On $v$ and Voice: German Medium verbs and their nominalizations

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1 Data
Data source: 50 non-prefixed -ung nominalizations manually identified in a cleaned and parsed version of the deWaC corpus (Baroni et al. [2009]). Prime example: Die Wirkung der Tablette (“the effect of the pill”). I call the base verbs of these -ung nominalizations 'Medium Verbs' (MV) and their nominalizations 'Dispositional Nominalizations' (DN).

1.1 Perfect auxiliary selection
Like unergatives (1a), MVs select haben as an auxiliary in perfect formation (1b)-(1d).

(1) a. Peter hat gesungen.
   Peter have.AUX sing.PRES.PERF
b. Die Tablette hat
the pill have.AUX
gewirkt.
take effect.PRES.PERF
c. Die Wunde hat
the wound have.AUX
geblutet.
bleed.PRES.PERF
d. Das Uran hat
the uran have.AUX radiate.PRES.PERF

1.2 Impersonal Passive
Unlike unergatives (2a) but like unaccusatives (2b), no impersonal passive can be formed (2c)-(2e).

(2) a. Es wurde gesungen.
it be.AUX.PASS sing
b. *Es wurde gebrochen.
it be.AUX.PASS broken
c. *Es wurde gewirkt.
it be.AUX.PASS taken effect
d. *Es wurde geblutet.
it be.AUX.PASS bleed
e. *Es wurde gestrahlt.
it be.AUX.PASS radiate

1.3 No middles
Unlike unergatives (3a), no middle construction is possible (3b)-(3d).

(3) a. Das Lied singt sich leicht.
   the song sings REFL easily
b. *Die Tablette wirkt sich leicht.
The pill takes effect REFL easily.
c. *Die Wunde blutet sich leicht.
The wound bleeds REFL easily
d. *Das Uran strahlt sich leicht.
The uran radiates REFL easily.

1.4 Adjectival use of the perfect participle
Like unergatives (4a), no adjectival use of the perfect participle is possible (4b) - (4d).

(4) a. *Der gesungene Peter
   the sung Peter
b. *Die gewirkte Tablette
   the effected pill
c. *Die geblutete Wunde
   the bleeded wound
d. *Das gestrahlte Uran
   the radiated uran

1.5 Resultative constructions
Unlike unergatives (5a), a reflexive in object position does not allow for a resultative construction (5b)-(5d).

(5) a. Peter sang sich heiser.
Peter sang REFL hoarse.
b. *Die Tablette wirkte sich gesund.
The pill took effect REFL healthy.
c. *Die Wunde blutete sich voll.
The wound bleeded REFL full.
d. *Das Uran strahlte sich tot.
The uran radiated REFL dead.

Unlike unaccusatives (6a), no resultative construction is possible (6b)-(6d), (7a)-(7d)

(6) a. Die Schachtel brach auf.
The box broke open.
b. *Die Tablette wirkte aus.
The pill took effect out.
c. *Die Wunde blutete aus.
The wound bleeded out.
d. *Das Uran strahlte tot.
The uran radiated dead.
Peter brach die Schachtel auf.
The pill took effect the patient healthy.

b. *Die Tablette wirkt den Patienten
The pill took effect the patient

c. *Der Metzger blutete das Tier aus.
The butcher bled the animal out.
d. *Das Uran strahlte den Arbeiter tot.
Theuran radiated the worker dead.

But: a dispositional “result state” can be diagnosed with a dispositional adjective

(8) a. Die Tablette wirkte tödlich.
The pill took effect lethally.
b. Die Wunde blutete gefährlich.
The wound bled dangerously.
c. Das Uran strahlte gefährlich.
Theuran radiated dangerously.

That no result state can be diagnosed suggests that MVs are “mono-eventive”.

1.6 Nominalization
Unlike unergatives (9a) but like unaccusatives (9b), eventive -ung nominalizations can be formed (9c)

(9) a. *Die Singung des Liedes
The singUNG des.GEN song
b. Die häufige Fütterung des Löwen
The frequent feed.UNG the.GEN lion
c. Die konstante Wirkung der Tablette
The constant effect.UNG the.GEN pill

- Formation of event nominalizations: “It has been noted in the literature that across languages event nominals are […] derived from unaccusative predicates, but not from unergative ones” [Alexiadou, 2001, p.78]
- Formation of German -ung nominalizations: “-ung formation constraint: a verbal construction has an -ung nominalization if and only if the verb is constructed bi-eventively.” [Roßdeutscher, 2010, p. 106].

1.7 Genitive interpretation in nominalization
Unlike -ung nominalizations formed from unaccusatives no theme interpretation of the genitive adjunct is possible.

1.8 Productivity
-ung formation from MVs is productive as exemplified in (11)

(11) a. Für mein Brot mache ich eine
for my bread make I a
Kühlschrank “Gehung” über Nacht.
fridge-prove.UNG over night
http://bfriends.brigitte.de/foren/rezeptideen/55358-was-kocht-und-backt-ihr-zu-ostern-6.html

2 Dispositions
Inspiration for my analysis: Ryle [1949]’s analysis of to hibernate and its nominalization hibernation as dispositions. Ryle argued that dispositions are “inference-tickets, which license us to predict, retrodict, explain and modify […] actions, reactions and states.” [Ryle, 1949, p. 124]. I propose an analysis of MVs and DNs
at the syntax-semantics interface in which events are inferred from the instantiation of dispositional properties. NB: (12a) - (12c) are english DNs but I focus on German data in the following.

(12) a. The hibernation of the bear (*by-PP) was interrupted
    b. The constant ulceration of the wound (*by-PP)
    c. The constant vibration of the car (*by-PP)

A disposition can be defined as follows:

• \( x \) has the disposition to \( p \) if \( C \) iff it would \( p \) if \( C \) were the case. (Simple Conditional Analysis (SCA) of Dispositions, Choi [2012])

Dispositions fall square within the distinction between unergative and unaccusative verbs when this distinction is based on the different role that the DP argument of these verbs realizes:

• Unergative verbs: DP argument is an agent/causer
• Unaccusative verbs: DP argument is a theme/patient

The bearers of dispositions, I call them the 'Medium' of the disposition, are neither exclusively agents nor themes. In the realization of a disposition, a Medium has both properties of the proto-agent and the proto-theme (Dowty [1991]). On the one hand, a pill “causes an event or change of state in another participant” – the effect of the pill – on the other hand, a pill is “causally affected by another participant” – it takes effect only when ingested. That is, a Medium argument is external to the disposition property but internal to the instantiation of the disposition as an event. Making precise the connection between these two roles of Medium argument at the syntax-semantics interface is the goal of this paper.

2.1 Syntax of medium verbs and their nominalizations

The syntactic structure that I propose for Medium verbs such as \textit{wirken} is the one given in (13).

\[
\begin{array}{c}
\text{DP:Medium} \\
\text{Voice}_{\text{DISP}} \\
\text{Voice}_{\text{DISP}} \\
\end{array}
\begin{array}{c}
\sqrt{\text{wirk}} \\
\text{vP} \\
\text{Voice}_{\text{DISP}} \\
\end{array}
\begin{array}{c}
\text{DP} \\
\text{Det} \\
\end{array}
\begin{array}{c}
\text{vP} \\
\lambda.e.\text{medium}(\text{tablette})(e) \wedge \text{wirk}(e) \\
\end{array}
\]

Medium theta role is defined as follows:

• The Medium theta role is assigned to DPs which are in the specifier of Voice \textit{and} in the specifier of the complement XP of vP.

Under the assumption that in “a 'pervasive syntax' approach to morphologically complex forms, like that of Distributed Morphology, the analysis and structures proposed for a form must also be contained within the analysis of any structure derived from that form” [Harley, 2009, p.320], the DN \textit{-ung} nominalization of a MV has an analysis as in (14)

\[
\begin{array}{c}
\text{DP} \\
\text{Det} \\
\text{a} \\
\text{vP} \\
\lambda.e.\text{medium}(\text{tablette})(e) \wedge \text{wirk}(e) \\
\end{array}
\begin{array}{c}
\text{Voice}_{\text{DISP}} \\
\text{Voice}_{\text{DISP}}' \\
\sqrt{\text{wirk}} \\
\lambda.e.\text{wirk}(e) \\
\end{array}
\]

(13) and (14) get most of the syntactic issues involved in the data right:

• Selection of \textit{haben} as an auxiliary in perfect formation is predicted by the occurrence of Voice
• No impersonal passive and no middles for MVs because Voice has already been determined as dispositional
• No agent/causer introduction with \textit{durch}-PPs in the \textit{-ung} nominalization because the external argument position is already occupied

2.2 Semantics of medium verbs and their nominalizations

First attempt at a compositional semantics for Medium verbs, employing Kratzerian event identification Kratzer [1996].

\[
\begin{array}{c}
\text{vP} \\
\lambda.e.\text{medium}(\text{tablette})(e) \wedge \text{wirk}(e) \\
\end{array}
\begin{array}{c}
\text{v} \\
\lambda.e.\text{medium}(\text{tablette})(e) \wedge \text{wirk}(e) \\
\end{array}
\begin{array}{c}
\text{DP} \\
\text{Voice}_{\text{DISP}} \\
\text{Voice}_{\text{DISP}}' \\
\lambda.e.\text{medium}(x)(e) \wedge \text{wirk}(e) \\
\end{array}
\begin{array}{c}
\lambda.e.\text{wirk}(e) \\
\end{array}
\]

(15) gets the remaining issue in the data right:

• No resultative construction and no adjectival use of the participle because no result state is available.

But: what is the \textit{semantic} contribution of little \textit{v} besides its syntactic function of determining the theta role of the DP? Shouldn’t we just omit \textit{v} in the analysis? What are the semantic properties of MVs and their nominalizations which make them obviously contradict the pre-
dictions in the literature? In the next section I want to provide a semantics for little \( v \) that provides an analysis of MVs and their -ung nominalizations that makes MVs and DNs fit into the picture of the semantics that has been devised for mono-eventive and bi-eventive verbs, adopting Roßdeutscher [2010]’s interpretation of Marantz [2005] conception of mono-eventivity and bi-eventivity. In a mono-eventive construction, \( v \) selects for an atelic event type whereas in a bi-eventive construction, \( v \) selects for a state-denoting XP. The semantics for \( v \) that I develop in the following combines both semantic construction types in a “Medium construction type”, in that \( v \) selects for a disposition-denoting XP as an atelic event type.

2.3 The semantics of little \( v \) in Medium constructions

The semantic characterization of the Medium theta role is to be the medium of a disposition, but what is a disposition? Recall the SCA analysis:

SCA-L \( \lambda x.\lambda p.\text{wirken}(p) \land \text{medium}(p)(x) \equiv x \) would take effect if \( C \) were the case (a property).

SCA-R \( \lambda x.\lambda e.\text{wirken}(e) \land \text{medium}(e)(x) \equiv x \) has the disposition to take effect if \( C \) (a dispositional event?).

But something is strange with SCA-R: Medium verb dispositions are necessarily instantiated by their triggering conditions: a vase that is fragile can break when shuttered but a pill takes effect when ingested. Thus, the dispositions expressed by MVs are not “easy possibilities” in the sense that adjectival fragile means “can break easily” (Vetter [forthcoming]): verbal to take effect does not mean “can take effect easily” but “does take effect if C”. NB: This is also why MVs are distinct from ability modals. There are no “dispositional events” but only events which result from the instantiation of a disposition. Thus the correct formulation of the right hand side of the SCA for MVs is SCA-R’:

SCA-R’ \( \lambda x.\lambda e.\text{wirken}(e)(x) \land \text{medium}(x) \equiv x \) takes effect if \( C \) (an event).

Furthermore, dispositions can only be instantiated once, and once they are instantiated, they result in complex events. I use linear logic implication \( \rightarrow \) and the dynamic box operator \( [] \) (semantically representing a necessary causal accessibility relation between possible worlds) to model the causal relation between MV dispositions and MV events (see e.g. Steedman [2002] for an overview).

Example: if something is shut and you push it, it becomes open: \( \text{shut}(x) \rightarrow [\text{push}(x)\mid \text{open}(x)] \). Once you apply the rule, the proposition in question is “used up”.

Applied to dispositions, this means that the ingestion of a pill leads you from a state in which the pill has the dispositional property to take effect if ingested to a state of affairs in which the pill takes effect. Formally, this can be represented as in (16), employing a Lewis-style analysis of counterfactuals (Lewis [1973]).

\[
\text{(16) a. } (\lambda p.\text{medium}(\text{tablette})(p) \land \text{ingest(\text{tablette})}, ~ \square \rightarrow \text{wirk}(p)) \rightarrow [\text{ingest(\text{tablette})}] \\
(\lambda e.\text{medium}(\text{tablette})(e) \land \text{wirk}(e)).
\]

b. “If a pill would take effect if it were ingested, then, when it is ingested it takes effect.”

A general proposal for an instantiation scheme for dispositions that introduces events is given in (17).

\[
\text{(17) a. } (\lambda p.\text{medium}(x)(p) \land (C \rightarrow Q(p))) \rightarrow [C](\lambda e.\text{medium}(x)(e) \land Q(e)).
\]

b. “If a medium would take effect if it were the case that \( C \) then, when \( C \) it ps.”

2.4 Semantic construction for Medium Verbs

I propose that Medium Verbs are ontologically different from their nominalizations in that Medium Verbs denote events (i.e. instantiations of dispositions) whereas their nominalizations denote uninstantiated dispositions.

Then, the function of little \( v \) in verbal constructions is to identify the disposition predicated of the medium as denoting an event when instantiated, i.e. \( \square \text{ iff } [C] \) is applied to the dispositional property. This leads to a semantics of \( v \) in which \( v \) derives a mono-eventive structure in that \( v \) instantiates a disposition as an atelic event but \( v \) derives also a bi-eventive structure in that \( v \) selects a disposition (roughly corresponding to a property/state) denoting XP (i.e. \( \text{Voice}_{\text{Disp}}P \)). This is in accordance with the prediction on -ung formation made by Roßdeutscher [2010]. Voice identifies the Medium of the dispositional property instead of the agent of an event but disposition identification is parallel to Kratzerian event identification. NB: There are other options for the semantics of \( v \), e.g. that \( v \) does not instantiate the disposition but that this is done by e.g. Tense or modifiers. I won’t explore these other options here. I propose: Medium verbs have a bi-eventive construction which is selected by \( v \) as an atelic event type via disposition instantiation, i.e. they have a Medium construction as in (19).
2.5 Semantic construction for Dispositional Nominalizations

Again, for DNs, two options for the semantics of $v$ seem possible: either $v$ instantiates the disposition or not. I propose that in DNs, the disposition is not instantiated but the semantics of DNs “waits” for $C$ to be contextually supplied at a level above DP as part of a selection restriction for a complex event. This would rehabilitate the generalization of Alexiadou [2001] as DNs are not eventive because they have a medium construction in which the disposition is not instantiated. Again, there are other options available, e.g. that $v$ instantiates the event also in DNs, but I am uncertain about which tests actually could tell about the instantiation of dispositions. Data as in (18) suggests that in nominalizations, $v$ does not instantiate the dispositions. In (18a), no event seems to be introduced by Wirkung on its own and that is why the localization of an event fails. But once the disposition denoted by Wirkung is explicitly instantiated as in (18b)), the event can be localized. However, I consider the diagnosis of event denotation an open research question, see Pross [2013].

(18)

a. ?Die Wirkung der Tablette fand the effect.UNG the.GEN pill took sofort statt. immediately place

b. Die Wirkung der Tablette the effect.UNG the.GEN pill trat sofort ein. occurred immediately

3 Summary and Outlook

- I proposed an analysis of a class of strictly intransitive German verbs and their -ung nominalizations in which the argument position bears Medium theta status in that it conflates a combination of proto-agentive and proto-thematic properties in a dispositional property.
- I argued that dispositions are coded syntactically and realized semantically in a setting where $v$ selects for a disposition denoting Voice$_{Disp}$ as an atelic event.
- I expect that other languages than German also have MVs and DNs (cp. the English data in (12a)-(12c)).
- A note on the no agent-idioms hypothesis: there are no agent-idioms but it seems as if there are medium-idioms. Possible fillers of the argument slot of medium verbs are highly restricted: only wounds bleed in the literal sense. But if my heart bleeds because of lovesickness, this leads to a special meaning of to bleed. Thus it seems as if the domain of special meaning for Dispositional Voice includes the Medium argument.
- MVs and DNs support the view that Voice is a causal head which is responsible for the encoding of causality in natural language and that $v$ is a categorizer for event-denoting verbs.

References
