \rangle \to \uparrow_{\sigma}) \to_o \langle \uparrow_{\sigma} \text{ARG}_1 \rangle \to_o \langle \uparrow_{\sigma} \text{EVENT} \rangle \to_o \uparrow_{\sigma} ] \\
\text{b.} & \quad \lambda P \pi \lambda x.\pi. P(e) \land \text{patient}(e) = x : \\
& \quad \quad [(\langle \text{EVENT} \rangle \to \uparrow_{\sigma}) \to_o \langle \uparrow_{\sigma} \text{ARG}_2 \rangle \to_o \langle \uparrow_{\sigma} \text{EVENT} \rangle \to_o \uparrow_{\sigma} ]
\end{align}

Note that representing these semantic contributions in lists would not help either, since this
would just shift the conflict to another place. Lists are ordered and if (21a) is the first member
of a list and (21b) is the first member of a second list, the two lists are incompatible. In order
to avoid such conflicts auxiliary features and mappings between auxiliary features may be used
(Koenig, 1999). The problem is that one auxiliary feature per interaction is needed (Müller,
2007b, Section 7.5.2.2).

Assuming sets rather than lists would not work either if the general understanding of sets as
is common in HPSG (Pollard and Moshier, 1990) is assumed. What could be done is that one
inherits constraints on list or set membership. The AGENT and PATIENT templates would then
have the following feature-value specification:

\begin{align}
(22) \quad \text{a.} & \quad \text{SEM} \in \in \lambda P \pi \lambda x.\pi. P(e) \land \text{agent}(e) = x : \\
& \quad \quad \quad \quad [(\langle \text{EVENT} \rangle \to \uparrow_{\sigma}) \to_o \langle \uparrow_{\sigma} \text{ARG}_1 \rangle \to_o \langle \uparrow_{\sigma} \text{EVENT} \rangle \to_o \uparrow_{\sigma} ] \\
\text{b.} & \quad \text{SEM} \in \in \lambda P \pi \lambda x.\pi. P(e) \land \text{patient}(e) = x : \\
& \quad \quad \quad \quad [(\langle \text{EVENT} \rangle \to \uparrow_{\sigma}) \to_o \langle \uparrow_{\sigma} \text{ARG}_2 \rangle \to_o \langle \uparrow_{\sigma} \text{EVENT} \rangle \to_o \uparrow_{\sigma} ]
\end{align}

So one would say that the value of SEM is a set (\(\in\)) and that the meaning constructor for agent
is an element of this set and that the meaning constructor for patient is an element of this set too.
Note that the set is not constrained otherwise. So in principle any formula could be part of this
set. So one would need the additional assumption that we are looking for minimal models when
we interpret linguistic structures, an assumption that is usually made in LFG.
In general such a system of semantics construction would not work since it would not be clear in which order partial formulae that are inherited from supertypes are to be combined. Authors have used semantic types in order to make it clear what type of argument has to be combined with a certain functor (e.g., in GPSG, Gazdar et al. 1985, Chapter 9–10), but this does not help in all cases. The glue approach has additional means to specify what is combined with what: specific resources are used when elements are combined. So, while the lambda expressions for the agent and the patient template in (22) are identical, the glue resources are not. The AGENT template involves an ARG\(_1\) and the PATIENT template an ARG\(_2\). Furthermore, the glue apparatus can be used for mapping predicates of a certain arity to predicates of another arity. For instance the BENEFACTIVE template requires an ARG\(_2\) and an ARG\(_3\) and then a verb that selects for an ARG\(_2\) ([↑\(_\sigma\) ARG\(_2\) ⇒ (↑\(_\sigma\) EVENT) ⇒ ↑\(_\sigma\)]).

(23) Part of the BENEFACTIVE template that remaps ARG\(_2\) to ARG\(_3\):

\((↑\sigma\text{ARG}_2) ⇒ (↑\sigma\text{ARG}_3) ⇒ [↑\sigma\text{ARG}_2) ⇒ (↑\sigma\text{EVENT}) ⇒ ↑\sigma]\)

This basically turns a two-place verb selecting for an object (ARG\(_2\)) into a three-place verb that has a new first object (ARG\(_2\)) and realizes the object of the two-place verb as its second object (ARG\(_3\)). The glue-term basically does what a lexical rule does in lexical rule-based systems, it maps a two-place predicate to a three-place predicate:

(24) \( \langle \text{ARG}_X, \text{ARG}_Y \rangle \mapsto \langle \text{ARG}_X, \text{ARG}_Z, \text{ARG}_Y \rangle \)

So a lexical item with several glue-constraints attached to it corresponds to a lexical item with several lexical rules attached to it (for later application). The resource sensitivity of the glue statements ensures that the glue statements are used in a specific order in the proofs. Similarly the input and output conditions of lexical rules make sure that they are applied in a certain order.\(^3\)

### 2.2 Resultative constructions

Christie (2010) assumes the following c-structure rule for transitive resultative constructions like the one in (25):

(25) He hammered the metal flat.

(26) \( V' \rightarrow V \ \text{DP} \ {\{ \text{DP|AP|PP } \}} \)

\( ↑=↓ \quad (↑\text{OBJ})=↓ \quad (↑\text{XCOMP})=↓ \quad (↓\text{SUBJ})=(↑\text{OBJ}) \)

@RESULT-T((↑\text{PRED FN}))

The resultative template licenses the result predicate and provides a glue semantics term that licenses subject and object. Christie (2010) assumes the following lexical entries for transitive verbs:

\(^3\)See for instance Blevins, 2003, p. 515 for the application of the impersonal lexical rule to the output of the passivization lexical rule. The output of the impersonal lexical rule cannot function as input to passivization since passivization requires a subject to be suppressed and the subject was already suppressed by the impersonalization.
The resource sensitive semantics and the specification of a PRED value is declared to be optional. When these verbs are used in the c-structure rule in (24), the lexical information is replaced by the information contributed by the resultative template. Christie assumes that all sentences must have a specified PRED value and therefore the optional PRED value must be realized in simple sentences without a result predicate.

Christie does not explain how resultatives with intransitive verbs as in (1) are analyzed but by analogy there would be lexical items for intransitive verbs with an optional meaning contribution and a resultative template that integrates the meaning of the result predicate with the meaning of the intransitive verb and licenses an additional object argument.

The previous subsections introduced the phrasal template-based analyses of benefactive constructions and resultative constructions by Asudeh et al. (2014) and Christie (2010). In what follows I will explain the problematic aspects. I start with the discussion of morphology.

3 Morphology and valence

Morphological processes have to be able to see the valence of the element they apply to (this point was also made by Müller and Wechsler, 2014a, Section 4.2 in connection with the GPSG representation of valence.). For instance, the generalization about productive -bar ‘able’ derivation in German is that it only applies to verbs that govern a subject and an accusative object. While lösbar ‘solvable’ and vergleichbar ‘comparable’ can be formed, * schlafbar ‘sleepable’ and * helfbar ‘helpable’ are ruled out:

\begin{align*}
\text{a. lösbar} & \quad \text{solveable} \\
& \quad (\text{NP}[\text{nom}], \text{NP}[\text{acc}]) \\
\text{b. vergleichbar} & \quad \text{comparable} \\
& \quad (\text{NP}[\text{nom}], \text{NP}[\text{acc}], \text{PP}[\text{mit}]) \\
\text{c. * schlafbar} & \quad \text{sleepable} \\
& \quad (\text{NP}[\text{nom}]) \\
\text{d. * helfbar} & \quad \text{helpable} \\
& \quad (\text{NP}[\text{nom}], \text{NP}[\text{dat}])
\end{align*}

The resultative construction also interacts with -bar ‘able’ derivation: the adjectives leerfischbar ‘empty.fish.able’ = ‘It is possible to fish X empty.’ and plattfahrbar ‘flat.drive.able’ can be formed. If arguments are introduced by phrasal configurations which refer to fully derived and inflected words or phrases consisting of words, the accessibility of the valence information to the morphology component is not given and it remains an open question how phrasal analyses can explain the contrasts in (28) and the fact that -bar ‘able’ derivation does apply to verbs

\footnote{http://www.forum-3dcenter.org/vbulletin/archive/index.php/t-236032.html, 02.06.2016.
in the resultative construction. In Christie’s analysis the intransitive verbs probably would be represented as intransitive in the lexicon with an optional semantic representation. As was argued in Müller, 2003 the derivational affix attaches to the verbal stem and hence the information about an accusative object would not be available in Christie’s approach. Even if one assumes that leer and fisch are combined before the attachment of -bar, it is unclear what licenses this combination. The fact that leerfisch takes an accusative object would have to be available at the point when -bar attaches and could not be contributed by phrase structure rules in the syntax. Furthermore, there are resultative constructions with phrasal result phrases like (29) and here it could not be argued that PP and verbal stem form a new verbal stem to which -bar attaches.

(29) Die Mauer ist in kleine Stücke fahrbar.
    the wall is into small pieces driveable
    ‘The wall can be driven into small pieces.’

So, the -bar ‘able’ derivation constitutes evidence against Alsina’s and Christie’s phrasal approach, if one wants to maintain the view that words are the atoms of syntax.

Another example of derivational morphology that clearly shows (provided we believe that affixes do not combine with phrases but with stems) that the fact that there will be an accusative object has to be present at the verb is the derivation of adjectival participles. (30) shows an example:

(30) a. Er tanzt die Schuhe blutig / in Stücke.
    he.NOM dances the.ACC shoes bloody into pieces

b. die in Stücke / blutig getanzten Schuhe
    the into pieces bloody danced shoes

c. * die getanzten Schuhe
    the danced shoes

The shoes are not a semantic argument of tanzt. Nevertheless the referent of the NP that is realized as accusative NP in (30a) is the element the adjectival participle in (30b) predicates over. Adjectival participles like the one in (30b) are derived from a passive participle of a verb that governs an accusative object. The example in (30c) shows that the passive participle cannot be formed with unergative intransitive verbs. This should be contrasted with a transitive verb like lieben ‘to love’:

(31) der geliebte Mann
    the loved man
    ‘the beloved man’

The transitive verb allows the formation of the adjectival participle and the participle with resultative predicate in (30b) behaves completely parallel.

If the accusative object in resultative constructions is licensed phrasally by configurations like the one in (24), it cannot be explained why the participle getanzte can be formed despite the absence of an accusative object in the valence specification of the verb. See the next section for further interactions of resultatives and morphology. The conclusion, which was drawn in the late 70s and early 80s by Dowty (1978, p. 412) and Bresnan (1982, p. 21), is that phenomena that feed morphology should be treated lexically. The natural analysis in frameworks like

4 Lexical Integrity in recent LFG publications

Asudeh, Dalrymple & Toivonen’s papers are about the concept of lexical integrity and about constructions. Asudeh and Toivonen (2014) replied to the target article by Müller and Wechsler (2014a) and pointed out (again) that their template approach makes it possible to specify the functional structure of words and phrases alike. In the original paper they discussed the Swedish word vägen, which is the definite form of vädg ‘way’. They showed that the f-structure is parallel to the f-structure for the English phrase the way. I think the reply by Asudeh and Toivonen missed the point of the criticism. Müller & Wechsler did not criticize the template-based approach as such, they just pointed out that a complete theory of natural language(s) has to deal with morphology and that it has to explain how morphological phenomena that refer to valence information can be handled. It is not sufficient to be able to provide the f-structure of words, the question is how this f-structure can be systematically related to the parts of the words in a morphological analysis. More generally speaking, one wants to derive all properties of the involved words, that is, their valence, their meaning, and the linking of this meaning to their dependents. What we used in our argument was parallel to what Bresnan used in her classical argument for a lexical treatment of passive. So either Bresnan’s argument (and Müller & Wechsler’s) is invalid or both arguments are valid and there is a problem for phrasal template-based approaches to argument structure constructions and for phrasal approaches to argument structure constructions that assume lexical integrity in general. I want to give another example that was already discussed in Müller, 2006, p. 869 but was omitted in Müller and Wechsler, 2014a due to space limitations. I will first point out why this example is problematic for phrasal approaches and then explain why it is not sufficient to be able to assign certain f-structures to words: In (32a), we are dealing with a resultative construction. According to the common phrasal approach, which we termed the plugging approach, the resultative meaning is contributed by a phrasal construction into which the verb fischt is inserted (Goldberg 1995; Goldberg and Jackendoff 2004; Christie 2010). There is no lexical item that requires a resultative predicate as its argument. If no such lexical item exists, then it is unclear how the relation between (32a) and (32b) can be established:

(32) a. [dass] jemand die Nordsee leer fischt that somebody.NOM the.ACC North.Sea empty fishes

b. wegen der Leerfischung der Nordsee5 because of the empty fishing of the North.Sea
‘because of the fishing that resulted in the North Sea being empty’

As Figure 3 on the following page shows, both the arguments selected by the heads and the structures are completely different. In (32b), the element that is the subject of the related con-

5Example from the national newspaper taz, 20.06.1996, p. 6.
Struction in (32a) is not realized. As is normally the case in nominalizations, it is possible to realize it in a PP with the preposition durch ‘by’:

(33) wegen der Leerfischung der Nordsee durch die Anrainerstaaten
because of the empty.fishing of.the North.Sea by the neighboring.countries
‘because of the fishing by the neighboring states that resulted in the North Sea being empty’

If one assumes that the resultative meaning comes from a particular configuration in which a verb is realized, there would be no explanation for (32b) since no verb is involved in the analysis of this example. One could of course assume that a verb stem is inserted into a construction both in (32a) and (32b). The inflectional morpheme -t and the derivational morpheme -ung as well as an empty nominal inflectional morpheme would then be independent syntactic components of the analysis. However, since Goldberg (2003, p. 119) and Asudeh et al. (2013) and Asudeh and Toivonen (2014) assume lexical integrity, only entire words can be inserted into syntactic constructions and hence the analysis of the nominalization of resultative constructions sketched here is not an option for them.

It would also be possible to assume that both constructions in (34), for which structures such as those in Figure 3 would have to be assumed, are connected via metarules.6

(34) a. [ Sbj Obj Obl V ]

The construction in (34b) corresponds to Figure 4 on the next page.8 The genitive NP is an argument of the adjective. It has to be linked semantically to the subject slot of the adjective.

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6LFG does not assume transformations or metarules, but such an extension would be necessary if one insisted on the phrasal analysis. For instance, Goldberg (p.c. 2007, 2009) suggests connecting certain constructions using GPSG-like metarules. Note also that GPSG metarules relate phrase structure rules, that is, local trees. The structure in Figure 4, however, is highly complex. The question of relating certain configurations will be discussed again in Section 5, which deals with missing language-internal generalizations and transformations in the sense of transformational grammar.

7The structure in (34b) violates a strict interpretation of lexical integrity as is commonly assumed in LFG. Under the LFG view it is not allowed to access the internal structure of words. Booij (2005, 2009), working in Construction
Alternatively, one could assume that the construction only has the form [Adj V -ung ], that is, that it does not include the genitive NP. But then, one could also assume that the verbal variant of the resultative construction has the form [OBL V] and that Sbj and Obj are only represented in valence lists. This would almost be a lexical analysis, however.

Turning to lexical integrity again, I want to point out that there seem to be just two options for template-based approaches to resultatives to deal with nominalizations like the one in Figure 4. Either they go for a lexical approach and assign the template to the combination of adjective and verb and hence admit that the genitive argument is licensed lexically and not by a phrasal construction or they assume that the template is attached to the N in the rule that combines N and NP[gen]. The template would say that the N may contribute a resultative meaning and an appropriately linked genitive argument. What is needed, however, is a principled account of how the f-structure of the N comes about and how it is related to the resultative construction at the sentence level. One could of course claim that the RESULTATIVE template applies to N and since the -ung affix is resource sensitive it consumes certain semantic resources and adds others (the trick that was used in the BENEFACATIVE template). Such templates that remap predicates to take different resources are equivalent to postponed lexical rules. Note though that this analysis would require the stipulation of an optional RESULTATIVE template at the N node, basically saying: there may be a resultative construction deeply embedded somewhere inside of the N. Remember that Leerfischbarkeit ‘empty.fish.able.ity’ with embedding of the resultative construction under a modal affix is possible. The point is that nothing is known about the internal structure of the N if we assume lexical integrity and speculating about possible resultative constructions inside the N is mere guesswork. Since resultative constructions are not the only argument structure sensitive constructions that interact with nominalization, one would have to specify all possible interactions as a big disjunction at the N node. A rather unattractive conse-

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Grammar, subscribes to a somewhat weaker version, however. This weaker view could also be adopted in LFG.

I do not assume zero affixes for inflection. The respective affix in Figure 4 is there to show that there is structure. Alternatively one could assume a unary branching rule/construction as is common in HPSG/Construction Morphology (Riehemann 1993; 1998; Booij 2010).
quence. Note further that the BENEFACTIVE template refers to the \( \sigma \) structure of its mother node. For Leerfischbarkeit this would be a nominal structure containing the modal operator and not the ARG\(_2\) and ARG\(_3\) that the template refers to. The general problem is that embedding is needed to account for morphological derivations and that inheritance fails to capture this (Krieger and Nerbonne, 1993). The inherited information may be relevant at different levels of embedding (e.g., no embedding in the verb phrase where the template refers to the \( \sigma \) structure of the mother directly and some embedding in the derived noun). The general problem was also discussed by Müller (2006, Section 5.3; 2010) in more detail. See also Müller, 2016a.

In lexical approaches a verbal stem for *fisch*- selecting for a subject argument would be related to a verbal stem *fisch*- that selects for a subject, an object and a result predicate. This stem can be nominalized by normal nominalization rules. The nominalization rules take care of the realization of the verbal arguments as genitive NPs. This is the normal realization of arguments in nominalizations and it is completely independent of the resultative construction.

5 Missing Generalizations: Active passive alternations

In this section, I want to show that Asudeh, Giorgolo & Toivonen’s approach to the phrasal introduction of benefactives either does not need to be stated at the phrasal level since the phrasal construction does not contribute relevant information or that the approach misses generalizations regarding the configurations for active and passive.

(35a) is an example of the latter construction.

(35)  
a. The performer sang the children a song.  
b. The children were sung a song.

According to the authors, the noun phrase *the children* is not an argument of *sing* but contributed by the c-structure rule that optionally licenses a benefactive.

(36) \[ V' \rightarrow V \quad \text{DP} \quad \text{DP} \quad \text{DP} \quad \text{DP} \]

\[ \uparrow = \downarrow \quad (\uparrow \text{OBJ}) = \downarrow \quad (\uparrow \text{OBJ}_0) = \downarrow \]

( @BENEFACTIVE )

Whenever this rule is called, the template BENEFATIVE can add a benefactive role and the respective semantics, if this is compatible with the verb that is inserted into the structure. The authors show how the mappings for the passive example in (35b) work, but they do not provide the c-structure rule that licenses such examples. Unless one assumes that arguments in (34) can be optional (see below), one would need a c-structure rule for passive VPs and this rule has to license a benefactive as well.\(^9\) So it would be:

(37) \[ V' \rightarrow V[\text{pass}] \quad \text{DP} \quad \text{DP} \]

\[ \uparrow = \downarrow \quad (\uparrow \text{OBJ}_0) = \downarrow \]

( @BENEFACTIVE )

Note that a benefactive cannot be added to just any verb: Adding a benefactive to an intransitive verb as in (38a) is out and the passive that would correspond to (38a) is ungrammatical as well, as (38b) shows:

(38)  a. *He laughed the children.
     b. *The children were laughed.

The benefactive template would account for the ungrammaticality of (38) since it requires an ARG2 to be present, but it would admit the sentences in (39b–c) since give with prepositional object has an ARG2 (Kibort, 2008, p. 317).

(39)  a. He gave it to Mary.
     b. *He gave Peter it to Mary.
     c. *Peter was given it to Mary.

So, if the c-structure is to play a role in argument structure constructions at all, one could not just claim that all c-structure rules optionally introduce a benefactive argument. Therefore there is something special about the two rules in (34) and (35). The problem is that there is no relation between these rules. They are independent statements saying that there can be a benefactive in the active and that there can be one in the passive. This is what Chomsky (1957, p. 43) criticized in 1957 with respect to simple phrase structure grammar and this was the reason for the introduction of transformations. Bresnan-style LFG captured the generalizations by lexical rules and later by lexical rules in combination with Lexical Mapping Theory (Toivonen, 2013). But if elements are added outside the lexical representations, the representations where these elements are added have to be related too. One could say that our knowledge about formal tools has changed since 1957. We now can use inheritance hierarchies to capture generalizations. So one can assume a type (or a template) that is the supertype of all those c-structure rules that introduce a benefactive. But since not all rules allow for the introduction of a benefactive element, this basically amounts to saying: c-structure rule A, B, and C allow for the introduction of a benefactive. In comparison lexical rule-based approaches have one statement introducing the benefactive. The lexical rule states what verbs are appropriate for adding a benefactive and syntactic rules are not affected.

Asudeh (p. c. 2016) and an anonymous reviewer of HeadLex16 pointed out to me that the rules in (34) and (35) can be generalized over if the arguments in (34) are made optional. (40) shows the rule in (34) with the DPs marked as optional by the brackets enclosing them.

(40)  \[ \begin{align*}
    \text{V}' & \rightarrow \text{V} \quad (\text{DP}) \quad (\text{DP}) \\
    \uparrow & = \downarrow & (\uparrow \text{OBJ}) & = \downarrow & (\uparrow \text{OBJ}_0) & = \downarrow \\
    \text{V}' & \rightarrow \text{V} \quad \text{DP} \\
    \uparrow & = \downarrow & (\uparrow \text{OBJ}_0) & = \downarrow \\
\end{align*} \]

Since both of the DPs are optional (40) is equivalent to a specification of four rules, namely (34) and the three versions of the rule in (41):

(41)  a. \[ \begin{align*}
    \text{V}' & \rightarrow \text{V} \quad \text{DP} \\
    \uparrow & = \downarrow & (\uparrow \text{OBJ}_0) & = \downarrow \\
\end{align*} \]
b. \[ V' \rightarrow V \quad \text{DP} \]
\[ \uparrow = \downarrow \quad (\uparrow \text{OBJ}) = \downarrow \]
( @BENEFACTIVE )

c. \[ V' \rightarrow V \]
\[ \uparrow = \downarrow \]
( @BENEFACTIVE )

(41a) is the variant of (38) in which the OBJ is omitted, (41b) is the variant in which the OBJ is omitted and in (41c) both DPs are omitted. Hence, (38) can be used for V's containing two objects and for V's in the passive containing just one object. The template-based approach does not overgenerate since the benefactive template is specified such that it requires the verb it applies to to select for an ARG2. Since intransitives like laugh do not select for an ARG2 a benefactive cannot be added. So, in fact the actual configuration in the c-structure rule does only play a minor role: the account mainly relies on semantics and resource sensitivity. There is one piece of information that is contributed by the c-structure rule: it constrains the grammatical functions of ARG2 and ARG3, which are underspecified in the template definitions for ARG2 and ARG3 (see the discussion on page 8). ARG2 can be realized as SUBJ or as OBJ. In the active case ARG1 will be the SUBJ and because of function argument bi-uniqueness (Bresnan et al., 2015, p. 334) no other element can be the SUBJ and hence ARG2 has to be an OBJ. ARG3 can be either an OBJ or an OBJ. Since ARG2 is an OBJ in the active, ARG3 has to be an OBJ in the active. In the passive case ARG1 is suppressed or realized as OBL. ARG2 will be realized as SUBJ (since English requires a SUBJ to be realized) and ARG3 could be realized as either OBJ or OBJ. This is not constrained by the template specifications so far. Because of the optionality in (38), either the OBJ or the OBJ function could be chosen for ARG3. This means that either Lexical Mapping Theory has to be revised or one has to make sure that the c-structure rule used in the passive of benefactives states the grammatical function of the object correctly. Hence one would need the c-structure rule in (35) and then there would be the missing generalization I pointed out above.

If one finds a way to set up the mappings to grammatical functions without reference to c-structures in lexical templates, this means that it is not the case that an argument is added by a certain configuration the verb enters in. Since any verb may enter (41) and since the only important thing is the interaction between the lexical specification of the verb and the benefactive template, the same structures would be licensed if the benefactive template were added to the lexical items of verbs directly. The actual configuration would not constrain anything. All (alleged) arguments from language acquisition and psycholinguistics (for an overview of such arguments see Müller and Wechsler, 2014a,b) for phrasal analyses would not apply to such a phrasal account.

If the actual c-structure configuration does not contribute any restrictions as to what arguments may be realized and what grammatical functions they get, the difference between the lexical use of the benefactive template or the phrasal introduction as executed in (38) is really minimal. However, there is one area in grammar where there is a difference: coordination. As Müller and Wechsler (2014a, Section 6.1) pointed out, it is possible to coordinate ditransitive verbs with verbs that appear together with a benefactive. (42a) is one of their examples and (42b) is an additional example:
(42) a. She then offered and made me a wonderful espresso — nice.\(^\text{10}\)

b. My sisters just baked and gave me a nutella cupcake with mint chocolate chip ice-cream in the middle and milk chocolate frosting on top.\(^\text{11}\)

If the benefactive information is introduced at the lexical level the coordinated verbs basically have the same selectional requirements. If the benefactive information is introduced at the phrasal level \textit{baked} and \textit{gave} are coordinated and then the benefactive constraints are imposed on the result of the coordination by the c-structure rule. While it is clear that the lexical items that would be assumed in a lexical approach can be coordinated in a symmetric coordination, problems seem to arise for the phrasal approach. It is unclear how the asymmetric coordination of the mono- and ditransitive verbs can be accounted for and how the constraints of the benefactive template are distributed over the two conjuncts.

The next section deals with German and explains in detail why cross-linguistic generalizations are not captured in the phrasal approach, but I want to mention two phenomena here since they are relevant to the point of missing language internal generalizations. As was shown in Section 4 on morphology, there is interaction between the resultative construction and nominalizations, which cannot be captured by inheritance. Similarly there are prenominal adjectival phrases in German that include resultatives and/or benefactives (Section 3, Section 6.1.3). For these phenomena the interaction of the respective constructions follows immediately from a lexical approach while the interaction has to be stated on a case by case basis on the template-based phrasal approach. So, while the passive example above may be dealt with by underspecification, e.g., optionality of arguments, this is not possible for the nominalization structures since the syntax of NPs is really different from the syntax of verb phrases. In a phrasal world, transformations or meta-rules would be needed to capture the relation between the verbal and the nominal structures. Note that GPSG-style metarules relate local trees, that is, trees of depth one. The structure for the noun phrase in Figure 4 is more elaborate. This means that transformations with their full power would be needed to relate this structure to verbal structures. Such powerful transformations were abandoned in all branches of linguistics a long time ago (Chomsky, 1981).

In summing up this section, it can be said that either the c-structure configurations do not contribute any constraints that are relevant for the analysis of argument structure constructions apart from the \textsc{benefactive} template itself or they do and then there is a missing generalization since active and passive c-structures are unrelated.

To relate the c-structure rules or complete trees, one would need meta-rules or transformations, respectively. No such devices are needed in lexical approaches, in which complex structures are licensed by valence information of lexical items and abstract rules or schemata. Rather than relating rules that license certain structures or relating certain structures directly, lexical items are related by lexical rules.


\(^{11}\)http://bambambambii.tumblr.com/post/809470379.05.06.2012.
6 Crosslinguistic generalizations

In Müller and Wechsler (2014a) we argued that the approach to Swedish caused motion constructions by Asudeh, Dalrymple, and Toivonen (2008, 2013) would not carry over to German since the German construction interacts with derivational morphology. Asudeh and Toivonen (2014) argued that Swedish is different from German and hence there would not be a problem. However, the situation is different with the benefactive construction and with resultative constructions. Although English and German do differ in many respects, both languages have similar benefactive and resultative constructions.

In the following subsections I discuss the properties of these constructions in detail and show that a lexical account works for both German and English while a phrasal account does not extend to less configurational languages like German.

6.1 The benefactive construction

German has a benefactive construction that is rather similar to the English construction.

(43) a. He baked her a cake.
    b. Er buk ihr einen Kuchen.

German differs from English in having a dative case and this affects phenomena like passivization, but in general the constructions are similar enough to make it worthwhile to look for crosslinguistic generalizations. In what follows, I look at ways to account for constituent structure in German and show that all imaginable ways are incompatible with approaches that assume that arguments are introduced in certain configurations.

6.1.1 Binary branching structures

The analysis of the free constituent order in German was explained by assuming binary branching structures in which a VP node is combined with one of its arguments or adjuncts (see Berman 1996, Section 2.1.3.1; 2003 and also Choi, 1999). For instance, Berman (2003, p. 37) assumes the analysis depicted in Figure 5. The c-structure rule for VP-argument combinations is provided in (44):

(44) $\text{VP} \rightarrow \text{DP} \quad \text{VP} \\
\quad (\uparrow \text{SUBJ} | \text{OBJ} | \text{OBJ}_b) = \downarrow \quad \uparrow = \downarrow$

The dependent elements contribute to the f-structure of the verb and coherence/completeness ensure that all arguments of the verb are present. One could add the introduction of the benefactive argument to the VP node of the right-hand side of the rule as in (45):

(45) $\text{VP} \rightarrow \text{DP} \quad \text{VP} \\
\quad (\uparrow \text{SUBJ} | \text{OBJ} | \text{OBJ}_b) = \downarrow \quad \uparrow = \downarrow \\
\quad (\@\text{BENEFACTIVE})$
However, since the verb-final variant of (41b) would have the structure in (46), one would get spurious ambiguities, since the benefactive could be introduced at any of the three VP nodes in (46), one would get three analyses with exactly the same semantics.

(46) weil [VP er] [VP ihr] [VP einen Kuchen [VP [V bunk]]]]
    because he.NOM her.DAT a.ACC cake baked

So the only way to avoid this seems to be to introduce the benefactive at the rule that got the recursion going, namely the rule in (47), that projects the lexical verb to the VP level.

(47) VP $\rightarrow$ (V)
    $\uparrow$ = $\downarrow$

But this unary branching rule is almost a lexical rule. The only difference is again the interaction of the rule with coordination that was discussed with respect to the examples in (40).

Note that there is a further problem for the template-based approach. The traceless approach to the verb position in German developed by Berman (2003) assumes that the verb is optional in (47). The optionality is marked by enclosing the V in brackets. Because of the optionality, there is nothing to attach the benefactive template to. Even if one would change the notational schema of LFG and allow for the attachment of f-structure constraints to mother nodes this would not solve the problem since a principle that is called Economy of Expression (Bresnan 2001, p. 81; Bresnan, Asudeh, Toivonen, and Wechsler 2015, p. 90) removes/avoids nodes without daughters. The verb-initial variant of (44) is given in Figure 6. There is no verbal node to which one can attach the benefactive template and introducing it at the C node seems counter-intuitive. The natural place for it to be introduced is the verb though since it has to be realized somewhere in

\[12\text{"All syntactic phrase structure nodes are optional and are not used unless required by independent principles (completeness, coherence, semantic expressivity)." (Bresnan et al., 2015, p. 90)}\]
Figure 6: Left: Analysis of German verb-initial clauses in a co-head approach with empty nodes removed because of Economy of Expression according to Berman (2003, p. 41). Right: Analysis with VP introducing the benefactive template

the sentence. This is of course the lexical approach. Of course one could insist on introducing constraints regarding a benefactive argument at the projection in (45). For instance, one could assume that the V is optional and that the annotation is made at the VP. The result would be the structure at the right in Figure 6. The V is omitted, but the VP node has to be there since it contributes the benefactive constraints. So whether there are verb traces or not would depend on the presence of argument structure changing elements in the clause, a highly counter-intuitive outcome. Again, if the information about the benefactive argument is introduced lexically, the left structure in Figure 6 can be assumed and no additional assumptions are necessary.

As an alternative to introducing the benefactive template at a V or VP node, one could assume that the dative DP introduces the benefactive. Berman (2003) develops an analysis in which grammatical functions are assigned via implicational constraints that infer the grammatical function from the case of an NP/DP. Figure 7, which is a simplified version of the figure she discusses on p. 37, shows the implicational constraints and that they are attached to certain phrase structure positions. This proposal was criticized in Müller (2016c, Section 7.4) since case in German cannot be unambiguously related to grammatical functions. In the case at hand the presence of a dative could be used to infer the grammatical function of a benefactive argument and hence find a natural place for the attachment of the benefactive template. However, the situation is not as simple as it first may appear. In examples like (48a) we have a so-called dative passive. The dative object is promoted to subject and hence gets nominative. When verbal projections are embedded under AcI verbs, their subject is realized as accusative. (48b) shows an example of the embedding of the benefactive construction under an AcI verb in which the benefactive argument is realized as accusative. Finally, the nominalization in (48c) shows that the benefactive argument can be realized in the genitive as well.
Figure 7: Correspondence between case and grammatical function according to Berman (2003, p. 37)

(48) a. Der Mann bekam einen Kuchen gebacken.
the.NOM man got a.ACC cake baked

b. Peter ließ den Mann einen Kuchen gebacken bekommen und kümmerte sich nicht darum.
Peter let the.ACC man a.ACC cake baked get and cared

‘Peter permitted that the man got a cake baked and did not care about this.’

c. Das Kuchen-gebacken-Bekommen der Männer nervt mich.
the cake-backed-get the.GEN men nerve me

‘The getting cake baked of the men annoys me.’

This can be accounted for straightforwardly in a lexical approach in which the dative is a dependent of backen. Either a lexical rule or the auxiliary verb takes care of the fact that the dative argument has to be realized as nominative in dative-passive constructions like (48a) (see Müller, 2002, Section 3.2.3 for details of an auxiliary-based approach in HPSG). When dative-passives are embedded under AcI verbs, the subject becomes the object of the AcI verb and hence receives accusative. And finally, arguments with structural case that are realized in nominal environments get genitive as in (48c). Nothing special has to be stipulated in the lexical approach. A phrasal approach that wants to assign semantic roles based on dative case is lost though.

Note also that the dative can be fronted over clause boundaries:

(49) Dieser Frau hat er behauptet, nie einen Kuchen zu backen.
this.DAT woman has he.NOM claimed never a.ACC cake to bake

‘He claimed that he never bakes this woman a cake.’

A simple model that adds an OBJ to the f-structure in which a dative appears would fail here
since the OBJ belongs into the f-structure of *backen* rather than into the f-structure of *behauptet*. This is due to the fact that the benefactive is extracted and not realized within the VP with the appropriate f-structure (*nie einen Kuchen zu backen* ‘never a cake to bake’). The situation is depicted in Figure 8 on the next page. So one would either have to assume a dative trace in the *backen* VP, something that is usually not done, or functional uncertainty (Kaplan and Zaenen, 1989) would be needed to find the right f-structure or σ structure. This means that benefactive arguments have to “know” where they could come from. This is an unwanted consequence since the treatment of nonlocal dependencies should be independent of the benefactive construction.

### 6.1.2 Flat structures

A reviewer of HeadLex2016 suggested that flat structures could be assumed for German as well. The first problem with this is that most authors working in HPSG and LFG follow Haider (1993) in assuming that there is no IP/VP separation in German. For finite verbs it is assumed that subjects are realized in the verbal domain just like other arguments are (Berman, 2003, Section 3.2.2, Section 3.2.3; Zaenen and Kaplan, 2002, p. 412). So for German one would have to assume a c-structure rule that includes the subject (as Zaenen and Kaplan, 2002, p. 412 do) and hence would have a rule that differs from the c-structure rule for English. A missed generalization.\(^\text{13}\)

\(^{13}\text{In a HPSG setting this would not be a problem since subjects of finite verbs are treated as complements and one could use a flat schema that combines the verb with all complements. The same schema would work for English VPs and German finite clauses. See Müller, 2016b.}\)
Adjuncts  Furthermore, German differs from English in allowing adjuncts to appear everywhere between the arguments of a verb. So, all of the following sentences are possible:

(50) a. dass der Mann seiner Frau den Kuchen morgen bäckt
   that the man his wife the cake tomorrow bakes
   ‘that the man will bake his wife the cake tomorrow’

   b. dass der Mann seiner Frau morgen den Kuchen bäckt
   that the man his wife tomorrow the cake bakes
   ‘that the man will bake his wife the cake tomorrow’

   c. dass der Mann morgen seiner Frau den Kuchen bäckt
   that the man tomorrow his wife the cake bakes
   ‘that the man will bake his wife the cake tomorrow’

   d. dass morgen der Mann seiner Frau den Kuchen bäckt
   that tomorrow the man his wife the cake bakes
   ‘that the man will bake his wife the cake tomorrow’

As Uszkoreit (1987) has shown, all adjunct positions can be filled simultaneously and it is also possible to have more than one adjunct per adjunct position. The modified flat c-structure would look as in (51):

(51) \[ V' \to \begin{array}{ccc}
        & \text{XP*} & \text{(DP)} \\
        \downarrow & \in (\uparrow \text{ADJ}) & \hspace{1em} \downarrow & \in (\uparrow \text{ADJ}) & \hspace{1em} \downarrow & \in (\uparrow \text{OBJ}) & \hspace{1em} \downarrow \\
        \text{XP*} & \text{(DP)} & \text{XP*} & \text{(V)} \\
        \downarrow & \in (\uparrow \text{ADJ}) & \hspace{1em} \downarrow & \in (\uparrow \text{OBJ}_0) & \hspace{1em} \downarrow & \in (\uparrow \text{ADJ}) & \hspace{1em} \uparrow & = & \downarrow \\
        \end{array} \]

The ‘*’ stands for arbitrarily many repetitions. While this rule works for German, it is inappropriate for English. One could say that English has a more specific version of this rule, namely a rule in which the number of possible adjuncts is specified to be zero. This would beg the question though how the more general rule could play a role in the grammar of English. One would have to stipulate that the language acquisition process somehow involves rules like (51) but the English speaking children have to find out that they cannot use adjuncts in the respective slots. This is implausible if one does not want to assume that rules like (51) are innate and language learners derive more specific instances from them. So, again there are differences in the grammars of German and English that prevent phrasal approaches from capturing the commonalities of argument structure constructions.

Scrambling  German differs from English in allowing for almost free orderings of arguments. This also affects benefactives as is shown by (52):

(52) a. dass der Mann seiner Frau einen Kuchen bäckt
   that the man his wife a cake bakes
   ‘that the man bakes his wife a cake’

   b. dass der Mann einen Kuchen seiner Frau bäckt
   that the man a cake his wife bakes
   ‘that the man bakes his wife a cake’
c. dass dieser Frau jeder Mann einen Kuchen bäckt
   that this woman every man a cake bakes
   ‘that every man bakes this woman a cake’

d. dass dieser Frau solchen Kuchen niemand bäckt
   that this woman such.a cake nobody bakes
   ‘that nobody bakes this woman such a cake’

e. dass einen Kuchen dieser Frau niemand bäckt
   that a cake this woman nobody bakes
   ‘that nobody bakes this woman a cake’

f. dass einen Kuchen niemand dieser Frau bäckt
   that a cake nobody this woman bakes
   ‘that nobody bakes this woman a cake’

This can be captured by either stating six c-structure rules that all involve the benefactive template or by using just one c-structure rule that does not specify the grammatical functions of the involved DPs. See Zaenen and Kaplan, 2002, p. 413 for the latter approach.\(^\text{14}\) In any case the c-structure rule or rules would differ from what was assumed for English and there would be no way to capture the generalization.

**Verbal complexes** Apart from these differences between English and German, phrasal accounts are challenged by the fact that the verb may be separated from the benefactive DP/NP by an auxiliary:

\[(53)\]
\[
dass er ihr einen Kuchen wird backen müssen
   that he.NOM her.DAT a.ACC cake will bake must
   ‘that it will be necessary for him to bake her a cake’
\]

Sentences like (53) are usually analyzed by assuming that *backen* and *müssen* form a verbal complex, which is in turn embedded under the future auxiliary *wird* (Bech 1955; Hinrichs and Nakazawa 1989, 1994; Haider, 1990; Kiss 1995; Meurers 1999a; Kathol 2001; Müller 1999, 2002; Berman 2003, Section 3.2.4; Forst and Rohrer 2009). The complete verbal complex is combined with *einen Kuchen, ihr* and *er*. There have been proposals for a flat analysis of sentences containing a verbal complex (Bouma and van Noord, 1998) but these relied on argument attraction and suggested a very general dominance schema. Of course one could (optionally) add the benefactive template to a very general schema but this solution would not be an implementation of the pattern-based constructional approaches in which it is assumed that certain specific configurations license the introduction of specific arguments.

Note that the benefactive template cannot be attached to the VP node or to the dative DP. The benefactive template would add arguments to the \(\sigma\)-structure of *wird since backen* is embedded under *wird* and *müssen*. *wird* introduces a tense relation and *müssen* a modal operator. Depending on the analysis of the semantic structure the ARG\(_2\) and ARG\(_3\) referred to in the

\[^{14}\text{A simplified version of Zaenen & Kaplan’s rule is given in Footnote 17. Their rule only deals with NPs/DPs. German also allows for the scrambling of PPs, APs, VPs and even CPs. So the category and the grammatical functions that are assigned in such a general rule for the German clause have to be more inclusive.}\]
BENEFACTIVE template would end up in the $\sigma$ structure of *wird* or *müssen* rather than in the $\sigma$ structure of *backen*.\(^{15}\)

To make things even more complicated for the phrasal account, the verbal complexes can be coordinated. (54) illustrates:

(54) dass er ihr einen Kuchen wird backen müssen oder hat backen sollen

‘that it will be necessary for him to bake her a cake or that he should bake her a cake’

Such sentences can be accounted for easily if one assumes that *wird backen müssen* and *hat backen sollen* form verbal complexes which are then coordinated and finally combined with the other NPs/DPs in the sentence. The structure for (51) with a flat VP including the subject is given in Figure 9.\(^{16}\)

Bresnan et al. (1982) developed an account of cross-serial dependencies that explains sentences like (55) by assuming that objects and prepositional objects are part of a verbless VP with the verb being realized in the verbal complex.

(55) dat Jan Piet Marie de kinderen zag helpen laten zwemmen

‘that Jan saw Piet help Marie make the children swim’

Since both the content of the verbless VP and the respective verb in the verbal complex are mapped to the same f-structure (the VCOMP value of the respective mother node), the objects are mapped to the correct f-structure. Since there is a VP in this account one could be tempted to believe that this account could be extended to German and a resultative or benefactive VP could be assumed for German, which would make the argument above irrelevant.

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\(^{15}\)This is not a problem for grammatical functions in f-structures since raising predicates are assumed to have additional slots for raised arguments, but this should not be the case for semantic representations.

\(^{16}\)This structure is equivalent modulo node names to what Zaenen & Kaplan’s rules (2002, p. 413) would license. Zaenen & Kaplan’s rule incorporate a linearization constraint that prevents orders in the verbal complex in which the governing verb is not final. So they exclude so-called Auxiliary Flip. But this can be fixed easily.
I do not want to discuss the details of Bresnan et al.’s proposal here but simply want to point out that it would not extend to German since, first, subjects can be scrambled with other arguments so a VP without the subject would not be an appropriate unit to begin with and, second, subjects of higher verbs may be scrambled with objects of embedded verbs, as is demonstrated by the examples in (56):

(56) a. dass den Mann seiner Frau solchen Kuchen niemand backen sah
    that the.ACC man his.DAT wife such.ACC cake nobody.NOM bake saw
    ‘that nobody saw the man bake his wife such a cake’

b. dass den Mann niemand seiner Frau solchen Kuchen backen sah
    that the.ACC man nobody.NOM his.DAT wife such cake bake saw
    ‘that nobody saw the man bake his wife such a cake’

c. dass solchen Kuchen niemand den Mann seiner Frau backen sah
    that such.ACC cake nobody.NOM the.ACC man his.DAT wife bake saw

These are three examples that exemplify the phenomenon but in principle all permutations of arguments belonging to verbs of a verbal complex are possible. Of course there are problems with arguments of the same case when there is not sufficient context information to resolve which argument fills which role, but this is also the case with simplex verbs. See Müller, 1999, Section 11.4 for discussion.

The point about these examples is that unless one is willing to include the subject of AcI verbs among the daughters of a very flat phrase structure rule there is no way to model sentences like (56) with a flat rule for benefactives like (38) or (49) and continuous constituents.\footnote{The rule in (i) is an adapted version of the rule that Zaenen and Kaplan (2002, p. 413) use to describe sentences with verbal complexes:}

\begin{align*}
\text{(i)}\quad \text{VP} & \rightarrow \text{DP}^* \quad (V^*) \\
& \quad (\uparrow \text{COMP}^* \text{ NGF}) = \downarrow \quad \uparrow = \downarrow
\end{align*}

The ‘*’ after the DP symbol means that there can be arbitrarily many DPs. The grammatical function that is filled by the DPs is not specified. It is just specified that the DP has to fill a NGF, where NGF stands for nominal grammatical function, that is SUBJ, OBJ, OBJ2, . . . . The COMP* ensures that the specification of the nominal grammatical function can reach any feature structure at the end of a path of several COMPs. This solves the problem that \text{einen Kuchen} in (51) is the object of \text{backen}. By using the functional uncertainty it is possible to assign the OBJ function to the f-structure of \text{backen}. But note that this schema is very general. Mentioning benefactives on either the DP or the \text{V'} would not capture the constraints that are supposed to be associated with a constructional pattern for benefactives. Independent of where the benefactive template is introduced one would need functional uncertainties to find an appropriate verb in the verbal complex.

Note furthermore that Zaenen & Kaplan’s rule is too simple. Their rule and the version provided here only admits NPs/DPs before the verbal complex but German allows for NPs, PPs, APs and even VPs and CPs and there is no fixed order of these elements. So rather than specifying DP* and appropriate grammatical function assignments, one would have to specify (DP|PP|AP|VP|CP)* and appropriate grammatical functions.

In any case the idea of isolating a constructional pattern for benefactives would not be captured by such a proposal and again the rule in (i) and possible adaptations are very different from the c-structure rule for English.
Coordination, fronting and partial structures  Forst and Rohrer (2009) assume a flat VP for German to account for certain coordination structures. However, their theory of coordination assumes partial VPs. In the analysis of (57), the VP seiner Frau buk ‘his wife baked’ would be coordinated with seiner Tochter zeigte ‘his daughter showed’.

(57) dass er den Kuchen [seiner Frau buk] und [seiner Tochter zeigte]
      that he.NOM the.ACC cake his.DAT wife baked but his.DAT daughter showed
      ‘that he baked his wife a cake and showed it to his daughter’

These partial VPs are parallel to the VPs in approaches with binary branching. Any LFG analysis of German has to admit such partial VPs since German allows for partial VP fronting:

(58)  a. [Seiner Frau backen] würde er solche Kuchen niemals.
       his.DAT wife bake would he.NOM such.ACC cakes never
       ‘He would never bake such cakes for his wife.’

   b. [Solche Kuchen backen] würde er seiner Frau niemals.
      such.ACC cakes bake would he.NOM his.DAT wife never

   c. [Backen] würde er seiner Frau solche Kuchen niemals, kaufen schon.
      bake would he.NOM his.DAT wife such.ACC cakes never buy PART
      ‘He would never bake his wife such a cake, but he would buy one.’

Hence the idea that the benefactive is introduced in a special phrase structural configuration together with a verb and all other objects would not work for German. See Nerbonne (1986) and Johnson (1986), who introduced lexical valence representations in a Categorial Grammar style into GPSG since there was no way to make the phrasal GPSG approach compatible with German partial VP fronting data.

6.1.3 Other environments

Note also that benefactive datives appear in adjectival environments as in (60):

(60)  a. der seiner Frau einen Kuchen backende Mann
       the his.DAT wife a.ACC cake baking man
       ‘the man who is baking a cake for his wife’

\[ Again see Zaenen and Kaplan, 2002 for an account of partial VP fronting in German in the framework of LFG. \]
b. der einen Kuchen seiner Frau backende Mann
   the a.ACC cake his.DAT wife baking man
   'the man who is baking a cake for his wife'

The examples in (60) show that the arguments of backende may be scrambled, as is common in verbal environments.

In order to account for these datives one would have to assume that the adjective to AP rule that would be parallel to (45) introduces the dative. The semantics of the benefactive template ensures that the benefactive argument is not added to intransitive verbs like lachen ‘to laugh’ or participles like lachende ‘laughing’. While this is a possible analysis, I find the overall approach unattractive. First, it does not have anything to do with the original constructional proposal but just states that the benefactive may be introduced at several places in syntax. Second, the unary branching syntactic rule is applying to a lexical item and hence is very similar to a lexical rule. Third, the analysis does not capture cross-linguistic commonalities of the construction. In a lexical rule-based approach such as the one that was suggested by Briscoe and Copestake (1999, Section 5), a benefactive argument is added to certain verbs and the lexical rule is parallel in all languages that have this phenomenon. The respective languages just differ in the way the arguments are realized in respect to their heads. In languages that have adjectival participles, these are derived from the respective verbal stems. The morphological rule is the same independent of benefactive arguments and the syntactic rules for adjectival phrases do not have to mention benefactive arguments.

6.1.4 Summary

I showed in this section that it is not viable to introduce the benefactive argument in binary branching structures since there is no canonical place for doing so. Introducing it at the VP recursion results in spurious ambiguities. Introducing it at the rule that gets the recursion going is almost equivalent to the lexical approach and in any case it would not have anything to do with a specific configuration that licenses the construction. Making the benefactive template dependent on the presence of a DP/NP with a certain case fails for several reasons: first, the benefactive argument may be realized in various cases and, second, it may be realized far away from its canonical place and hence all constraints referring to the f-structure or the σ structure would potentially address wrong structures because of nonlocal dependencies. I furthermore showed that flat structures are not an option either since partial structures are needed for partial verb phrase fronting and coordination and in any case flat structures may be interrupted by verbal complexes that embed the main verb under modal operators, again leading to the inaccessibility of the relevant f-structures and σ structures.

The lexical approach adds information right at the place where the necessary information is accessible. None of the discussed problems affects the lexical approach.

6.2 Resultative constructions

Having discussed the benefactive construction, I now turn to Christie’s analysis of resultative constructions. Christie (2010) suggests the following c-structure rule for resultatives in English:
Christie claims that the result predicate cannot be extracted. According to her examples like (62) are ungrammatical (p. 157):

(62)  ? Pink, Kim dyed her hair.

She rates the example with a ‘?’ rather than an ‘*’, but examples of this kind have been frequently cited in the literature as well-formed and corpus examples can be found:

(63)  a. What Color Should You Dye Your Hair?\(^{19}\)

   b. How flat did John hammer the metal?\(^{20}\)

Examples like (62) and (63) are usually treated by functional uncertainty. The element that is extracted is declared to be optional in the c-structure. The f-structure slot is filled via a functional uncertainty equation. The problem with an optional result phrase in (62) is that (62) could be used to analyze simple verb phrases of strictly transitive verbs. This would result in two analyses of sentences with transitive verbs with exactly the same f-structure. A clearly unwanted result. Of course one could argue that the rule in (59) is supposed to cover both strictly transitive verbs and transitive verbs with a result predicate, but this would not capture the original constructional idea that the phrasal configuration somehow is connected to the meaning contributed by the pattern. The problem with result predicate extraction could be fixed by shifting the call to the RESULT-T template to the verb since the verb cannot be extracted. However, this shifting the template to the verb would not help in the case of German. German V2 and V1 clauses are usually analyzed as involving head-movement of the verb. C and V are treated as co-heads and the functional information is contributed by the finite verb in C rather than by an empty element in the VP. The analysis is shown in Figure 10. The consequence of this is that all elements that would be part of a resultative VP can in fact be realized outside of this VP: the subject, the object and the result can be extracted and the verb can be realized in C. To illustrate this, the elements that are missing from the VP are indicated by _\(i\) and _\(j\) in (64):

(64)  a. Peter, hämmert\(^{1}_j\) [\(VP:\_i\) das Metal flach \(_j\)].

   Peter hammers the metal flat

   b. Das Metal, hämmert\(^{1}_j\) [\(VP:\_i\) flach \(_j\)].

   the metal hammers Peter flat

   c. Flach, hämmert\(^{1}_j\) Peter [\(VP:\_i\) das Metal \(_j\)].

   flat hammers Peter the metal

Hence, there is no reliable element to attach the resultative template to. The only sensible option seems to be the extension of LFG’s c-structure annotation conventions: the resultative template would be added to the mother node of the VP.


\(^{20}\)Roberts, 1988, p. 115.
Furthermore, German differs from English in forming verbal complexes, as was already discussed in Section 6.1.2. Müller (2002, Section 5.1) argued that result adjectives should also be treated as part of the verbal complex. Hence, the structure of (65a) differs from the one of the corresponding English example.

(65) a. dass er das Metal flach hämmert
   b. that he hammers the metal flat

The respective structures are shown in Figure 11. As explained above, both the adjective and the verb and even adjective and verb simultaneously may be realized outside of the verbal complex, so there is no reliable element to attach the resultative template too. One could attach it to the mother node of the verbal complex but this would not include the object as in English or one could attach it to the VP dominating the object and the verbal complex but the latter proposal could not even enforce the presence of a result predicate of a certain category and a verb since adjective, verb and object are not in the same local tree.

In the lexical approach the template is combined with the verb directly both in German and in English (and other languages). The verb can be realized in C or in V. It contributes valence information to the f-structure that belongs to the V projection either as head or co-head and this
ensures that the result predicate and the object has to be present in the f-structure. Extracted elements are contributed to the f-structure via functional uncertainty.

Concluding this subsection it can be said that the fact that result adjectives form a verbal complex in German while they are part of the VP in English could not be covered if the use of templates required similar structures cross-linguistically. The lexical approach, on the other hand, does not have problems since the lexicon just states which arguments are needed leaving the actual realization to the syntax, which may be different from language to language.

6.3 Interaction between the benefactive and the resultative construction

As was already pointed out in Müller, 2006, p. 861, the benefactive construction and the resultative construction interact. The example in (66c) shows that both a dative argument and an accusative argument may be added to the valence representation of a verb.

(66) a. [dass] er fischt
   that he fishes

b. * [dass] er ihm fischt
   that he him fishes

c. [dass] er ihm den Teich leer fischt
   that he.NOM him.DAT the.ACC pond empty fishes

In order to cover this in a phrasal analysis, one would need a resultative c-structure rule like (67):

(67) \( V' \rightarrow (D) \) \( (D) \) \( (D) \) \( ((AP|PP)) \) \( (V) \)
\[ (↑●SUBJ) = ▼ \ (↑●OBJ) = ▼ \ (↑●OBJ_q) = ▼ \ (↑●XCOMP) = ▼ \]
\[ ◊ = ▼ \ ( @BENEFACTIVE ) \]

The interesting thing about this rule is that all items on the right-hand side are optional. The rule licenses any combination of these items. In order to avoid overgeneration, it has to be made sure that exactly the right combination of items is present. This is ensured by the templates that regulate which grammatical functions have to be realized. The c-structure does not play any role in this business. Hence we could also assume a lexical approach and even return to binary branching structures: with binary branching structures each subtree licenses a head with an adjunct or an argument and it is either the f-structure + coherence and completeness or the glue semantics that has to make sure that all needed and only those arguments are present.

Note also that the combination of the benefactive and the resultative is hardly acceptable in English (Bresnan and Zaenen 1990, p. 53; Bresnan, Asudeh, Toivonen, and Wechsler 2015, p. 339) and Norwegian (Tungseth, 2007).

(68) * He fished him the pond empty.

So this means that the constituents in the right-hand side of the rule in (65) may never be realized simultaneously, if we want to assume this rule for both German and English. This is a very strange situation for a phrase structure rule indeed, even more so for a constructional theory.

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21This ignores the possibility of inserting adjuncts and the option to scramble the DP arguments.
Note also that the rule in (65) could not be learned by speakers of English since they never hear all components simultaneously. The generalization that has to be captured is that benefactives may be added to verbs with an accusative object and that accusative objects and result predicates may be added to intransitive verbs. Lexical rule-based approaches cover this. The two phenomena are independently covered by two lexical rules: the benefactive lexical rule requires a verb that governs the accusative and adds an argument as second argument, which is realized as dative in German. The resultative lexical rule that is needed for the examples discussed above takes an intransitive verb as input and licenses one that governs an accusative and a result predicate. This is the same across languages. What is different is the interaction between the rules. While German does allow benefactives with resultative constructions, English does not permit this. So the English rule is more constrained, but the general form of the rules is similar and generalizations can be captured.

7 A lexical approach that can capture the cross-linguistic generalizations

This paper has argued for a return to lexical analyses. Analyses of the respective phenomena have been worked out in LFG by Simpson (1983); Bresnan and Zaenen (1990) for resultative constructions and Kibort (2008) and Toivonen (2013) for benefactives. These analyses assume lexical items with a certain a-structure and related items with a different a-structure. I could point to these well-established analyses and leave it at that, but I want to use the remainder of the paper to work out a detailed analysis of the phenomena that have been mentioned throughout the paper and explain how their interactions are captured. The underlying framework that is assumed is HPSG (Pollard and Sag, 1994; Sag, 1997) with the basic assumptions regarding German and more generally Germanic made in Müller, 2013a, 2015b, 2016b.

What is needed is basically two lexical rules: one for the introduction of the benefactive argument and one for the introduction of resultative predicates and the respective object. In addition we of course need syntactic schemata that license the structures of German and English. These schemata are maximally simple: Four schemata are relevant in the context of this paper: 1) theSpecifier-Head Schema, 2) the Head-Complement Schema, 3) the Filler-Head Schema and 4) the Predicate Complex Schema.

7.1 Phrase structure, argument structure mappings and scrambling

7.1.1 Argument structure mappings

I assume that all lexical items come with a list that contains their arguments, the so-called argument structure list (ARG-ST). The elements of this list are mapped to valence features. In English and other SVO languages the first element of the ARG-ST list is mapped to the SPECIFIER feature (SPR) and all other arguments are mapped to the COMPLEMENTS list (COMPS). In German and other SOV languages all arguments of finite verbs are mapped to COMPS and the value of the SPR feature is the empty list. The lexical items in (69) illustrate:

(69) a. lexical entry for the stem give:
V[SPR (), COMPS ()]
NP[nom]
V[SPR (NP[nom]), COMPS ()]
V[SPR (NP[nom]), COMPS (NP[acc])]
V[SPR (NP[nom]), COMPS (NP[acc], NP[acc])]
nobody
gives
him
the book

Figure 12: Analysis of an English example with a ditransitive verb

Both argument structure lists have the same order, corresponding to agent, recipient and theme. Because of this, the linking constraints for both English and German are parallel and generalizations are captured. The languages differ in how the arguments are realized: In English the first argument is mapped to the SPR list () and the others to COMPS ( ), while in German, the complete ARG-ST list ( ) is mapped to COMPS. Several authors have argued that there is no difference between subjects and objects of finite verbs in languages like German and this claim is reflected by treating subjects as complements.

7.1.2 Phrase structure rules

The Figures 12 and 13 show how the lexical items can be used in actual analyses.

I assume binary branching structures for both German and English. English, being a VO language, is assumed to combine the head with the first element on the COMPS list first, while in the analysis of the German example the last element of the COMPS list is combined first with the head.

The schemata that license these structures are shown in Figure 14 and 15. Figure 14 shows a sketch of the Specifier-Head Schema, which licenses structures with a specifier. This is subject-
VP combinations in English and determiner-N combinations in both English and German. The figure shows that the SPR list of the head (marked by H) is split into two parts: a list with exactly one element (□) and a rest (□) (⊕ stands for list concatenation). □ has to match the element that is combined with the head. The remaining list (□) is the value of the SPR list of the mother node. Usually this list is the empty list, but see Müller and Ørsnes, 2013 for an analysis of object shift in Danish where multiple specifiers are assumed.

Figure 15 shows the Head-Complement Schema as it would be needed for English. The COMPS list of the head is split into two lists. One contains exactly one element, the element that is combined with the head (□). The remainder of the list is passed up to the COMPS list of the mother.
For German, I assume that adjuncts may attach to any verbal projection (to be precise, to any verb-final projection) and in English adjuncts may attach to VPs. Because of the binary branching structures the fact that adjuncts can appear anywhere between arguments in German is accounted for. Adjuncts do not have to be mentioned in argument structure constructions as would be the case in phrasal models of German syntax assuming flat structures (see (49) on page 26).

7.1.3 Scrambling

Now, German differs from English in allowing scrambling. Rather than having a fixed constituent order as in English, German allows for six order variants of sentences with verbs with three arguments (see (50) on page 26). This can be allowed for by relaxing the order in which heads are combined with their arguments. The more general schema is provided in Figure 16.

In this version of the Head-Complement Schema the COMPS list of the head is split into three lists: the two lists $\boxempty$ and $\boxcheck$ and a list in the middle that contains exactly one element ($\boxequal$). $\boxequal$ is combined with the head and the COMPS list of the mother contains all remaining complements, namely $\boxempty \oplus \boxcheck$. This general schema allows for various instantiations: $\boxempty$ and $\boxcheck$ may contain elements or be empty. If $\boxempty$ is empty, we get VO languages with strict order and if $\boxcheck$ is empty, we get OV languages with strict order. This gives the nice result that the grammar of English is more restrictive than the one of German, since the schema for English is basically the same as in Figure 16 but with the additional constraint that $\boxempty$ is the empty list.

7.2 Lexical items and lexical rules

7.2.1 Structural and lexical case

The following lexical items and lexical rules assume a distinction between structural and lexical case. Roughly speaking, structural case is case that is assigned in certain structures, that is, case that may change. On the contrary, lexical case does not depend on the environment a lexical item is used in. I assume that verbal arguments that are realized as nominative and accusative in active sentences bear structural case. The dative in German is treated as a lexical case. (70) shows examples of structural cases:

(70)

a. Der Teich ist leer.
   the pond is empty

b. Er fischt den Teich leer.
   he fishes the pond empty
c. Der Teich wird leer gefischt.
   the pond is empty fished
   ‘the pond is fished empty’

d. das Leerfischen des Teiches
   the empty fishing the pond
   ‘the fishing of the pond empty

Case is assigned according to the following case principle (Przepiórkowski, 1999; Meurers, 1999b):22

Principle 1 (Case Principle)

- In a list that contains both subjects and complements of a verbal head, the first element with structural case is assigned nominative case unless it is raised to a dominating head.
- All other elements of this list with structural case are assigned accusative case.
- In nominal environments all elements with structural case are assigned genitive case.

This principle is not specific to German and English. It accounts for the case assignment of many languages, for instance Icelandic (Müller, 2016b) and also Hindi (Müller, 2015a).

7.2.2 Linking

(67) showed the argument structure of give and how the elements of the ARG-ST list are distributed to the valence features. Assuming the distinction between lexical and structural cases, we have the ARG-ST value in (71). The referential indices of the NP arguments are linked to semantic roles of the predicate geben. Instead of traditional role names like agent, recipient and theme, I use the features ARG1, ARG2 and ARG3. ARG0 is the event variable, also represented as the INDEX (IND) under CONTENT (CONT). Due to space limitations it is impossible to explain the complete semantic setup, but the interested reader is referred to Copestake, Flickinger, Pollard, and Sag, 2005.

(71) Lexical entry for the stem geb- ‘give’:

The linking pattern for the English lexical item is completely parallel: the first argument is linked to ARG1, the second to ARG2, and the third to ARG3.

---

22This Case Principle is a declarative version of the case assignment theory that was developed by Yip, Maling, and Jackendoff (1987).
7.2.3 Lexical rules

This section discusses the lexical rules for benefactives and for resultative constructions and the interaction of these lexical rules with nominalization.

Benefactives I assume the lexical rule in (72) for adding an additional benefactive argument:

(72) Lexical rule for benefactives:

\[
\begin{align*}
\text{stem} & \quad \text{ARG-ST} \left\{ \text{NP}[\text{str}] \right\} \oplus \left( \text{NP}[\text{str}] \ldots \right) \\
\text{CONT} & \quad \text{IND} \quad \text{RELS} \\
\text{ARG-ST} & \quad \left\{ \text{NP}[\text{str}], \text{NP}[\text{ldat}] \right\} \oplus \left( \text{benefactive}(\text{IND}, \text{RELS}) \right) \\
\text{CONT} & \quad \text{IND} \quad \text{RELS}
\end{align*}
\]

The ARG-ST list of the input has to include two NPs with structural case (a nominative and an accusative argument in the active). The ARG-ST list of the input is split into two lists: one that contains a single NP[\text{str}] and another one that contains an NP[\text{str}] and some possibly non-empty rest. The ARG-ST in the output of the lexical rule contains the initial NP of the input (\text{IND}), an NP[\text{ldat}] and the list (\text{RELS}), that is, at least the second NP with structural case. The input description mentions the index of the input verb, which is the event variable (\text{RELS}). The list of semantic relations that is contributed by the input sign is (\text{REL}). The output specification of the lexical rule contains the list of relations of the input plus a benefactive relation that states that the benefactive of the event (\text{IND}) is (\text{RELS}). (\text{RELS}) is identified with the referential index of the added dative NP.

The result of applying the lexical rule to (73a) is (73b):

(73) a. monotransitive version of \text{backen}:

\[
\begin{align*}
\text{PHON} & \quad \langle \text{back} \rangle \\
\text{ARG-ST} & \quad \left\{ \text{NP}[\text{str}] \right\} \oplus \left( \text{NP}[\text{str}] \ldots \right) \\
\text{IND} & \quad \text{RELS} \\
\text{REL} & \quad \langle \text{backen} \rangle \\
\text{ARG0} & \quad \text{ARG1} \quad \text{ARG2}
\end{align*}
\]
b. ditransitive version of backen:

\[
\begin{align*}
\text{PHON} & \quad \langle \text{back} \rangle \\
\text{ARG-ST} & \quad \langle \text{NP[\text{str}]}^1, \text{NP[\text{ldat}]}^4, \text{NP[\text{str}]}^2 \rangle \\
\text{IND} & \quad \text{[backen]}^3 \\
\text{RELS} & \quad \langle \text{backen}^0 \text{ ARG}0 \quad \text{ARG}0^1 \text{ ARG}1^1 \text{ ARG}2^2 \text{benefactive} \text{ ARG}0^0 \text{ ARG}1^1 \rangle
\end{align*}
\]

A dative argument is added between the two NPs that bear structural case and this dative argument is linked to a role in the benefactive relation.

The lexical rule for English is very similar. Of course, English does not have a dative case. This can be captured by assuming a type for ditransitive verbs that is language specific. In German, ditransitives have a lexical dative as the second argument, while they have an argument with structural case in second position in English. The lexical rule refers to this language specific type and hence does not have to mention case at all.

**Resultative constructions** The lexical rule for resultative constructions with intransitive, mono-valent verbs or mono-valent variants of transitive verbs is provided in (74):\(^{23}\)

\begin{align*}
\text{(74) Lexical rule for resultatives:} \\
\text{ARG-ST} & \quad \langle \text{NP[\text{str}]} \rangle \\
\text{CONT} & \quad \langle \text{IND} \text{[ind]} \rangle \\
\text{RELS} & \quad \langle \text{cause}^{\text{cause}}(\text{\text{become}^{\text{become}}}) \rangle
\end{align*}

The input is a verbal stem that selects for an NP with structural case and the output is a verbal stem selecting for two NPs with structural case and a result predicate. The second NP is simultaneously the subject of the result predicate. I assume that there is not a person that causes the change of state but rather that the event of the input verb (\(\text{[ind]}\)) causes the change of state. This makes it possible to capture cases in which there is no participant in the causing event:

\begin{align*}
\text{(75)} & \quad \text{Es regnet die Stühle \ / Wäsche nass.} \\
& \quad \text{it rains the chairs clothes wet}
\end{align*}

The result of the rule application to (76a) is shown in (76b):

---

\(^{23}\text{This rule is not complete. Further constraints regarding the semantics of the input verb have to be stated.}\)
a. intransitive version of *fischen*:

\[
\begin{array}{l}
\text{PHON} \langle fisch \rangle \\
\text{ARG-ST} \langle \text{NP[}str\text{]} \rangle \\
\text{IND} \langle \rangle \\
\text{RELS} \langle \text{fischen} \text{, ARG0 }\langle \rangle \text{, ARG1 }\langle \rangle \rangle
\end{array}
\]

b. resultative version of *fischen*:\n
\[
\begin{array}{l}
\text{PHON} \langle fisch \rangle \\
\text{ARG-ST} \langle \text{NP[}str\text{]} \text{, NP[}str\text{]} \text{, XP[PRD+]} \rangle \\
\text{IND} \langle \rangle \\
\text{RELS} \langle \text{fischen} \text{, cause ARG0 }\langle \rangle \text{, ARG1 }\langle \rangle \text{, ARG2 }\langle \text{become} \rangle \text{, ARG1 }\rangle \rangle
\end{array}
\]

The lexical item for the resultative construction may be input to the benefactive lexical rule. The output is shown in (77):

(77) ditransitive version of resultative *fischen*:

\[
\begin{array}{l}
\text{PHON} \langle fisch \rangle \\
\text{ARG-ST} \langle \text{NP[}str\text{]} \text{, NP[ldat]} \text{, NP[}str\text{]} \text{, XP[PRD+]} \rangle \\
\text{IND} \langle \rangle \\
\text{RELS} \langle \text{fischen} \text{, benefactive ARG0 }\rangle \text{, ARG1 }\langle \rangle \text{, cause ARG0 }\langle \rangle \text{, ARG1 }\langle \rangle \text{, ARG2 }\langle \text{become} \rangle \text{, ARG1 }\rangle \rangle
\end{array}
\]

In (77) we have NP[*str*], NP[ldat], and NP[*str*] as arguments, but in addition also the predicative X(P).

Figure 17 shows the analysis of (64c). The resultative lexical rule applies to the mono-valent version of the lexical item for *fish*—‘to fish’. The stem licenses another stem that selects for two NPs with structural case, which are resolved to nominative and accusative in the example at hand. The benefactive lexical rule applies to this lexical item and licenses another lexical item that selects for nominative, dative, accusative and a result predicate. An inflectional lexical rule licenses the V\(^0\). The V\(^0\) is combined with the adjective to form a verbal complex, indicated

\(^{24}\text{NP[}str\text{]} \langle \rangle \text{ is the element of the SUBJ list of the X(P). This is omitted in the following AVMs to enhance readability.}\)
Figure 17: Analysis of *dass er ihm den Teich leer fisch*  ‘that he fishes the pond empty for him’, an example in which the benefactive and the resultative construction interact
by the label $V^0$ at the mother node. *leer fischt* is combined with its arguments by the German version of the Head-Complement Schema in Figure 16 and hence it is explained why six orders of the nominative, dative and accusative argument are possible. In the analysis suggested here, the fact that scrambling is possible is a fact of German syntax that is independent of how the arguments are licensed.

Note that all the stems in Figure 17 could be input to derivational lexical rules that derive prenominal participles:

(78) a. der fischende Mann
    the fishing man
b. der den Teich leer fischende Mann
    the the pond empty fishing man
    ‘the man who fishes the pond empty’
c. der den Teich seinem Freund leer fischende Mann
    the the pond his friend empty fishing man
    ‘the man who fishes the pond empty for his friend’
d. der leer gefischte Teich
    the empty fished pond
e. der dem Besitzer leer gefischte Teich
    the the owner empty fished pond
    ‘the pond that was fished empty for the owner’

The derivational rules are independent of the benefactive and the resultative construction and apply to verbs that have a subject in the case of the first participle formed with *-end* and to verbs that have an underlying object (transitive verbs and unaccusative ones) in the case of the second participle formed with *ge-* *-t*.

**Nominalizations** There are several variants of nominalizations. The noun can be used with an agent as specifier as in (79a) or with a normal determiner as in (79b,c):

(79) a. Peters Leerfischung des Teiches
    Peter’s empty.fishing of.the pond
b. die Leerfischung des Teiches
    the empty.fishing of.the pond
c. die Leerfischung des Teiches durch Peter
    the empty.fishing of.the pond by Peter

The important point is that this is independent of the resultative construction. (80) shows an example with a transitive verb:

(80) a. Peters Lesen des Buches
    Peter’s reading of.the book
b. das Lesen des Buches
    the reading of.the book

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I assume that the nominalization attaches to the verb stem. In the case of the resultative the result predicate is then combined with the derived nominal stem. As the result of the combination we get a word that has one NP with structural case on its COMPS list. The case principle assigns genitive to this NP since it is realized in a nominal environment.

7.3 Constraints on extraction and passivization

Toivonen (2013, p. 516) argues that the benefactive construction is best seen as an instantiation of the phrasal configuration in Figure 18. She noticed that question formation that involve the extraction of the benefactive NP are excluded. (81b) and (82b) illustrate:

(81) a. I baked Linda cookies  
    b. * Who did I bake cookies?

(82) a. The kids drew their teacher a picture.  
    b. * Which teacher did the kids draw a picture?

She also discusses the example in (83), which is judged ungrammatical by speakers of certain dialects of English:

(83) * My sister was carved a soap statue of Bugs Bunny (by a famous sculptor).

She observed that all these ungrammatical examples are accounted for by assuming that benefactives are licensed in structures like the one given in Figure 18.

Again, the benefactive arguments can be extracted in German and can be used in questions:

(84) a. Wem habe ich Kekse gebacken?  
    who.DAT have I cookies baked

b. Welchem Lehrer haben die Kinder ein Bild gemalt?  
    which.DAT teacher have the children a picture drawn

Figure 18: Benefactive construction according to Toivonen (2013, p. 505)
8 Conclusions

I have shown that morphology needs access to valence (adjectival formation and -bar ‘able’ derivation). If this valence information is not added to lexical items but dependents are introduced by phrasal constructions instead, there is no way to account for the insights regarding morphological rules.

Furthermore, I have argued that the relation between active and passive variants of a construction is not covered by the template-based analyses suggested in the framework of LFG and that the analysis for English benefactive constructions does not carry over to languages that are assumed to have different c-structures. As was the case for the phrasal GPSG approach to valence, partial phrases that play a role in coordination, partial fronting, and also certain accounts of fronting are problematic for pattern-based approaches to argument structure.

I have shown that all these problems disappear and crosslinguistic generalizations regarding the benefactive, resultative constructions and many other constructions can be captured if one returns to the traditional lexical analysis which assumed that all arguments are introduced lexically. A version of the lexical analysis was presented in Section 7. This analysis is the basis of implemented fragments of German and English that have been developed in the CoreGram project (Müller, 2007a, 2015a). As was demonstrated, the lexical rule for the benefactive in German and English is the same. The languages differ in how the second argument of ditransitive verbs is realized since German has a morphologically marked dative case, which is absent from English. But this is a general property of ditransitive verbs that is independent of the benefactive rule. Lexical rules for resultative predicates are parallel for English and German. The differences are due to the differences in the syntactic systems of the languages but this is independent of the resultative construction.

With the system of lexical rules in place the phrasal schemata for specifier-head structures and head-complement structures in German and English are identical (or rather the schema for English is a specialization of the one of German). No special construction-specific stipulations are needed.

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References

Kazimierz AJDUKIEWICZ (1935), Die syntaktische Konnexität, Studia Philosophica, 1:127.


Gunnar BECH (1955), Studien über das deutsche Verbum infinitum, number 139 in Linguistische Arbeiten, Max Niemeyer Verlag, 2nd unchanged edition 1983.


Hans C. BOAS and Ivan A. SAG, editors (2012), Sign-based Construction Grammar, number 193 in CSLI Lecture Notes, CSLI Publications.

Geert E. BOOIJ (2005), Construction-Dependent Morphology, Lingue e linguaggio, 4:3146.


Noam CHOMSKY (1957), *Syntactic Structures*, number 4 in Janua Linguarum / Series Minor, Mouton.
Noam CHOMSKY (1981), Lectures on Government and Binding, Foris Publications.


Peter W. CULICOVER and Ray S. JACKENDOFF (2005), Simpler Syntax, Oxford University Press.


Hubert HAIDER (1990), Topicalization and other puzzles of German syntax, in Günther GREWENDORF and Wolfgang STERNEFELD, editors, Scrambling and Barriers, number 5 in Linguistik Aktuell/Linguistics Today, pp. 93112, John Benjamins Publishing Co.


Walt Detmar MEURERS (1999a), German partial-VP fronting revisited, in Weibelhuth et al. (1999), pp. 129144.


Stefan MÜLLER (2016a), Default inheritance and derivational morphology, ms. Humboldt-Universität zu Berlin.


Stefan MÜLLER and Bjarne ØRSNES (2013), Towards an HPSG analysis of object shift in Danish, in Formal Grammar: 17th and 18th International Conferences, FG 2012, Opole, Poland, August 2012, Revised Selected Papers, FG 2013, Düsseldorf, Germany, August 2013: Proceedings, number 8036 in Lecture Notes in Computer Science, pp. 69–89.


Adam PRZEPIÓRKOWSKI (1999), On case assignment and “adjuncts as complements”, in Weibelhuth et al. (1999), pp. 231–245.

Susanne RIEHEMANN (1993), Word Formation in Lexical Type Hierarchies: A Case Study of bar-Adjectives in German, Master’s thesis, Eberhard-Karls-Universität Tübingen, also published as SfS-Report-02-93, Seminar für Sprachwissenschaft, University of Tübingen.


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