THE ROLE OF THE PARADIGM IN GERMAN AUXILIARY CONSTRUCTIONS

Amanda Pounder
University of Calgary

1. Introduction: Periphrasis as Morphology

Some recent work (e.g. Ackerman and LeSourd 1987, Webelhuth and Ackerman 1998, Ackerman and Stump 2002) urges the treatment of verbal periphrasis in the lexicon as a morphological phenomenon, rather than in the syntax, as advocated by e.g. Butt et al. 1996, Marillier 1998. Work in this morphological vein proposes that the lexicon be responsible for multiword expressions of all kinds, such as auxiliary constructions, "small verb" constructions, and constructional idioms. There are two principal reasons given for the direction taken, namely the non-compositionality of periphrastic constructions and the force of the morphological paradigm, which we shall review in turn.

For all these construction types, it is claimed that, unlike the meaning relationships obtaining in normal verb + verb or verb + noun constructions, the meaning of the periphrastic construction is not a function of the meaning of the individual parts: it is non-compositional. For example, the German verb WERDEN does not have its usual meaning 'become' when in an auxiliary construction (1).

(1) a. Max wird ein reicher Mann.
Max becomes a rich man.

b. Max wird uns einladen.
Max will us invite.

The conclusion is, then, that the meanings found in these constructions, e.g. 'future' in (1), are attributable to the constructions as a whole, and not to one or other of their component parts (cf. e.g. Bierwisch 1990). As this is not a feature of non-idiomatic syntactic constructions, the structures must be formed elsewhere (Ackerman and Stump 2002). It should be noted here that some researchers claim that auxiliary constructions, for example, are indeed compositionally formed, and that the normal meaning of the auxiliary verb, such as 'become' for German WERDEN, is in fact present in the construction (cf. e.g. Klein 2000, Marillier 1998).

Like the argument of non-compositionality, that stemming from paradigmatic force is semantically motivated. Here it is considered that the auxiliary construction expresses a value, say 'future', of a morphosyntactic category, here Tense, that is or could be an inflectional category of the language in question. In the case of German, one would say that the Tense category contains e.g. the values 'past' and 'present',

both expressed synthetically by the morphology and thus in the morphological paradigm; 'future' belongs to this set semantically, so the paradigm includes the systematic expression of this value, no matter how it is expressed. So just as *küsste* (preterite, 3rd p.sg.) and *küsst* (present, 3rd p.sg.) are members of the inflectional paradigm of KÜSSEN, *küssen wird* (future, 3rd p.sg.) will likewise be a member of that paradigm. Arguments along these lines clearly attribute primacy to the semantic side of morphology; those in the Word-and-Paradigm or similar frameworks base the paradigm on the realization of semantically-defined cells as a matter of course. This approach certainly has tradition on its side, for pedagogical grammars have incorporated analytic constructions in their inflectional paradigms for centuries.

Supposing that the semantic approach is worth pursuing, let us now consider just how periphrastic expressions can be integrated into a formal theory of morphology. Ackerman and Stump (2002) articulate the Periphrastic Realization Hypothesis, according to which "inflectional rules that deduce the realizations of a morphological paradigm's cells include rules defining periphrastic combinations as well as rules defining synthetic forms." This is a radical yet logical step from the idea that analytic constructions are somehow contained in the inflectional paradigm: not only are they part of the paradigm, but they are created by means of inflectional rules, rather than by syntactic composition.

An example of this approach can be seen in the set of inflectional rules proposed by Ackerman and Stump (2002) in their description of Western Mari. A single block of rules may contain rules for the synthetic realization of a paradigmatic cell defined by morphosyntactic category values, rules for the creation of analytic structures, and rules for inflecting the auxiliary verb, as shown in (2).

(2) a. $RR_{I,\{POL:aff,\ TNS:1st\ past,\ AGR:\{PER:3,\ NUM:PL\}\},\ V}(<X, \sigma>) = < Xep, \sigma >$

b. $RR_{I,\{POL:neg\},\ V}(<X, \sigma>) = < [\underline{Y}\ Z, \sigma\ ] >$, where Y is the auxiliary

c. $RR_{I,\{TNS:1st\ past,\ AGR:\{PER:3\}\},\ \{AK\}}(<X, \sigma>) = < əš, \sigma >$

The synthetic "Realization Rule" given in (a) shows that a suffix *ep* is applied to the base in order to realize the set (σ) of inflectional values of positive polarity, 1st past, and 3pl. number agreement. The analytic Realization Rule in (b) shows that to realize the inflectional value of negative polarity, a phrase headed by Y, the auxiliary verb AK, is used. The suppletive Realization rule in (c) gives an inflectional form of AK.

Both traditional paradigms as found in pedagogical grammars and the formalized version developed by Stump (2000) and extended in Ackerman and Stump (2002) encounter a number of problems. For example, the incorporation of auxiliaries into inflectional paradigms of "main" verbs creates issues for paradigm structures. In pedagogical grammars, we observe simple vertical arrays such as the following:

(3)

a.		b.	
	küsse		*werde küssen*
	küsst		*wirst küssen*
	küsst		*wird küssen*

küssen	*werden küssen*
küsst	*werdet küssen*
küssen ...	*werden küssen* ...

In the arrays of (3), we find one expression for each cell, i.e. full set of morpho-syntactical category values. Now it will be observed that what really seems to be inflected in (b) is the auxiliary verb, not KÜSSEN (or in a more abstract representation, the main verb). In an abstract pedagogical grammar, one auxiliary verb could be found inflected in its "own" paradigm or lexical entry, and then again in each part of the verbal inflectional paradigm where it is used. Inclusion of the auxiliary in the paradigm of the "main" verb is problematic from the aesthetic criterion of excessive redundancy, but also because of the dislocation of the auxiliary verb from its independent inflectional self.

It would seem that the relationship between the lexical entry - and inflectional paradigm - of auxiliary verbs (e.g. German WERDEN) and the forms of these verbs "appearing" in the inflectional paradigms of other verbs needs clarification. Based on the above problems as stated, the challenge presented by Ackerman et al's claim that periphrastic constructions, such as auxiliary constructions, must be incorporated in the morphological paradigm of the verb, is to find a way to do so while maintaining the lexical and syntactic independence of the auxiliary. This paper will propose a solution according to which auxiliary constructions involve the accessing of two (or more) lexical entries via a linking mechanism between paradigm structures. First, we will review the facts of German auxiliary structures, and then review crucial features of the Process-and-Paradigm framework used. The proposed solution will present models of morphological paradigms and of the lexical entries of auxiliary verbs.

2. Data: Auxiliary Constructions in Modern Standard German

There are three auxiliary verbs in German, namely HABEN 'have', SEIN 'be', both used in perfect constructions, and WERDEN 'become', used in future, passive, and subjunctive constructions. These constructions are illustrated in (4) below (complex versions, such as Perfect Passives, have been omitted for lack of space).

(4)	a.	Perfect	...,	weil	sie	den Frosch	geküsst hat		
				because	she	the frog	kissed has		
		Perfect	...,	weil	ihr Ball	in den Brunnen	gefallen ist		
				because	her ball	into the well	fallen has		
	b.	Future	...,	weil	sie	den Frosch	küssen	wird	
				because	she	the frog	kiss	will	

c.	Passive (pres.)	...,	weil		ihr	Ball	gefunden	wird
			because		her	ball	found	is
d.	Subjunctive	...,	wenn	sie	den Frosch		küssen	würde
			if	she	the frog		kissed	

(a) shows perfect constructions with each of the two available auxiliary verbs, (b) the future, (c) shows the passive, and (d) illustrates the subjunctive, the only value for which there is competition with a synthetic form, this alternative being for (d) ...*wenn sie den Frosch küsste*.

Where necessary, an "override" of morphosyntactic values must be provided for. That is, the category value for e.g. Tense expressed by the auxiliary must in some cases be overridden by the value expressed by the construction as a whole. In (4b), the auxiliary *wird* has the category value 'present', but the value of the construction is 'future'. In order to deal with problems of this sort, Ackerman and Stump (2002) propose a complex lexical-morphological system containing two paradigms in the lexicon, the syntactic paradigm and the morphological paradigm. Under this conception, the syntactic paradigm would provide the value 'future' to the syntax, whereas the morphological paradigm would produce the value 'present' by means of the usual inflectional rules. The result of this is a heavily redundant lexicon; the same end needs to be achieved with simpler means.

Further, a morphological and lexical model accounting for auxiliary constructions in the manner sketched so far must allow access only to those forms of the verb that participate in these constructions. For example, the future tense of the verb WERDEN makes use only of the present tense forms of the auxiliary, so we must ensure that forms such as **küssen wurde* ('kiss was') are not produced.

3. Theoretical Background: Process-and-Paradigm Morphology

This paper assumes a Process-and-Paradigm Morphology framework. The essential points of the proposal presented in Section 4, though, should be exploitable in any morphological framework. This section presents features of Process-and-Paradigm relevant to the problem of auxiliary constructions.

The framework postulates a morphological component which is dynamic and rule-based. Its static counterpart is the lexicon, which provides lexical material on which the morphology operates and lexeme-specific information which guides the operation of the morphology. The units of analysis in the system include rule elements (e.g. affixes), rules, and operations mapping rules onto each other. Following a separationist conception of form-meaning relations, affixes are not lexical items and do not "have" meaning as lexemes do; they figure only in rules. Rules are of three types: form rules expressing change of form, semantic rules expressing a function of the meaning of the base, and syntactic rules expressing a change or specification of lexical or syntactic properties. Operations include information on

conditions and domain of application.

An example of an operation belonging to the German inflectional (verb) paradigm is given in (5).

(5) $$\begin{bmatrix} < x \oplus st \ ; \text{sc: V} > & \text{sc: V} \\ < AGR_{SUBJ}(\text{'2p.'}, \text{'sg.'}) \ ; \text{sc: V} > & \text{oc: Slot II} \end{bmatrix}$$

This operation maps a form rule affixing *st* to a base *x* onto a syntactic agreement rule expressing values '2nd' for Person and 'singular' for Number. Both the rules and the operation apply to verb bases, which is indicated under "sc", standing for "stem conditions". The indication "oc", for "operation conditions" allows for a statement for how the operation is to be applied, here indicating that it is assigned to the second suffix position following the initial base.

The morphological paradigm is an organizational construct based on the set of operations in the system (see also Stump 2001), and is likewise located in the morphological component. It consists of sets of sequences of operations that are applied to a lexeme base to produce the set of correct forms. The paradigm is thus fundamentally dynamic in nature. It can be conceived as having a network structure, as shown schematically in Figure (1).

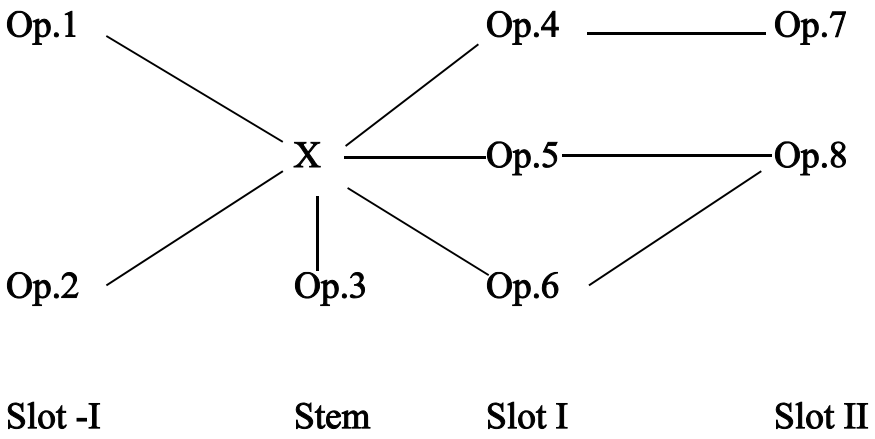

Figure 1. Schematic Structure of the Morphological Paradigm

It is assumed that both inflection and derivation are fundamentally paradigmatic in nature; the differences between the two types of paradigm are minimal and not relevant here. The lexicon in Process-and-Paradigm Morphology likewise has a lexeme-based network structure. An individual lexical entry may be complex. For example, derivational morphology may be contained in the entry of the base (root), and in the case of irregularity, suppletion, and lexicalization, nodes or branches of the paradigm may be included in the lexical entry. Of course, speakers may store more than the minimum, which likewise means storing lexical versions of (part of) the paradigm. There is, naturally, constant interaction between the morphology and the lexicon, or if one likes, between the dynamic and static components.

4. Simplified Model of the Verbal System of German

As illustrated in Section 2, auxiliary constructions in German involve a finite form and one or more non-finite forms, infinitive or "past" participle. The "main" verb will always be non-finite, while auxiliaries may be either finite or non-finite. Our first problem is how to integrate non-finite forms into the paradigm.

Let us first consider the infinitive. Often, the infinitive is considered to be an inflected form of the verb; however, there are some good reasons for taking seriously the traditional characterization of the infinitive as a verbal noun. For example, as an inflectional form, the infinitive would be expected to have the same syntactic behaviour as other word-forms of verbs; clearly, it does not. If the infinitive is a derived verbal noun, the obviously nominal uses of the infinitive, as in *Das Küssen des Frosches* 'the kissing of the frog' need not be derived via word-formation from an inflected form of the verb, a popular but theoretically undesirable move. When the infinitive is required for auxiliary constructions, it is the derivational paradigm of the verb that will be accessed.

There is likewise a case to be made for considering the "past" participle of German to be not an inflectional form of the verb, but a derived one, and thus a member of the derivational, not the inflectional paradigm. Like the infinitive, it clearly does not have the same syntactic behaviour as inflectional verb forms. In its clearly adjectival uses, as in *der geküsste Frosch* 'the kissed frog', it need not be derived via word-formation from an inflected form of the verb. Finally, there is a formal advantage to assigning participle formation to the derivational, rather than the inflectional paradigm. Namely, by virtue of the prefix *ge*, which is one of the formal marks of the participle, the participle is anomalous in the inflectional, but integrated into the derivational paradigm. There are no other prefixes in German inflection of any type, whereas prefixation is typical of German derivation. Indeed, the prefix *ge* itself appears in other functions with verb bases (non-productively), adjective bases, and noun bases. The semantic value of the participle has long been debated. The theoretical advantage of having it be a derivation is that we need not have an exact match between its semantics and the semantics of the constructions in which it appears; in forming a construction where no synthetic forms are available, the system makes the best possible use of available pieces.

Space restrictions make it impossible to discuss the semantic value of the participles, that is, verbal adjectives, at length here (see e.g. Marillier 1998, Klein 2000, Musan 2001). Let us assume, based on the use of the participles in attributive function, and the contrast with the "present" participles (6), that they have the value 'perfective' (PERFV('X')): they have no Tense value. With a telic verb base, the event denoted by a perfective VAdj has reached its natural endpoint, while there is no beginning or endpoint interpretable with the imperfective VAdj.

(6) a. der küssende Frosch 'the kissing frog'
b. der geküsste Frosch 'the kissed frog'

With most VAdjs derived from atelic verbs (7), we observe that the perfective participle can only express that the beginning point of the situation is achieved, as there is no inherent endpoint (similarly with iterative interpretations of telic verb bases).

(7) a. der liebende Frosch 'the loving frog'
b. der geliebte Frosch 'the loved frog'

The latter example brings out another aspect of the participles: as adjectives, they are associated with one or another Participant role in the situation described by the base; in the case of the perfective participle, this is usually the Theme/Patient, and in the case of the imperfective participle, it is the 1st participant, whatever its role.

Now assuming that participle formation involves the semantic function PERFV('X'), as well as an association with a Theme or Patient participant, we can see how Perfect and Passive formation work. The Perfect (PERF('X'), meaning that the situation is finished before the reference time) uses the PERFV('X') derivate as its closest semantic match; it is, however, oblivious to association with a Participant role as irrelevant to the construction (that is determined by the base verb's diathesis and the Voice selection). The Perfect is thus of wider applicability than the perfective attributive adjective (we can say *Der Frosch hat neben der Prinzessin geschlafen* 'the frog has slept beside the princess', but not *der geschlafene Frosch* 'the slept frog').

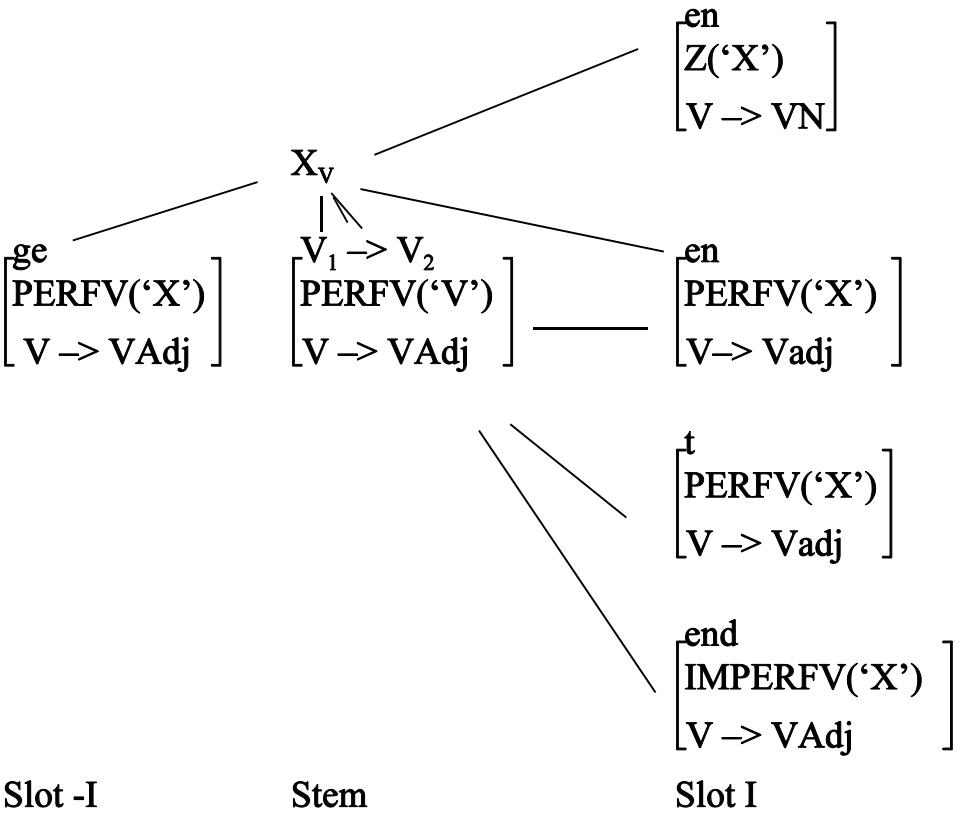

Figure 2: The Derivational Paradigm of Modern Standard German Verbs

The time of reference before which the event takes place in the Perfect is provided by the tense of the auxiliary (and may be made more precise or supplanted by additional sentential information). The passive, meanwhile, is oblivious to the semantics of the participle (PERFV('X')) but finds a match in the association to the Theme/Patient participant. Those aspects of the participle not relevant to the construction would seem to be neutralized by it.

We are now ready to sketch the derivational paradigm for German verbs (Figure 2, previous page). We will ignore all parts of it but the formation of participles and infinitives from verb bases. The path for the formation of the imperfective participle is also shown in Figure (2). It will be noted that there is just one paradigm, which will allow for the formation of both strong and weak verb classes, and even irregular verbs; it is the conditions on the operations which determines the path taken for any given verb, matched with any lexical indications provided for that verb.

The inflectional paradigm contains the full set of operations producing synthetic finite forms. As well, however, it contains a set of five "quasi-operations" (QO_1 - QO_5). These "quasi-operations" map the desired semantic rules (e.g. involving 'future') onto a mechanism which links either a perfective participle or an infinitive to the lexical entry of one of the three auxiliary verbs of German. They are called quasi-operations because they do not act exactly like normal morphological operations: both involve the mapping of a semantic rule, but rather than mapping it onto a form rule, it maps onto the linking between the inflectional and derivational paradigms. The idea is here that it is the conjunction of two morphological items that expresses the semantic value in question. In addition, there is no involvement of a syntactic rule, as in a morphological operation. Note that by following the traditional intuition that category values such as 'future' are expressed by the combination of auxiliary and non-finite derivate, we can exclude the auxiliaries themselves from the inflectional paradigm. This is desirable, as noted above, for we can thus avoid a mixture of levels by not including lexical material in the structure. Auxiliary verbs themselves will be inflected in the paradigm just like any other verb.

As in the case of the derivational paradigm, entry into the inflectional paradigm is effected via the base. The semantic rule required is not (except in case of Subjunctive) available in the set of inflectional operations, so the base passes on to the quasi-operations, where it is then required to go to the derivational paradigm of the verb and "pick up" the appropriate non-finite form as well as to the lexical entry of the appropriate auxiliary, whence inflection (of the auxiliary) will take place, in a simple construction.

(8) QO_1 $\begin{bmatrix} \text{PERF('X')} \\ \text{LINK (VAdj, HABEN)} \end{bmatrix}$

Quasi-Operation$_1$ consists of a mapping of the inflectional rule for the 'perfect' function onto the linking mechanism, which in this case links the VAdj and the lexical entry of HABEN 'have'. The only available VAdj will be the perfective participle,

according to the combinatory information associated with it in its syntactics. This is the default operation for the perfect; verbs of the appropriate semantic class (predicate verbs; intransitive verbs denoting a change of state in the broad sense (unaccusative change-of-state verbs and unergative change-of-place verbs)) select QO_2 (9). QO_2 maps the same inflectional semantic rule onto the linking function involving the perfective participle and the lexical entry of SEIN 'be'.

(9) QO_2 $\begin{bmatrix} \text{PERF('X')} \\ \text{LINK(VAdj, SEIN)} \end{bmatrix}$

QO_3 (10) maps the inflectional rule for 'passive' onto the linking function involving the perfective participle and the lexical entry of WERDEN 'become'. We are here assuming that PASS is actually a remapping function which effects a mapping of the second participant if there is one onto the Subject argument, and that there is a semantic component to this.

(10) QO_3 $\begin{bmatrix} \text{PASS('X')} \\ \text{LINK(VAdj, WERDEN)} \end{bmatrix}$

QO_4 (11) maps the inflectional rule for 'future' onto the linking function involving the infinitive (verbal noun) and the lexical entry of WERDEN 'become'.

(11) QO_4 $\begin{bmatrix} \text{FUT('X')} \\ \text{LINK(VN, WERDEN)} \end{bmatrix}$

Finally, QO_5 (12) maps the inflectional rule for 'subjunctive' onto the linking function involving the infinitive and the lexical entry of WERDEN 'become'. It is within this lexical entry that the correct forms for each construction involving WERDEN will be selected.

(12) QO_5 $\begin{bmatrix} \text{SUBJ('X')} \\ \text{LINK(VN, WERDEN)} \end{bmatrix}$

5. Lexical Entries

In this section, we will concentrate on the lexical entries of the auxiliary verbs themselves. As far as non-auxiliary verbs are concerned, there is no need for lexical specifications for construction with a particular auxiliary in the perfect, as the choice of auxiliary is entirely predictable: the default choice is HABEN, while intransitive verbs denoting a change of state (including change of place) and predicate verbs (SEIN 'be', BLEIBEN 'remain', and WERDEN 'become' (of course also a change of state)) select SEIN. These class specifications need therefore only be expressed in the lexical entry of SEIN.

It has been debated whether auxiliary verbs associated with several distinct functions (such as WERDEN in German) should be considered as homophonous, distinct verbs, thus being assigned distinct lexical entries (cf. e.g. Warner 1993). Likewise, it has been suggested that all auxiliaries be considered only homophonous with their "full" verb counterparts, so that there would be e.g. two distinct verbs HABEN 'have' and HABEN, auxiliary for the perfect. Given the fact that formal identity is so nearly perfect for all three auxiliaries in German (the lone exception being the perfective participles of WERDEN, one having become specialized for use in the passive), and that all three verbs are irregular, we will follow our usual practice of incorporating polysemy within the same lexical entry. In other words, considerations of form motivate the decision to propose just one lexical entry for all functions of these verbs. Accordingly, the lexical entry must make it possible to distinguish the interpretations of these verbs and to create appropriate syntactic structures.

(13) HABEN

F: stem: /hab/ ; S: 'have' ; Σ: V_{wk}

[NP _____]

QO_1: [VAdjP _____]

IO !

(13) sketches a minimal entry for the auxiliary verb HABEN. The entry contains basic information for form, meaning (details omitted), and lexico-syntactic properties, here verb class assignment and subcategorization. Thus as a weak verb, it will undergo the default operations in the inflectional paradigm where there is no lexical specification blocking them. Such specifications (indicated here by "IO!") occur for the subjunctive, where the vowel-changing operation normally associated with the class of strong verb is specified, as well as for the three irregular forms. There are two subcategorizations provided for the verb, the first for the "full" verb use, where there is an obligatory NP complement. The VAdjP complement is associated with the appropriate quasi-operation in the auxiliary construction. We can assume that the meaning of the "full" verb here and in the case of the other auxiliaries is overridden by the meaning of the construction, i.e. the semantic function will be retrieved from the morphological paradigm via the "quasi-operation". The semantic function for 'perfect' will apply to the meaning of the base of the complement verbal adjective, just as other inflectional functions modify the meanings of their bases in the synthetic case.

(14) SEIN

F: stem: /zaj/, /vez/, /vaʀ/ ; S: 'be' ; Σ: V_{str}

[_____]

QO_2: [VAdjP _____]

IO!

(14) sketches a minimal lexical entry for the verb SEIN. The same types of information are provided in this lexical entry. There are two stems listed, the second being suppletive. The stems also appear in the appropriate parts of the lexical version of the paradigm. SEIN is a member of the strong verb class, so that wherever an operation in the inflectional or derivational paradigm is specified for this class, it will apply, unless overridden by a lexical specification. There are a large number of suppletive forms of the verb, which are given or produced at the appropriate nodes of the lexical paradigm (omitted here). Where regular inflectional morphology occurs with these forms as well, this is made possible by not specifying all nodes in the path; reference will then be made to the morphological paradigm. As in the case of HABEN, there are two subcategorization frames. Adjectival and nominal predicates occur with the full verb. As a participant in QO_2, which is responsible for 'perfect', SEIN takes a VAdjP complement.

(15) WERDEN

F: stem: /vɛʀd/ ; S: 'become' ; Σ: V_{str}

[_____]

QO_3: [VAdjP _____]

QO_4: [VNP _____]

QO_5: [VNP _____]

(15) shows a sketch of the minimal lexical entry of the auxiliary verb WERDEN. This entry is more complex in some ways than that of the other auxiliaries. Like SEIN, it is a member of the "strong" verb class, and will undergo the operations in the inflectional paradigm that are specified for that class (as well as those that apply to all verbs, of course). There are also a few suppletive forms, which will be incorporated into the lexical paradigm. The lexical derivational paradigm must also specify the form of the participle to be used in conjunction with the perfect

passive (QO_3) . The vowels for the ablaut rules must be given in order for the appropriate operations to be carried out. The first subcategorization frame given is for the "full" use of the verb, as a predicate verb. The second is needed for QO_3, responsible for the passive. Here, the VAdjP is the complement of WERDEN. The third frame is for WERDEN as a participant in QO_4 responsible for 'future', where the complement is a VN-phrase. The quasi-operation itself is indicated in the skeleton lexical paradigm, where it appears in conjunction only with present tense forms of the verb. Likewise in the case of the subjunctive, QO_5 appears only in the branch of the lexical paradigm producing the synthetic subjunctive of WERDEN.

6. Conclusion

It is possible to describe auxiliary constructions in German as morphological inasfar as they can be integrated into the inflectional paradigm due to their semantics, which is considered to correspond to a morphological semantic function. At the same time, the individual words of the construction are available to the syntax as distinct atoms and are located in distinct lexical entries. This is preferable to a system which does not relate word-forms and derivates of auxiliaries to the lexical entries of these, but rather incorporates them into the paradigm of the "helped" verb. Lexical entries for almost all verbs need make no reference to auxiliaries. This result is achieved via the linking of lexical entries via the morphological paradigm. Such linking can be extended to various types of complex expression, such as constructions with modal verbs, separable-prefix verbs, and compounds.

References

Ackerman, F., and P. LeSourd. 1987. Toward a Lexical Representation of Phrasal Predicates. In *Complex Predicates*, eds. A. Alsina, J. Bresnan, and P. Sells, 67-106. Stanford:CSLI..

Ackerman, F., and G. Stump. 2002. Paradigms and Syntactic Expression. A Study in Realization-Based Lexicalism. In *Constraint-Based Morphosyntax*, eds. A. Spencer and L. Sadler. Stanford:CSLI.

Bierwisch, M. 1990. Verb Cluster Formation as a Morphological Process. *Yearbook of Morphology* 3:173-199.

Klein, W. 2000. An Analysis of the German perfekt. *Language* 76: 358-382.

Marillier, J.-F. 1998. *sein/haben* + P2: Morphologie oder Syntax? Oder: Das deutsche Perfekt revidiert. In *Deutsche Grammatik: Thema und Variationen*, eds. K. Donhauser and L. Eichinger, 21-34. Heidelberg: Winter.

Musan, R. 2001. The Present Perfect in German: Outline of its Semantic Composition. *Natural Language and Linguistic Theory* 19:355-401.

Pounder, A. 1996. Inflection and the Paradigm in German Nouns. *American Journal of Germanic Language and Linguistics* 8:209-263.

Pounder, A. 2000. *Processes and Paradigms in Word-Formation*. Berlin: Mouton de Gruyter.

Stump, G. 2001. *Inflectional Morphology: A Theory of Paradigm Structure*. Cambridge:CUP.

Warner, A. 1993. *English Auxiliaries*. Cambridge: CUP.

Webelhuth, G. and F. Ackerman. 1998. *A Theory of Predicates*. Stanford: CSLI.