

# On Predication

Stefan Müller

Deutsche Grammatik

Institut für Deutsche und Niederländische Philologie

Fachbereich Philosophie und Geisteswissenschaften

FU Berlin

Stefan.Mueller@fu-berlin.de

## 1 Introduction

Van Eynde (2008) suggested a revision of the treatment of predication that can be found in (Pollard and Sag, 1994, p. 360) and (Ginzburg and Sag, 2000, p. 409). This paper points out several shortcomings of van Eynde's analysis and suggests returning to a raising analysis. We will present the problems that van Eynde identified with Pollard and Sag's account and the solution he suggested in Section 2, and explain which of the problems are not real problems. Section 3 shows where the shortcomings of van Eynde's proposal are and Section 4 provides our own analysis. We draw some conclusions in Section 5.

## 2 Problems and alleged Problems and Proposed Solutions

Pollard and Sag (1994, p. 360) sketch the lexical rule in (1) that takes nouns as used in normal referential NPs like *a teacher* in (2a) and maps them onto another lexical item that can be used predicatively like in (2b).

- (1)  $N[-PRD, SUBJ \langle \rangle]:[RESTRICTION \{ \square \}]_{\square}$   
 $\mapsto$   
 $N[+PRD, SUBJ \langle XP_{\square} \rangle]:\square$
- (2) a. A teacher laughs.  
b. John is a teacher.

Ginzburg and Sag (2000, p. 409) give the following variant of the lexical rule in (1):

- (3) Singular Predicative Noun Lexical Rule:
- $$\left[ \begin{array}{l} SS|LOC|CAT|HEAD \ n \\ ARG-ST \langle \square \rangle \oplus \square \\ lx \end{array} \right] \Rightarrow_{LR} \left[ \begin{array}{l} SS|LOC|CAT \left[ \begin{array}{l} HEAD \left[ \begin{array}{l} AGR|NUM \ sg \\ PRED \ + \end{array} \right] \\ SPR \langle \square \rangle \\ SUBJ \langle \square \rangle \end{array} \right] \\ ARG-ST \langle \square, \square \rangle \oplus \square \\ word \end{array} \right]$$

The lexical rule in (1) adds a subject to the valence features of the noun and by doing so makes

it parallel to predicative adjectives. The copula and verbs like *seem* and *consider* are treated as raising verbs that raise the element in SUBJ and make it their own subject or – in the case of *consider* – object. This analysis is also assumed by other researchers working on different languages (see for instance (Müller, 2002)).

Pollard and Sag suggest that the element in the set of restrictions of the noun in the input of the rule is represented as the main semantic contribution of the resulting noun. So the contribution of *teacher* in (2b) is *teacher'*( $\square$ ), while it is  $\square\{teacher'(\square)\}$  for (2a).<sup>1</sup> As Pollard and Sag point out, this does not extend to proper nouns like those in (4) for semantic reasons:

- (4) Cicero is Tully.

Van Eynde mentions such examples and adds one with a pronoun:

- (5) That must be her.

But Pollard and Sag (1987, p. 66) point to the solution already: There is a distinction to be made between the *be* of predication and the *be* of identity.

Van Eynde discusses examples like (6) and argues that nominalizations pose problems for the raising approach since the subject of *choose* is *she* and the object is *this hotel* and in predicative structures like (6) one would be forced to assume that *her* is a specifier and *this hotel* is the subject.

- (6) This hotel was her first choice.

We think that this is a very weak argument since we have other processes that change the realization of grammatical functions. A prominent example is the passive of transitive verbs, in which an object is realized as the subject.

The next phenomenon that van Eynde discusses is gerunds:

- (7) a. The greatest pleasure on earth is eating oysters and drinking champagne.  
b. His main worry now is to get rid of his detractors.

<sup>1</sup> The curly brackets around  $\square$  in the input are missing in Pollard and Sag's version of the lexical rule.

It is clear that the subject of *eating* is not *the greatest pleasure on earth*. Neither is *his main worry* the subject of the infinitive. Rather these are equational structures in which the NP is equated with another element the subject of which remains implicit. This is unproblematic if one assumes an equational copula. The translation of (7a) into German shows that implicit subjects are nothing unusual:

- (8) Das größte Vergnügen auf der Welt ist das Essen von Austern und das Trinken von Champagner.

In his analysis of sentences like (7) van Eynde suggests that *eating* is nominal and *to* is a preposition with nominal semantics. Of course this analysis can be employed in an analysis with an identity copula as well.

Van Eynde suggests the following alternative to the raising analysis: Lexical items for *seems* as in (9a) are constrained by (10) and items like *consider* in (9b) are constrained by (11).

- (9) a. John seems a nice guy.  
b. Bob considers his brother a genius.

- (10) a1-pred-lex  $\Rightarrow$
- |                  |  |                              |
|------------------|--|------------------------------|
| ARG-ST           | $\langle$ NP <sub>1</sub> , PP <sub>2</sub> , Z <sub>3</sub> $\rangle$ |                              |
| SS LOC CONT NUCL | [ EXPERIENCER <sub>1</sub> ]   | [ SOA-ARG NUCL ]             |
|                  | [ exp-soa-rel ]  | [ INST <sub>1</sub> index ]  |
|                  |  | [ THEME <sub>1</sub> index ] |
|                  |  | [ coref-rel ]                |

- (11) a2-pred-lex  $\Rightarrow$
- |                  |  |                              |
|------------------|--|------------------------------|
| ARG-ST           | $\langle$ NP, NP <sub>2</sub> , Z <sub>3</sub> $\rangle$ |                              |
| SS LOC CONT NUCL | [ SOA-ARG NUCL ]   | [ INST <sub>1</sub> index ]  |
|                  | [ soa-rel ]  | [ THEME <sub>1</sub> index ] |
|                  |  | [ coref-rel ]                |

By assuming these lexical entries van Eynde can analyze the sentences in (9) with normal nouns without having to assume a separate predicative lexical item for the predicative usage of the noun.

Van Eynde assumes that all predicate selectors contribute such semantic information and explicitly includes the copula *be* here. He argues that the dative iudicantis depends on the copula which he takes as evidence for its relational status:

- (12) Es ist mir zu kalt.  
it is me.DAT too cold  
'It is too cold for me.'

Traditionally it is said that this dative depends on the *zu* (How this is captured in HPSG is a different question. The analysis is not trivial since dative and *zu* can be discontinuous). Note however, that van Eynde would be forced to assume empty copulas in prenominal position if he were to apply his argument to the following data:

- (13) a. bis auf das mir zu kalte Ziel  
until on the me.DAT too cold goal  
Spitzbergen  
Spitsbergen  
'except for the goal Spitsbergen,  
which is too cold for me'
- b. Kann man im Adapterbetrieb  
can one in.the battery.mode  
die mir zu warme  
the me.Dat to warm  
Book-Unterseite etwas kühler  
bottom.of.the.Book a.bit cooler  
bekommen, wenn man [...]   
get if one  
'Is it possible to get the bottom of the  
Book, which is to warm for me, a bit  
cooler if one ...'

Here we have *mir zu warme* and *mir zu kalte*, with *zu* present but in a prenominal context in which copulas are never present.

### 3 Problems of the Identity Approach

The analysis works for the given examples, but the argumentation against the raising analysis is not convincing. In addition, the identity analysis faces several problems.

The first problem is that pronouns and proper names cannot be used as predicates in such constructions:

- (14) a. \* He seems him.  
b. \* He seems John Malcovich.

Here the copula has to be used:

- (15) a. He seems to be him.  
b. He seems to be John Malcovich.

In addition there is a very general problem of the analysis: It does not extend to subjectless predicates. Müller (2002, p. 72–73) discusses the following examples:<sup>2</sup>

- (16) a. weil schulfrei ist.  
because school.free is  
'because there is no school.'
- b. Für dich ist immer offen.  
for you is always open  
'It is always open for you.'
- c. In der Mensa ist es laut.  
in the commons is it.EXPL loud  
'It is loud in the commons.'

The adjective *laut* also has a non-expletive version, and (16c) is actually ambiguous between the expletive and the non-expletive reading. With the expletive predicate, (16c) means that

<sup>2</sup> (16b) is quoted from (Haider, 1986, p. 18).

the people, machines, or whatever, in the commons are loud, whereas in the non-expletive reading the *es* could refer to a child. So the examples in (16) either do not involve an NP argument or an expletive one. In any case there is nothing present that could be “coreferential” with the adjectival predicate.

So concluding this discussion of van Eynde’s paper one must say that there is no compelling argument against the raising analysis and there are two areas in which the identity analysis has empirical problems.

#### 4 The Analysis

As van Eynde pointed out in earlier work, there is one aspect in which his analysis is clearly superior to the one suggested in (Pollard and Sag, 1994, p. 194–195) and (Ginzburg and Sag, 2000): The latter analyses fail for examples that contain modifiers in the predicative phrase.

(17) He is a good candidate.

The classical analysis of adjuncts assumes that nominal modifiers attach to an  $\bar{N}$  and identify their referential index with the referential index of the noun. But if the semantic contribution of *candidate* is a predicate rather than an index, modification cannot apply as usual.<sup>3</sup>

This problem can be solved by assuming a unary projection instead of the lexical rule in (3). The unary projection applies to a full NP and licenses the predicative NP with an appropriate SUBJ value. Note that in this analysis there is still ambiguity between NPs that can function as complements and NP that can function as predicates – something that van Eynde criticized – but the ambiguity is reduced considerably since it is only present at the NP level and not for all nominal projections. So there is no predicative version of *good candidate*.

It is interesting to note that we find a similar phenomenon in temporal NPs: As Flickinger (2008, p. 91–92) points out, it is not just simple NPs that can act as modifiers of verbs. The time nouns can be embedded inside of a more complex NP, as (18) shows.

(18) a. Kim disappears those days.  
b. Kim disappears some of those days.

Therefore a treatment in which the time noun has a MOD value that allows it to modify a verb is not appropriate. Further evidence for an analysis as unary projection is provided by parallel German examples:

<sup>3</sup> This may not be an issue if an MRS semantics (Copestake et al., 2005) is assumed. However, one would have to be willing to claim that the type of the index of *candidate* is not changed by the predication lexical rule.

(19) a. Er arbeitete den größten Teil  
he worked the.ACC largest part  
der Nacht.  
of.the.GEN night  
‘He worked almost all night.’  
b. Er arbeitete die halbe  
he worked the.ACC half.ACC  
Nacht.  
night  
‘He worked half of the night.’

In (19a) the time expression *der Nacht* is genitive but the whole NP is accusative. This accusative is called a semantic case. It is connected to the function of the NP and not assigned by the verb. It is clear from data like (19a) that an analysis like the one suggested by Müller (2007, p. 226) that assigns both function (i.e. MOD value) and case lexically cannot explain the data in (19a). Hence we have evidence that a unary projection that accounts for the property of predication is nothing unusual.

We assume the following entry for the copula in German:

(20) *sein* (copula):

$$\left[ \text{SUBCAT } \boxed{1} \oplus \boxed{2} \oplus \left\langle \left[ \begin{array}{l} \text{PRD} + \\ \text{SUBJ } \boxed{1} \\ \text{SUBCAT } \boxed{2} \end{array} \right] \right\rangle \right]$$

This lexical entry is similar to the one suggested by Müller (2002, p. 103) in that both the elements of SUBJ and of SUBCAT are raised to the SUBCAT list of the copula. The elements at the SUBCAT list of the embedded predicate are raised in addition to the elements in SUBJ since German forms a verbal complex and predicative constructions like copula constructions and resultative constructions take part in complex formation. The formation of verbal complexes is analyzed via argument attraction (Hinrichs and Nakazawa, 1989a,b, 1994; Kiss, 1995) and Müller (2002) extended this analysis to predicative constructions.

Note that nothing is said about the actual members of the lists. It is therefore possible to handle the cases in (21) as well as the subjectless examples that were given in (16).

(21) a. weil er auf seinen Sohn  
because he.NOM on his son  
stolz ist  
proud is  
‘because he is proud of his son’  
b. weil er klug ist  
because he.NOM smart is  
‘because he is smart’

- c. Ihm wurde schlecht.  
 him.DAT got bad  
 'He got sick.'

In the analysis of (21a), [1] contains the subject (*er*) and [2] the PP (*auf seinen Sohn*). In the analysis of (21b), [1] contains the subject (*er*) and [2] is the empty list. In the analysis of (21c), [1] is the empty list and [2] contains the dative object *ihm*. In the analysis of (16a), both [1] and [2] are the empty list.

It is further interesting to note that the treatment of raising in (20) differs from the characterization of raising as it is given in Ginzburg and Sag (2000, p. 22). Ginzburg and Sag assume the following constraint:

- (22) [ARG-ST < [ LOC [1] ], [ SUBJ < [ LOC [1] ] ] > ]

This version of raising differs from earlier proposals in that only LOCAL values are shared instead of whole *synsem* objects. The reason for this treatment is that one would get problems with the lexical SLASH amalgamation that was suggested by Bouma et al. (2001): if the whole *synsem* object was shared there would be SLASH amalgamation in the subject and in the phrase from which the subject is raised, an unwelcome result (Ginzburg and Sag, 2000, p. 21, fn. 8). So if one would assume an amalgamation account of nonlocal dependencies for German, one would be forced to either use disjunctions that refer to the arity of the respective lists or use a relational constraint that walks through lists and produces a copy of the list that contains elements that share the LOCAL values with the elements of the list from which they are raised. Given that the amalgamation analysis is not uncontroversial (Levine and Hukari, 2006), we suggest to drop it and return to an analysis that introduces nonlocal dependencies in syntax (through a trace or a unary branching projection).

There is another important aspect regarding the lexical item in (20): The predicate is selected via SUBCAT rather than VCOMP or XCOMP as was suggested by Chung (1993), Rentier (1994), Müller (1997), and Kathol (1998). Müller (2002, p. 103) gave the following lexical item for the copula:

- (23) *sein* (copula, according to Müller (2002)):
- $$\left[ \begin{array}{l} \text{SUBCAT } [1] \oplus [2] \\ \text{XCOMP } \left\langle \begin{array}{l} \text{ADJ}[\text{MOD } \textit{none}, \text{PRD } +, \text{SUBJ } [1], \text{SUBCAT } [2]] \\ \text{XCOMP } \langle \rangle, \text{LEX } + \end{array} \right\rangle \end{array} \right]$$

The problem with this lexical item is that it specifically selects a predicative adjective. Müller selected all verbs that take part in complex formation via XCOMP, but those that were realized as full phrases – that is in so-called incoherent constructions – were selected via SUBCAT. The motivation for this is that full phrases

can be permuted like other arguments in German, while lexical elements in general have to be adjacent to the verbal complex. With a uniform selection of verbal complements via SUBCAT it is possible to treat optionally coherent verbs like *versuchen* with one lexical item (Kiss, 1995, p. 178). The control verb does not specify whether it forms a verbal complex with the embedded verb or not. It does not mention the LEX value auf the embedded verbal element. Because of this we can analyze both examples with a predicate complex as in (24a) and examples like (24b) with so-called intraposition:

- (24) a. Karl hat das Buch nicht [zu lesen  
 Karl has the book not to read  
 versucht].  
 tried  
 'Karl did not try to read the book.'  
 b. Karl hat [das Buch zu lesen] nicht  
 Karl has the book to read not  
 versucht.  
 tried  
 'Karl did not try to read the book.'

In comparison verbs like *scheinen* ('to seem') or modals, that obligatorily construct coherently select a verbal complement that is LEX+. Consequently they do not allow for intraposition of a VP complement, but require complex formation.

Müller (2002, p. 112) criticized Kiss's analysis of optional coherence because it also licences unwanted structures like (25) and hence results in spurious ambiguities.

- (25) weil Karl das Buch [[dem Mann zu  
 because Karl the book the man to  
 geben] verspricht].  
 give promises  
 'because Karl promises to give the book  
 to the man.'

In (25) *versprechen* is combined with a partly saturated verbal projection *dem Mann zu geben* and the non-saturated argument *das Buch* is raised and combined with *dem Mann zu geben verspricht* in a later step. However, this structure is excluded if arguments are required to be saturated and elements of the predicate complex are required to be LEX+. With the new treatment predicate selection via SUBCAT, it is not required that predicative PPs or NPs are part of the predicate complex as was suggested by Müller (2002) for PPs in resultative constructions. Instead they can be analyzed via head-argument structures.

Returning to the copula, it allows the embedding of fully saturated phrases like predicative NPs and PPs but also allows for the formation of a predicate complex consisting of adjective and copula. Since coherence is optional we can

explain so-called focus movement of adjectives as in (26), something that was noted by Müller (2002, p. 69) but not treated in his analysis.

- (26) a. Sie wuchsen in einem  
they grew in a  
gesellschaftlichen Klima auf,  
social climate PART(up)  
das *freier* in Deutschland nie *war*.<sup>4</sup>  
that freer in Germany never was  
'They grew up in a social climate that  
was freer than ever in Germany.'
- b. Dabei könnte die Begründung des  
that.at could the reason for.the  
Urteils *absurder* nicht *sein*: [...] <sup>5</sup>  
verdict more.absurd not be  
'Yet the reason for the verdict could  
not be more absurd.'

## 5 Conclusion

We have shown that the arguments provided by van Eynde for a copula-based analysis are not convincing. In addition there are problems with pronouns in predication structures and the analysis does not extend to subjectless constructions.

We suggested returning to a raising analysis of predication that raises the complete value of SUBJ of the embedded predicate rather than identifying LOCAL values of raised subjects. The predication lexical rule was recoded as a unary branching immediate dominance schema, which allows the inclusion of modifiers in the NP. In addition it was suggested to dispense with the XCOMP feature and to return to a SUBCAT-based analysis. This makes it possible to treat the various predication structures as optionally coherent constructions.

The analysis is part of an implemented fragment of German.

## References

- Bouma, G., Malouf, R. and Sag, I. A. 2001. Satisfying Constraints on Extraction and Adjunction. *Natural Language and Linguistic Theory* 19(1), 1–65.
- Chung, C. 1993. Korean Auxiliary Verb Constructions Without VP Nodes. In S. Kuno, I.-H. Lee, J. Whitman, J. Maling, Y.-S. Kang and Y. joo Kim (eds.), *Proceedings of the 1993 Workshop on Korean Linguistics*, pp 274–286, Cambridge, Massachusetts: Harvard University, Department of Linguistics.
- Copestake, A., Flickinger, D. P., Pollard, C. J. and Sag, I. A. 2005. Minimal Recursion Se-

antics: an Introduction. *Research on Language and Computation* 4(3), 281–332.

- Flickinger, D. P. 2008. Transparent Heads. In Müller (2008).
- Ginzburg, J. and Sag, I. A. 2000. *Interrogative Investigations: the Form, Meaning, and Use of English Interrogatives*. Stanford: CSLI Publications.
- Haider, H. 1986. Fehlende Argumente: vom Passiv zu kohärenten Infinitiven. *Linguistische Berichte* 101, 3–33.
- Hinrichs, E. W. and Nakazawa, T. 1989a. Flipped out: AUX in German. In *Aspects of German VP Structure*, Eberhard-Karls-Universität Tübingen.
- Hinrichs, E. W. and Nakazawa, T. 1989b. Subcategorization and VP Structure in German. In *Aspects of German VP Structure*, Eberhard-Karls-Universität Tübingen.
- Hinrichs, E. W. and Nakazawa, T. 1994. Linearizing AUXs in German Verbal Complexes. In J. Nerbonne, K. Netter and C. J. Pollard (eds.), *German in Head-Driven Phrase Structure Grammar*, pp 11–38, Stanford: CSLI Publications.
- Kathol, A. 1998. Constituency and Linearization of Verbal Complexes. In E. W. Hinrichs, A. Kathol and T. Nakazawa (eds.), *Complex Predicates in Nonderivational Syntax*, pp 221–270, San Diego: Academic Press.
- Kiss, T. 1995. *Infinite Komplementation. Neue Studien zum deutschen Verbum infinitum*. Tübingen: Max Niemeyer Verlag.
- Levine, R. D. and Hukari, T. E. 2006. *The Unity of Unbounded Dependency Constructions*. Stanford University: CSLI Publications.
- Müller, S. 1997. Yet another Paper about Partial Verb Phrase Fronting in German. Research Report RR-97-07, DFKI, Saarbrücken, a shorter version appeared in *Proceedings of COLING 96*, pages 800–805.
- Müller, S. 2002. *Complex Predicates: Verbal Complexes, Resultative Constructions, and Particle Verbs in German*. Stanford: CSLI Publications.
- Müller, S. 2007. *Head-Driven Phrase Structure Grammar: Eine Einführung*. Tübingen: Stauffenburg Verlag, first edition.
- Müller, S. (ed.). 2008. *Proceedings of the 15th International Conference on Head-Driven Phrase Structure Grammar, NICT, Keihanna, Japan*, Stanford, CSLI Publications.
- Pollard, C. J. and Sag, I. A. 1987. *Information-Based Syntax and Semantics*. Stanford: CSLI Publications.
- Pollard, C. J. and Sag, I. A. 1994. *Head-Driven Phrase Structure Grammar*. Chicago, Lon-

<sup>4</sup> taz, 01.07.1995, p. 10.

<sup>5</sup> taz, 17.02.1999, p. 12.

don: University of Chicago Press.

- Rentier, G. 1994. Dutch Cross Serial Dependencies in HPSG. In COLING Staff (ed.), *Proceedings of COLING 94*, pp 818–822, Kyoto, Japan: Association for Computational Linguistics.
- van Eynde, F. 2008. Predicate Complements. In Müller (2008), pp 253–273.