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Proto-Roles and Case Selection in Optimality Theory

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Psych-Verbs and Lexical Economy

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Abstract

Psych-verbs have been a touch-stone to linking-theories, which assume that case selection is determined by thematic roles. Though psych-verbs share the same thematic grid (experiencer and stimulus), they show different case frames. Different syntactic (structural) and semantic (event- or causal structure) approaches exist, but at least in German we will show that none of the several approaches to psych-verbs cover all differences and similarities of the several formal classes of psych-verbs in that language. In this paper we argue that the case selection of psych-verbs does not depend on their psychological reading at all. While Functional Expressivity requires that different thematic roles are expressed by different forms, Lexical Economy states that lexical entries should be minimally, i.e. verbs should only provide one case frame. Thus, the case frame of a verb must be compatible to the thematic requirements of all readings of this verb. Researchers paid little attention to the fact that polysemy is characteristic for psych-verbs. Psych-verbs have (or have had) other, more specific readings, as well, and occasional psychological readings are possible for most verbs. According to the proto-role approach of Dowty (1991) and its modifications by Primus (1999b, 2002a, 2002b, 2002c), case selection is determined by the grade of agentivity or patientivity of arguments. Concrete readings have stronger agents and patients and make therefore stronger restrictions to case selection, and the psychological reading of a verb is always compatible with this reading. Thus, the case selection of psych-verbs is not affected by its psychological reading.

1 Introduction

Research on psych-verbs has been a central challenge for efforts to characterise the alignment between predicate arguments and their grammatical encoding. Under the assumption that verbs sharing the same theta-grid and event structure select the same case patterns, psych-verbs are misbehaving unless it is possible to show that the constructional variants of these verbs trace back to differences in their event structure.

The thematic roles of psych-verbs are usually referred to as experiencer and stimulus with one-place-predicates only allowing for an experiencer. Following Dowty (1991) an experiencer (Exp) is a verbal argument whose corresponding participant in the situation named by the verbs has a sensation, an emotion, a perception, a mental attitude or state with respect to this situation.¹ A stimulus (Stim) must be perceived by the experiencer and thereby causes some emotional reaction or cognitive judgment in the experiencer (p. 579).

¹ These entailments are subsumed by Dowty under sentience, a type of entailment that falls under Proto-Agent (cf. section 3.1).

A closer look on psych-verbs reveals that they can be semantically further distinguished. The most prominent subclass of psych-verbs comprises verbs denoting emotions (*lieben, verzweifeln*, etc.). Accordingly, the term ‘psych-verbs’ is often used in a narrower sense to design this subclass. The broader definition of psych-verbs also includes perceptual verbs (*sehen, schmecken*, etc.), cognitive verbs (*denken, raten, grübeln*, etc.), and evaluating verbs (*schätzen, achten*, etc.) (cf. Bossong 1998). The work of most linguists is more or less implicitly based on the narrower definition; i.e., they focus more or less explicitly on emotional verbs. This may be caused by the fact that mainly emotional verbs exhibit the above-mentioned variety of constructions. As Dowty’s definition suggests, we take the broader view as the basis for our approach.

The theoretical framework of our approach is based on Dowty’s theory of proto-roles and its modification and implementation in Optimality Theory (OT) in Primus (1999b, 2002a, 2002b, 2002c). Accordingly, we assume only two thematic roles, namely proto-agent and proto-patient. Verbal arguments inhere proto-agentive and proto-patientive properties like control, causation, sentience, etc. whereby the degree of agentivity or patientivity may vary (cf. Dowty 1991, Primus 2002c); also one argument can bear agentive and patientive properties at the same time. Within an OT implementation of this approach, the case selection is based on different types of violable constraints.

Our aim is to show that – at least for German – case selection of psych-verbs does not at all depend on their psychical reading. Since it is characteristic of psych-verbs to have other, non-psychical readings as well, we will argue that it is the non-psychical readings that determine case selection. This claim is deduced from the principle of Lexical Economy, which states that entries in the mental lexicon are as simple as possible. As a consequence, verbal lexemes should exhibit as few case frames as possible, and case frames should only vary minimally. Since psych-verbs must satisfy the principle of Lexical Economy, their case frame must be compatible with all readings of the verb. Thereby, we will show that the crucial reading for case selection is the strongest reading, i.e. the reading with the strongest thematic distinctiveness of each argument, which is in many instances a reading with a maximal agent and a maximal patient (cf. section 4).

The following table gives a survey of the main constructions of German psych-verbs.

(1) Table of psych-verb constructions²

Exp Stim		A	B	C	D
		NOM	ACC	DAT	PP
1	–	<i>ich staune</i> (2a) <i>ich friere</i> (3a)	<i>mich friert</i> (3b)	<i>mir ist kalt</i> (3c)	<i>es bakt bei mir aus</i> <i>in mir steigt Wut auf</i>
2	NOM		<i>er begeistert mich</i> (14)	<i>sie gefällt mir</i> (15)	<i>die Lösung schlummert in mir</i>
3	ACC	<i>ich mag ihn</i> (2b) <i>ich erhoffe mir das</i> (11)			
4	DAT	<i>ich traue dir</i> (7)			
5	GEN	<i>ich gedenke seiner</i> (8)		<i>mir ermangelt (es) der Ruhe</i> (16)	
6	PP	<i>ich hadere mit dir</i> (9) <i>ich vergnüge mich im Kino</i> (12)		<i>mir graut (es) vor morgen</i> (17)	
7	CP	<i>sie denkt, dass sie noch Zeit hat</i> (10)	<i>ihn dünkt, dass dies förderlich wäre</i> (18)	<i>mir schwant, dass das so nicht geben würd</i> (19)	
8	split	<i>ich gönne dir den Erfolg</i> (22) <i>er schenkt mir Gehör</i> (21a)		<i>er macht mir Angst</i> (21c) <i>er fällt mir ins Auge</i> (21b)	

² The numbers behind the examples refer to the examples below, where glosses and translations are given. For the sake of clarity we do not provide any glosses in the table.

Of all types of psych-verbs in German, verbs of perception and, with some minor exceptions (e.g. *dünken*), verbs of cognition show a strong affinity to the Exp/NOM³ construction. Verbs of sensation, emotion and evaluation on the other hand are distributed over different types of constructions. This is in line with the findings of Haspelmath (2001:63), who, using the data collected in Bossong (1998), shows that this phenomenon holds for 40 European languages regardless of their genetic or areal affinities. For our further outline we thus turn our attention to the latter subclasses of psych-verbs in particular, though nevertheless all of the classes are considered in our approach.

From a morphosyntactic perspective, German psych-verbs exhibit a wide range of construction types. First of all we find 1, 2 and 3-place predicates as in (2).

- (2) a. *Ich staune.*
1s:NOM be.astonished:PRS:1s
'I am astonished.'
- b. *Ich mag ihn.*
1s:NOM like:1s:PRS 3s:ACC
'I like him.'
- c. *Ich wünsche ihm den Erfolg.*
1s:NOM wish:1s:PRS 3s:DAT the success:ACC
'I wish him success.'

One-place-predicates only relate to an experiencer, but not to a stimulus. The experiencer usually appears in the nominative (cf. (2)), but also accusative and dative markings are possible, as will be dealt with further below. For a small class of one-place psych-verbs, the coding of the experiencer is not restricted to one case but may vary between nominative or accusative marking (e.g. *frieren* 'to be cold', *hungern* 'to be hungry') or between accusative and dative marking (*dünken* 'to seem/think', *grausen* 'to be horrified'), as illustrated in (3).

- (3) a. *Ich friere.*
1s:NOM be.cold:PRS:1s
'I am cold.'
- b. *Mich friert.*
1s:ACC be.cold:PRS:3s
'I am cold.'
- c. *Mich dünkt, dass (...)*
1s:ACC seem/think:3s:PRS Comp
'It seems to me, I think, that...'
- d. *Mir dünkt, dass (...)*
1s:DAT seem/think:3s:PRS COMP
'It seems to me, I think that...'

In all constructions without a nominative the predicate shows a 3rd person singular agreement (cf. (3.b-d)). In most cases, speakers of German do accept or even regularly use an expletive subject-NP *es* 'it', as shown in (4).

- (4) *mir ist schlecht* vs. *es ist mir schlecht*
'I feel sick.'

³ We use the notation semantic role/CASE to represent that an argument is coded in the given case.

According to Greule (1999:135), the Exp/NOM-Exp/ACC-doublets are found from the oldest German data on as illustrated in (5.a), in which the experiencer subject of the verb *hungern* ‘to be hungry’ is encoded in NOM, and in (5.b), in which the experiencer NP is encoded in ACC.⁴

- (5) a. *Bitiu uuanta ir hungeret*
 because 2p:NOM be.hungry:2p:PRS
 ‘Because you are hungry.’ (Tatian 23,2)
- b. *after thiu hungirita inan*
 after that be.hungry:3s:PAST 3s:ACC
 ‘After that he was hungry.’ (Tatian 15,2)

With two-place predicates we find several different case frames in German. Examples (6) to (22) show constructions in which the experiencer selects the nominative, while the case of the stimulus varies (ACC, DAT, GEN):

- (6) Exp/NOM & Stim/ACC
ich mag dich
 1s:NOM like:1s:PRS 2s:ACC
 ‘I like you.’
- (7) Exp/NOM & Stim/DAT
ich traue dir
 1s:NOM trust:1s:PRS 2s:DAT
 ‘I trust you.’
- (8) Exp/NOM & Stim/GEN
ich gedenke seiner
 1s:NOM commemorate:1s:PRS 3s:GEN
 ‘I commemorate him.’

The stimulus may also be added as a PP (cf. (9)) or as a sentential complement, as illustrated in (10).

- (9) Exp/NOM & Stim/PP
ich hadere mit dir
 1s:NOM quarrel:1s:PRS PREP 2s:DAT
 ‘I quarrel with you.’
- (10) Exp/NOM & Stim/CP
sie denkt, dass sie noch Zeit hat
 3s:NOM think:3s:PRS that 3s:NOM still time have:3s:PRS
 ‘She thinks that she still has time.’

The experiencer may be accompanied by an accusative (cf. (11)) or dative reflexive pronoun (cf. (12)).

- (11) Exp/NOM+Refl/DAT & Stim/ACC
ich erhoffe mir einen schönen Urlaub
 1s:NOM hope:1s:PRS 1s:Refl.:DAT a nice vacation:ACC
 ‘I hope for a nice vacation.’

⁴ The examples in (5) provide evidence for variability since they accrue from the same manuscript, namely Tatian, a bilingual Latin – Old High German gospel harmony of the 9th century.

- (12) Exp/NOM+REFL/ACC (& Stim/PP)
ich *vergnügte* *mich* *im Kino*
 1s:NOM amuse:1s:PRS 1s:REFL in the cinema
 'I amuse myself in the cinema.'

ACC-reflexive-constructions can be divided into two subgroups: constructions which cannot take a stimulus-PP, as in (13.a), and constructions to which a stimulus may be added via PP (cf. (13.c)). In both subgroups these verbs have non-reflexive two-place constructional variants with a theme or an experiencer in the accusative (cf. (13.b, d)) in a remarkably amount of cases.

- (13) a. *Ich* *fange* *mich*
 1s:NOM catch:1s:PRS REFL
 'I recover my poise.'
- b. *Ich* *fange* *den Hund*
 1s:NOM catch:1s:PRS the dog:ACC
 'I catch the dog.'
- c. *Ich* *ärgerere* *mich (über den Hund)*
 1s:NOM be.angry:1s:PRS REFL over the dog:ACC
 'I am angry (at the dog).'
- d. *Ich* *ärgerere* *den Hund*
 1s:NOM make.angry:1s:PRS the dog:ACC
 'I make the dog angry.'

But the experiencer may also select the accusative or dative. In this case, either the stimulus is in nominative case (examples (14) and (15)), or an optional expletive may appear (examples (16) and (17)). There are only some psych-verbs without an – at least optional – nominative. These verbs are rather antiquated like *dünken* 'to seem' in (18) and *schwanen* 'to suspect' in (19).

- (14) Exp/ACC & Stim/NOM
er *begeistert* *mich*
 3s:NOM inspire:3s:PRS 1s:ACC
 'He inspires me.'
- (15) Exp/DAT & Stim/NOM
sie *gefällt* *mir*
 3s:NOM appeal:3s:PRS 1s:DAT
 'She appeals to me.'
- (16) Exp/DAT & Stim/GEN (& Expletivum)
mir *ermangelt* *(es)* *der Ruhe*
 1s:DAT lack:3s:PRS (it):EXPL the calmness:GEN
 'I lack calmness.'
- (17) Exp/DAT & Stim/PP (& Expletivum)
mir *graut* *(es)* *vor* *morgen*
 1s:DAT be.afraid:3s:PRS (it):EXPL PREP tomorrow
 'I am afraid of tomorrow.'
- (18) Exp/ACC & Stim/CP
ihn *dünkt,* *dass dies förderlich wäre*
 3s:ACC seem:3s:PRS that this:NOM conducive be:3s:KONJ2
 'It seems to him that this would be conducive.'

- (19) Exp/DAT & Stim/CP
mir schwant, dass das so nicht geben wird
 1s:DAT suspect:PRS:3s that this that way not work:FUT:3s
 ‘I suspect that this won’t work that way.’

Finally, the experiencer may appear as the possessor of the referent of the object-NP, as in (20).

- (20) Exp/POSS & Stim/NOM
das Wetter trübt meine Stimmung
 DET:NOM weather:NOM spoil:3s:PRS 1s:POSS mood:ACC
 ‘The weather spoils my mood.’

Three-place psych-predicates in modern German are very rare except for metonymous constructions with body part nouns denoting the stimulus, as in (21.a), external possessor constructions with a body part noun denoting the experiencer, as in (21.b), and light verb constructions, as in (21.c).

- (21) a. *Er schenkt mir Gehör.*
 3s:NOM give:3s:PRS 1s:DAT ears:ACC
 ‘He listens to me.’
 b. *Er fällt mir ins Auge.*
 3s:NOM fall:3s:PRS 1s:DAT into.the eye
 ‘I see him.’
 c. *Er macht mir Angst.*
 3s:NOM make:3s:PRS 1s:DAT fear:ACC
 ‘He frightens me.’

Ditransitive psych-verbs like *gönnen* (cf. (22)) are somewhat extraordinary in that these verbs denote a mental state but simultaneously need a specification of the psych-activity by the ACC-NP. The stimulus is split: it consists of one predication [y has/does z] which entails two arguments y and z that are encoded in the dative and the accusative.

- (22) a. Exp/NOM & split Stim
Ich gönne dir den Erfolg.
 1s:NOM not-begrudge:1s:PRS 2s:DAT the success:ACC
 ‘I don’t begrudge you your success.’
 b. *Ich wünsche dir viel Glück.*
 1s:NOM wish:1s:PRS 2s:DAT much luck:ACC
 ‘I wish you good luck.’

Another strategy in forming psych-readings is by using a situation identifying expression as one argument-NP with predicates that otherwise would have a physical reading. German allows for this strategy for presumably any verb with a physical reading. Depending on the argument structure of the predicate, this strategy yields any constructional type, namely Exp/Nom (cf. (23.a)), Exp/ACC (cf. (23.b)), Exp/Dat (cf. (21)) and even Exp/PP (cf. (23.d))

- (23) a. *Ich glühe vor Verlangen*
 1s glow:1s:Prs from desire
 ‘I feel passionate.’
 b. *Die Wut packt mich*
 the anger:NOMseize:3s:Prs 1s:ACC
 ‘I am furious.’
 c. *Verlangen steigt in mir auf*
 desire climbs in me up
 ‘I begin to feel desire.’

In the remainder of our paper, we will motivate this great constructional variety of German psych-verbs and give a comprehensive model of the argument linking in psych-verbs for German. We start with a brief outline on the state of the art in research on psych-verbs in section 2. In section 3 the main principles of proto-role-driven case selection, as developed by Primus (2002a, 2002c), are delineated. In section 3 we explain the importance of the principle of lexical economy and how this principle can take account of the case selection of psych-verbs. The paper is completed by a summary including an outline of open problems in section 5.

2 The Gap in Research

Basically there are two fundamentally different approaches to the question of how lexical information and syntactic realisation of arguments are linked. On the one hand, there are syntactic approaches which try to trace back the constructional variation in psych-verb case frames to different deep structures and to movement rules. On the other hand, there are several lexical approaches to argument linking that try to explain the variation by the event structure of the verbs themselves. In the following we give an overview of the results of both types of approaches to psych-verbs.

Postal (1970) for English and Belletti/Rizzi (1988) in their X-Bar approach to Italian claim that only one constructional subclass of psych-verbs, namely the Exp/Nom-verbs exhibit an external argument in their deep structure, while Exp/ACC-verbs and Exp/DAT-verbs do not have an external argument. In their view then the difference in Exp/ACC-verbs and Exp/DAT-verbs is the inherent DAT assignment to Exp/DAT-verbs. While both subclasses of psych-verbs have in common the auxiliary selection of *essere*, Exp/Nom-verbs select *habere* for. Thus, it is claimed that Exp/ACC and Exp/DAT-verbs are similar in behaviour to unaccusative verbs.

This syntactic approach has been criticised (cf. Bouchard (1995) for the Italian data, Iwata (1995) and Pesetsky (1995, chap. 2) for English). Also for German, we can show that the unaccusative analysis does not hold. As (24) shows, the verbs of the Exp/ACC and Exp/DAT classes do not uniformly select *sein*, the auxiliary which is selected for unaccusative verbs in German.

- | | | | |
|---------|-----------------|-------------|--|
| (24) a. | <i>hat</i> | <i>mich</i> | <i>beeindruckt/geängstigt/gewundert/erbozt</i> |
| | have-AUX | 1s:ACC | impress/frighten/surprise/annoy:3s:PERF |
| b. | <i>hat</i> | <i>mir</i> | <i>gefallen</i> |
| | have-AUX | 1s:DAT | please:3s:PERF |
| c. | <i>?ist/hat</i> | <i>mir</i> | <i>eingeleuchtet</i> |
| | be/have-AUX | 1s:DAT | make.sense.to:3s:PERF |
| d. | <i>ist</i> | <i>mir</i> | <i>bekommen/nabegegangen</i> |
| | be-AUX | 1s:DAT | agree.with/affect:3s:PERF |

As is illustrated in (24.a) to (24.d), all Exp/ACC-verbs and a subclass of Exp/DAT-verbs select the auxiliary *haben*, while only a subclass of Exp/DAT-verbs selects *sein*. As to the argument relation of perfect participles, the Exp/DAT-verbs do not allow for an object-relation of the argument of the perfect participle (cf. (25.a), while on the other hand some Exp/ACC do (cf. (25.b)).

- | | | | |
|---------|--------------|-----------------------|------------------|
| (25) a. | * <i>der</i> | <i>bekommene</i> | <i>Wein</i> |
| | the | agree.with:PPERF | wine:NOM |
| | * <i>die</i> | <i>eingeleuchtete</i> | <i>Idee</i> |
| | the | make.sense.to:PPERF | idea:NOM |
| b. | <i>der</i> | <i>beeindruckte</i> | <i>Professor</i> |
| | the | impress:PPERF | professor:NOM |

<i>der</i>	<i>interessierte</i>	<i>Lehrer</i>
the	interest:PPERF	teacher:NOM
* <i>der</i>	<i>gewunderte</i>	<i>Student</i>
the	surprise:PPERF	student:NOM

For a significant number of native speakers of German from the northern part of the country, a subclass of the Exp/ACC-verbs even allow for passivisation. We tested the verbs given in (26) with 50 native speakers of the northern part of Germany of which 40% considered the passivisation of the Exp/ACC-verbs *beeindrucken*, *beunruhigen*, *trösten* and *nerven* with non-controlling stimuli as grammatical.⁵

- (26) *Hans wurde von der Nachricht beeindruckt/beunruhigt/getröstet/genervt*
 Hans:NOM AUX:PASS by the news impress/worry/console/annoy:3s:PAST
 ‘Hans was impressed/worried/consolated/annoyed by the news.’

Semantic approaches either combine event structure findings with syntactic argumentation as in Grimshaw (1990) or focus on the semantic differences in the event or causal structure alone (Croft 1993, 1998, Dowty 1991, Härtl 2001, Kailuweit Ms.), or they try to find a solution to the constructional variation in psych-verbs by assuming different theta roles for the stimulus (cf. Pesetsky 1995, chap 2).

Grimshaw (1990) follows Belletti/Rizzi (1995) in arguing for Stim/NOM-verbs not having an external argument. In contrast to Belletti/Rizzi, however, she regards the status of external argument as a consequence of the complex event structure of this subclass of psych-verbs. According to Grimshaw (1990), Exp/NOM- and Exp/ACC-verbs do not differ with respect to the thematic hierarchy Agent > Experiencer > Theme. Exp/ACC-verbs, however, are seen as causative verbs with the stimulus argument only being part of the first subevent of the verb. Since in her view arguments which are part of the first subevent are aspectually more prominent than arguments of the second subevent, in Exp/ACC-verbs the stimulus is realised as the subject. However, for the stimulus (i.e. the theme on the thematic hierarchy) there is then a mismatch between the argument structure (i.e. thematic hierarchy) and the aspectual structure. Therefore, the stimulus is not an external argument and thus exhibits the syntactic peculiarities shown in Belletti/Rizzi (1995). Hence, the counter arguments to the findings of Belletti/Rizzi 1988 as adduced above do also hold against the analysis of Grimshaw 1990.

Various event structure approaches (Grimshaw 1990, Croft 1993, 1998, Dowty 1991, vanValin/LaPolla 1997, Kailuweit Ms.) state that Exp/NOM-verbs differ from Exp/ACC-verbs in that the former are states while the latter are of an inhomogeneous event structure; i.e., they denote inchoative or transformative events. Exp/DAT-verbs are not taken into consideration in these approaches. The examples in (27) give a short illustration of the basic assumptions of this kind of analysis.

- (27) a. *The birthday party is surprising/pleasing Mary*
 b. **Mary is liking the birthday party*
 c. *What happened to Mary was that the birthday party surprised/pleased her*
 d. **What happened to Mary was that she liked the birthday party*

While Exp/NOM-verbs are states and thus cannot be combined with progressive (cf. (27.b) and used in a cleft sentence which focuses on the change of state within the event denoted by the verb (cf. (27.d), Exp/ACC-verbs can be used in both kinds of constructions (cf. (27.a) and (27.c)); i.e., they exhibit a complex event structure consisting of two subevents, a transgression and a following state.

⁵ The same test done with speakers from the southern part of the country showed quite different results in that all speakers from the south considered passivisation as ungrammatical with these verbs.

What follows from this argumentation is that all verbs of a constructional class are expected to exhibit a uniform behaviour as related to their event structure. However, on a closer look at the data, at least in German, we have found that this does not hold for the Exp/ACC-verbs. As to the compatibility with a progressive form we are restricted to test native speakers of the northern part of the Rhine valley, where the *Rheinische Verlaufsform* is used for progressive constructions. As (28) illustrates, not all verbs of the Exp/ACC can be used with the progressive in this variety of German; while *nerven* shows the same behaviour as the subject experiencer verbs in English (cf. (28.a) and (28.c)), the Exp/ACC-verb *überraschen* exhibits a different behaviour, since it can be used in the progressive (cf. (28.b)), though not in the cleft construction (cf. (28.d)).

- (28) a. **Die Feier war Hans am überraschen*
‘The party was surprising Hans.’
b. *Die Feier war Hans am nerven*
‘The party was annoying Hans.’
c. *Was Hans passierte war, dass die Feier ihn überraschte*
‘What happened to Hans was that the party surprised him.’
d. **Was Hans passierte war, dass die Feier ihn nervte*
‘What happened to Hans was that the party annoyed him.’

The same restriction holds for other event structure tests like the combination with durative (for an hour) and tense frame adverbials (within an hour), as (29) shows.

- (29) a. **Das Fest beeindruckte/überraschte/erboste ihn zwei Stunden lang*
‘The party impressed/surprised/annoyed him for two hours.’
b. **Das Fest beeindruckte/überraschte/erboste ihn in fünf Minuten*
‘The party impressed/surprised/annoyed him in five minutes.’
c. *Das Fest ängstigte/ärgerte/baute auf/reizte ihn zwei Stunden lang*
‘The party frightened/made angry/encouraged/tempted him in five minutes.’
d. *Das Fest baute ihn in kürzester Zeit auf*
‘The party encouraged him in best time.’
e. **Das Fest ängstigte/ärgerte/reizte ihn in kürzester Zeit*
‘The party frightened/made angry/tempted him in best time.’

While some Exp/ACC-verbs (e.g. *beeindrucken*, *überraschen*, *erbosen*) cannot be combined with either of the two types of adverbials (cf. (29.a) and (28.b)), others (e.g. *ängstigen*, *ärgern*, *reizen*) can be combined with durative adverbials (cf. (28.c)) though not with time frame adverbials (cf. (28.e)); some Exp/ACC-verbs (e.g. *aufbauen*) can be combined with both types of adverbials (cf. (28.c) and (28.d)).

Another type of semantic analysis for the motivation of the constructional variation within psych-verbs (Croft, 1993, 1998, Härtl 2001, Iwata 1995, Pesetsky 1995) tries to show that Exp/ACC-verbs have a controlling causal stimulus which evokes the change of the mental state in the experiencer, while in Exp/NOM-verbs, the stimulus is only target of the emotion, but not a controlling causer. Thus, it is argued by Croft (1993) that Exp/ACC-verbs allow for a means-clause extension. For Exp/ACC-verbs in German, however, this argumentation does not hold either. Considering the cause component, Exp/ACC-verbs in German are to be divided into two subclasses. Causative Exp/ACC-verbs allow for stimulus subjects (i.e. Stim/NOM) that denote human referents who are in control of the event denoted by the verb (cf. (30.c)). In contrast to this class the non-causative subclass of Exp/ACC-verbs do not allow stimuli which are in control of the situation (cf. (30.b)); some verbs even do not allow for human stimuli at all (cf. (30.a)).

- (30) a. *Die Nachricht / *Der Junge kratzt mich nicht*
‘The news / the boy does not bother me.’ (also: *packen*, *bewegen*, *belasten*, *bedrücken*)

- b. * *Das macht er, um mich anzukotzen/ekeln/wundern/erbosen/abzustossen*
 ‘He does this to tick me off/nauseate/surprise/annoy/disgust me.’
- c. *Das macht er, um mich zu ärgern/ängstigen/verwirren/aufzurichten*
 ‘He does this to make me angry/frighten/entangle/encourage me.’

As shown in (31) only the verbs of this causative Exp/ACC subclass allow for an extension by a means clause.

- (31) a. *Der Artikel* *beeindruckt* *mich* *durch seinen guten Stil*
 DET article:NOM impress:3s:PRS 1s:ACC by means of its good style
 ‘The article impresses me by means of its good style.’
- b. * *Das* *wundert* / *interessiert* *mich* *durch*
 this surprise:3s:PRS interest:3s:PRS 1s:ACC by.means.of

Thus, although a subclass of Exp/ACC-verbs in German exhibit characteristics that are covered by the causal structure approaches of Croft (1991, 1998), Pesetsky (1995) and Härtl (2001), a small but identifiable class of non-causative Exp/ACC-verbs do not fit.⁶ This does also hold for a larger section of psych-verbs in German that neither have Exp/NOM nor Exp/ACC but Exp/DAT. These verbs are not accounted for in Härtl (2001), or for that matter in any other of the above-mentioned approaches to argument linking in psych-verbs. Since within this argumentation only two case frames are possible – a controlling stimulus licenses nominative, in all other cases the experiencer is in the nominative – Exp/DAT-verbs do not fit to the assumption that case assignment in psych-verbs is controlled solely by the event structure of verbal semantics.

Within the science of human psychology the investigation of the cognitive nature of causal events has a long tradition and research has been done on the causal semantics of psych-verbs (for a comprehensive overview cf. Rudolph/Försterling 1997, and for a detailed analysis of the linguistic relevance, cf. Primus 1998 and 2002c). The results of the psychological tests for psych-verbs show that from a speaker’s psychological point of view the stimulus is seen as the causal factor of the mental situation independent from the linguistic construction. In other words, for both constructional types tested (namely Stim/NOM and Stim/ACC) the majority of the probands voted for the stimulus as the causal factor.

These findings are the starting point for Wegener (1999), who argues that since the stimulus is always the causer of the mental situation of the experiencer, the constructional variation in German psych-verbs cannot have a semantic motivation. According to Wegener (1999), the constructional variation is seen as a structural means comparable to diathesis, i.e. a discourse-pragmatic means that allows changing the perspective on the arguments of a psych-verb expression. As Primus (2002c) shows, however, the results of the psychological experiments cannot be transferred to the lexical structure, since what causal attribution tests trigger are saliency judgments and hence cannot be taken as an operational test for controlling causers of a situation denoted in a verbal lexeme.

In sum, we can state the following objections against the various approaches to psych-verbs in previous research. First, all but Belletti/Rizzi (1988) and Wegener (1999) only deal with two of the three formal subclasses of psych-verbs found in German and the Romanic languages. Secondly, all approaches try to cope with the constructional variation within psych-verbs by showing that psych-verbs with the same construction have the same theta-grid or the same event or causal structure; i.e., all approaches assume a general uniformity between the constructional type and the semantics of psych-verbs. But, as illustrated in the discussion above, this assumption

⁶ Our corpus includes the following Exp/ACC-verbs that cannot take part in expressions with a controlling stimulus or do not allow for a human stimulus altogether: *anziehen, ankotzen, anstinken, anwidern, bedrücken, belasten, erbosen, ergreifen, grauen, grausen, jucken, kratzen, reuen, schaudern, scheren, verwundern, wundern, zwicken*.

does neither hold for Exp/ACC nor for Exp/DAT-verbs. The constructional type Exp/ACC exhibits at least two semantically distinct subclasses, namely causative and non-causative stimuli (cf. (30) and (31)), and the constructional type Exp/DAT does not behave uniformly with respect to auxiliary selection (cf. (24.b)). With respect to auxiliary selection we even find a similar selectional behaviour across two constructional types (cf. (24.a) vs. (24.b)).

The lexical-semantic variability of one and the same verb has not been considered in any approach on the constructional variation in psych-verbs. But in our opinion this is the solution to the problem. As we will show in our paper, case selection in psych-verbs (at least in German) does not depend on the psychological reading, but on the non-psychological readings the verb lexeme has. This line of argument has been suggested, but not worked out in Wegener (1999).

3 Proto-Roles and Case Selection

3.1 Proto-Roles

Following Dowty (1991), Primus (2002a, 2002b, 2002c) manages with two thematic roles, namely proto-agent and proto-patient, which are defined by prototypical properties. Depending on their properties, verbal arguments are to a greater or lesser extent agents (A) and patients (P). That means not only that agentivity and patientivity are a matter of degree, but also that an argument may have agentive and patientive properties at the same time.

(32) presents the inventory of thematic relations which characterise the proto-roles as well as our notations for these relations:

- (32) Let x, y be individual variables and let s be a situation (or event) variable. Then the thematic relations which characterise the proto-roles are
- | | | |
|-------------|-------------|------------------------|
| $ctrl(x,s)$ | $ctrl(x,y)$ | (control) |
| $caus(x,s)$ | | (enabling condition) |
| $phys(x,y)$ | $phys(x)$ | (physical involvement) |
| $exp(x,y)$ | $exp(x,s)$ | (experience) |
| $poss(x,y)$ | | (possession) |

The thematic relations will be defined in particular in the next section.

Dowty also suggests the “independent existence of the event named by the verb” to be a contributing property of proto-agents (1991:572), but Primus demonstrates that this property primarily characterises the dependency of the patient on the agent, which accounts for the structural order of the arguments. It is therefore more suitable to note this dependency separately from the thematic relations (Primus 2002b, 2002c):

- (33) Dependency Hierarchy
 $A >_{dep} P$

Agentive and patientive properties are differentiated as follows:

- (34) If two verbal arguments x and y bear a thematic relation $f(x,y)$ to each other, f is called an agentive property of x and a patientive property of y . The one-place-properties $phys(x)$ and $exp(x)$ are agentive properties of x .

An argument that accumulates several agentive properties is called a maximal agent (A^{max}), and an argument that accumulates several patientive properties a maximal patient (P^{max}), respectively. Control is crucial to agentivity: An argument with agentive control is always an A^{max} since control always implies sentience (cf. below (45)). In return, an argument that accumulates only one agentive property is called a minimal agent (A^{min}), whereby an argument that accumulates only one patientive property is called a minimal patient (P^{min}). An argument that bears agentive properties as well as patientive properties is a minimal agent and a minimal patient at the same time (A^{min}/P^{min}). Typical A^{min}/P^{min} are recipients. Experiencers can now be described as “sentient

participants that have no other agentive properties in the traditional use of the term” (Primus 2002c).⁷ External agents, i. e. agents that are presupposed by the situation denoted by the verb, but that are not agents with respect to the situation denoted by the verb itself, are always minimal agents with respect to the verb in question.

3.2 Analysing Thematic Structure

Let us now proceed to the definitions of the thematic relations in (32). The variables *x* and *y* represent arguments of the verb in question; the variable *s* stands for the situation (event or state) denoted by the verb.

The first thematic relation is control. Control corresponds to volition or intention but also includes that the participant (*x*) is able to start and stop the situation denoted by the verb (cf. Primus 2002b). We might define control with respect to the situation, but also with respect to the patientive participant (*y*), which undergoes a change that is controlled by *x* (cf. Primus 2002c).

- (35) *ctrl(x,s)* *x* controls *s*, iff *x* is able to establish or to prevent *s* or some aspect in *s* at will.
 ctrl(x,y) *x* controls *y*, iff *x* is able to control some change of *y* or of some aspect of *y* at will.

As mentioned above, control is sufficient for maximal agentivity, and maximal roles are more decisive for a case frames than minimal roles (cf. section 3). Unfortunately it is not always easy to determine whether a verb allows for a control-reading or not. Therefore we used some common semantic tests for control. As a controlling agent we define a core participant that volitionally and agentively enables the state of affairs, which is expressed in the semantics of the verb in question. Roeper (1987) suggests to test the verbs by adding several expressions of intention and to check the acceptability of the outcoming expressions. We chose the sentential adverb *absichtlich* ‘intentionally’, the purposive infinitive construction *um...zu*, and the intentional cognitive verbs *beschließen* ‘conclude’ and *versuchen* ‘attempt’ and checked the acceptability of some problematic cases with some native speakers. We also checked in the Mannheim Corpus⁸ for expressions similar to these.

The following examples illustrate these tests. Only verbs that allow for controlling agents can be combined with the above-mentioned expressions (cf. (36)), while other verbs lead to unacceptable or semantic abnormal expressions (cf. (37)).

- (36) a. *Er beschloss, ihn mit einem neuen Hemd zu überraschen.*
 ‘He decided to surprise him with a new shirt.’
 b. *Er nahm sich Zeit, um alle Speisen abzuschmecken.*
 ‘He took his time to taste all the dishes.’
 (37) a. **Er beschloss, vom Baum zu fallen.*
 ‘He decided to fall out of the tree.’
 b. **Er ging hin, um ihn anzukotzen.*
 ‘He went there to tick him off.’

Of course recipients may pragmatically repair most semantically abnormal expressions: Though the more typical reading of *ankotzen* is the psychical one (‘to tick so. off’), we tend to interpret

⁷ As we will see below, an experiencer is always a causal factor of an experience-situation (in signs: *exp(x,s) → caus(x,s)*). It is therefore more precise to say that experiencers have no other *relevant* agentive properties than sentience.

⁸ The Mannheim Corpus COSMAS (Corpus Storage, Maintenance and Access System) is a corpus of German texts prepared and annotated by the IDS (Institut für Deutsche Sprache). It is accessible via internet (<http://www.ids-mannheim.de/kt/cosmas.shtml>).

(37.b) in a rather occasional, non-psychical reading in order to achieve an acceptable reading ('to puke all over so.') since only this reading allows for a controlling agent. Our statements always pertain to the core semantics of one single reading of a verb. The acceptability of a sentence or the belonging to semantic or pragmatic components is not in all cases equally decidable; confer the following examples.

- (38) a. **Ekle deine Großmutter nicht an!*
'Don't disgust your grandmother!'
- b. ??*Er versuchte, ihn anzuekeln.*
'He tried to disgust him.'
- c. ?*Er benahm sich wirklich widerlich, um seinen Nachbarn anzuekeln.*
'He really behaved awfully in order to gross his neighbour out.'

If, as taken for granted, all verbs with controlling subject allow imperative constructions, *anekeln* can not be a controller-verb according to (38.a). This is confirmed by (38.b). On the other hand, only controller-verbs should be acceptable in a construction like (38.c), which is only slightly irritating to most test persons. It seems that some verbs allow a certain degree of controllability if it is sufficiently licensed by the context. Also, not all expressions pass all tests equally well, as shown in (38). It is important to notice that imperative constructions alone do not give sufficient evidence for control, since these constructions may also express the desire of the speaker (e.g. *Fürchte dich nicht!* 'Don't be afraid!'). In reverse, we assume all controller-verbs to allow imperative constructions. Therefore a verb that does not allow for an imperative construction will not be considered a controller-verb.

We now turn to causation. As an extensively discussed issue in linguistics as well as in analytic philosophy, the question arises what kind of causation is relevant in linguistic processes. Primus (1998:117ff., 2002c) summarises the major concepts of causation with respect to our subject. They all revolve around the logical implication $x \rightarrow y$. The distinction of sufficient (x) and necessary (y) conditions is the starting point. The most basic definition of the causal relation would be that the participant denoted by an argument is a causal factor for a situation, if it is a necessary condition for the situation. This does not mean that exactly the given one and no other individual, but only that some individual must take this position. For instance, *to give* necessarily involves three arguments: a giver x, something that is to be given y, and someone who is the goal of the giving z. Arguments belonging to a lexical entry of a verb are usually seen as necessary components of the verbal meaning, though not all necessary semantic arguments must appear syntactically, too (cf. *Jan eats* vs. *Jan eats an apple*). Thus, this definition of causation does not help to distinguish the semantic roles of the arguments appropriately and may therefore be abandoned.

In contrast, the definition of a cause as something without which an effect would not have taken place (cf. Lewis 1973, Primus 2002c) is better suited to grasp the dependency between cause and effect which is characteristic for our intuitive understanding. But still, this does not help to discriminate agents and patients: without anything to give away, an event of giving would never have taken place. Thus, if we want to save the concept of causation for our purposes, we need to confine to a narrower definition of causation. Primus (2002c) suggests physical, mechanical causation; i.e. one (agentive) participant which moves independently from the second causes a physical manipulation (e.g. a change in location) in the second participant. We therefore distinguish between physically caused movement and similar changes ($\text{phys}(x,y)$, cf. (40.b) below), which might be described by the term 'prototypical causation', and other types of causation. For instance, $\text{phys}(x,y)$ is not able to capture the causal connection between clouds and rain, but we would like to be able to consider relations like this. In the classical view, we can only conclude from sufficient conditions to necessary conditions, that is we know that if there is rain, there must be clouds. Lewis (1973) points to the equivalence of $(y \rightarrow x)$ and $(\neg x \rightarrow \neg y)$, which states

that the conclusion from the lack of a necessary condition like clouds to the absence of sufficient conditions like rain is sound. In natural language enabling conditions – like clouds – are accepted as reasons or *causes* for events, though such an enabling condition alone is not sufficient for the effect in question. In our definition of cause we take this usage into account (cf. (39)).

- (39) *caus(x,s)* x is a cause for a situation s, iff x is an enabling condition for s or some aspect in s.⁹

Even on the basis of this broad definition of causation it is not possible to distinguish so-called causer-stimuli and non-causing stimuli. A causer might be the missing link between the experiencer and the experienced entity or situation, but both – the individual capable of experience and the experienced entity – are enabling conditions to experiencing situations as denoted by psych-verbs, too.

We now resume physical involvement. In addition to the above-mentioned physical manipulation, we also consider independent movement of a participant (cf. (40.a)). In (40.b) physical manipulation is meant in a broad sense; i.e. it includes movement without any further change of the second participant.

- (40) a. *phys(x)* x is physically active, iff x moves independently in the given context.
- b. *phys(x,y)* x is a physical cause for a change of y, iff y is physically manipulated or contacted depending on some physical activity of x.

It is important to remember that the meaning of a verb only entails a thematic property or relation if this property holds with respect to the situation named by the verb (denoted by the variable s). In the verbal construction (41) for instance, the verb entails no property *phys(x)*, since the presupposed movement of the argument x does not occur with respect to the break-up.

- (41) *mir* *zerbricht* *die Vase*
 1s:Dat burst:3s:PRS the vase:NOM
 ‘The vase broke.’ / ‘I broke the vase.’

The defining thematic relation of psych-verbs is, of course, experience. As noted above, an experience is meant to include a sensation, an emotion, a perception, and a mental attitude or state. An experiencer is thus an argument for which the verbs entails that the corresponding participant in the situation named by the verbs has a sensation, an emotion, a perception, a mental attitude or state with respect to this situation. It is more difficult to provide a striking definition of what a stimulus is. Of course, the stimulus must be in the attention of the experiencer in one way or another. An experiencer as well as a stimulus – the latter at least in most situations – are enabling conditions to experiencing situations denoted by psych-verbs. Without an individual capable of experience and without something to be experienced – a trigger that causes, simply by being perceived, some emotional reaction or cognitive judgment in the experiencer – no experience is possible.

- (42) *exp(x,y)* x is an experiencer and y is a stimulus for this experience, iff x is in some sensory, emotional or mental state in relation to y.¹⁰

⁹ As Primus notes, “the causation relation involves strictly speaking two events, but the causing event is rarely explicitly denoted by the verb” and therefore reduced to the agent involved in it (2002c).

¹⁰ The variable y stands either for some individual or for some event or situation. The vague expression “in relation to y” points to the problem of defining “stimulus” reasonably. Shall messengers and media, which seem to occur without any formal discrimination among other stimuli, be called stimuli? It is imaginable that all uses of triggering stimuli (‘causing stimuli’ in traditional terms) can be explained as metonymical uses.

Most psych-verbs involve a stimulus apart from an experiencer, but there are also psychical one-place-predicates without a stimulus, as *hungern*. In these cases the stimulus is more or less obvious, i.e. standardised (e.g. the reason of being hungry is lack of food, of freezing it is coldness, etc.). If the speaker wants to stress the stimulus or to point to an unexpected stimulus, the stimulus may be added (*er friert vor Kälte*, lit. ‘he freezes of coldness’, *er fror vor Müdigkeit*, lit. ‘he froze of tiredness’). We thus renounce of the one-place-property $\text{exp}(x)$ that is suggested in Primus (2002c) and always note experience as a relation with two arguments, as in (42).

In constructions with situation-identifying arguments (e.g. *ich habe Hunger* ‘I have hunger’, *das Verlangen packt mich* ‘I start to feel desire’ or *du machst mir Angst* ‘you frighten me’, cf. García García 2001), the emotion itself is made explicit. In other psych-verbs, the emotion is incorporated.

The semantic function of the stimulus can differ considerably: Although the typical stimulus is an object with respect to which the experiencer feels something (e.g. he might evaluate it), a stimulus can also function purely as a trigger for a feeling with respect to something else. This is captured by the vague expression “with relation to y ” in the definition of $\text{exp}(x,y)$ (cf. (42)). It is possible to distinguish between both types of stimuli, like Pesetsky does: He introduces the distinction between Objects of Emotion and Causers. According to Pesetsky, a stimulus is a Causer if it might be an Object of Emotion, but also allows for a reading in which it only evokes an experience, while something else constitutes the Object of Emotion (1995: 56-60). A stimulus that is necessarily (i.e. in all readings) an Object of Emotion is not a Causer. For example, *the article* in (43) is not a Causer, but a Target of Emotion, while in (44) it is a Causer.

(43) Bill was very angry at the article in the *Times*.

(44) The article in the *Times* angered/enraged Bill.

Pesetsky argues as follows: While from ‘ x is angry at y ’ follows, that ‘ y angered x ’, from ‘ y angered x ’ we cannot conclude that ‘ x is angry at y ’. It is possible that y only provoked x being angry at z (in example (44) z might be the newest governmental publication). Pesetsky’s concept of Causer, which corresponds with that of most researchers on psych-verbs, remains inexplicit: It does not correlate with a controller as introduced in (35) in this article, since unanimated objects cannot exercise control. Even less it matches the characteristics of an enabling condition: Although the existence of some object of Bill’s anger might be necessary, there does not need to be an additional trigger for this anger.

We omit an exact definition of possession, since it did not prove to be relevant to our purposes (but cf. Primus 2002c for a discussion of possession).

Between the thematic relations, some unilateral implications exist (cf. Primus 2002c). Thus, in some thematic constellations some of the relations are redundant and will not necessarily be listed in the following. Examples for such implications are listed in (45):

- (45) a. $\text{ctrl}(x,s) \rightarrow \text{caus}(x,s)$
 b. $\text{exp}(x,s) \rightarrow \text{caus}(x,\text{exp}(x,s))$
 $\text{exp}(x,s) \rightarrow \text{caus}(s,\text{exp}(x,s))$ ¹¹
 c. $\text{ctrl}(x,s) \rightarrow \text{exp}(x,s)$
 d. $\text{phys}(x,y) \rightarrow \text{phys}(x)$

The implications in (45.b) also hold for y instead of s .

¹¹ Remember that in this approach ‘causation’ rather denotes ‘being a cause’ in the sense of ‘necessary condition’ or ‘enabling condition’ than ‘being a controlling causer’, which is captured by the less ambiguous term ‘control’.

We do not claim the list of thematic basic relations given here to be exhaustive; neither will all of the introduced relations be crucial for the case selection of psych-verbs, as will be shown below (section 4.2).

3.3 Case Selection and Proto-Roles

According to Primus (2002a, 2002b, 2002c), both Proto-Roles are encoded by the two most prominent cases of a language, as stated by the Thematic Case Selection Principle (46) (2002c).¹²

- (46) Thematic Case Selection Principle
 For any language L, for any participants that are syntactic arguments, and for the highest ranking cases (i.e. morphological coding categories) A and B in L:
- a. The greater the number of Proto-Agent basic relations a participant accumulates, the more likely it is coded by A.
 - b. The greater the number of Proto-Patient basic relations a participant accumulates, the more likely it is coded by B.

That is to say that the most prominent case can be linked to Proto-Agent, as it is the case with nominative in non-ergative languages, but that it may also be linked to Proto-Patient, as it is the case with absolutive in ergative languages. The principle implies the existence of a Case Hierarchy as in (47):

- (47) Case Hierarchy
 $1C > 2C > 3C > \dots$, where nC is the n^{th} case of a given language, i.e.
 German: NOM > ACC > DAT > GEN

The alignment of the output of the Thematic Case Selection Principle with the Involvement Hierarchy (48) is reflected by optimality-theoretic constraints, which restrict the case selection. The Involvement Hierarchy (48) represents the thematic distinctiveness¹³ of the arguments.

- (48) Involvement Hierarchy
 $\theta^{\text{max}} > \theta^{\text{min}}$, i.e. $A^{\text{max}} > A^{\text{min}}$ and $P^{\text{max}} > P^{\text{min}}$

The resulting constraints for German may best be represented in the following schema (49) (cf. Primus 2002a, 2002b, 2002c).

- (49) Constraint Schema for Thematic Case Selection in German:
- | | | | | | | |
|--------------------------------|-------|---------------------------------|--|--------------------------------|-------|---------------------------------|
| a. $A^{\text{max}}/\text{NOM}$ | \gg | $A^{\text{max}}/\neg\text{NOM}$ | | b. $P^{\text{max}}/\text{ACC}$ | \gg | $P^{\text{max}}/\neg\text{ACC}$ |
| \Downarrow | | \Uparrow | | \Downarrow | | \Uparrow |
| $A^{\text{min}}/\text{NOM}$ | | $A^{\text{min}}/\neg\text{NOM}$ | | $P^{\text{min}}/\text{ACC}$ | | $P^{\text{min}}/\neg\text{ACC}$ |

These constraints are completed by some other case-affecting constraints. The Case Hierarchy is to equate with Case Markedness:

- (50) Case Markedness (CASEM)
 $*nC \gg *mC$ ($n > m \geq 1$)
 i.e. $*\text{GEN} \gg * \text{DAT} \gg * \text{ACC} \gg * \text{NOM}$
 (alternatively: $\text{NOM}! \gg \text{ACC}! \gg \text{DAT}! \gg \text{GEN}!$, cf. (53))

¹² By ‘‘Principle’’ we denote linguistic regularities which signify families of constraints and their fixed ranking (cf. Primus 2002c).

¹³ I.e. ‘‘the quantity of thematic information that an argument accumulates’’ (Primus 2002c).

More explicitly, CaseM leads to constraints like $A^{\max}/\neg\text{NOM}$, $A^{\min}/\neg\text{NOM}$, etc., which are more or less high ranked. One of the most interesting outcomes is the Dative Constraint (51), which is a convenient abbreviation meaning that the three constraints $A^{\max}/\neg\text{DAT}$, $P^{\max}/\neg\text{DAT}$ and $P^{\min}/\neg\text{DAT}$ are significantly higher ranked than $A^{\min}/\neg\text{DAT}$ (cf. section 3.4).

- (51) Dative Constraint
 $\neg A^{\min}/\neg\text{DAT}$

According to Case Markedness, the more restricted a case is the more marked it is, and a case is more likely to occur if all cases which are less marked than this case occur likewise. The Formal Case Principle unifies these corollaries (cf. Primus 2002c):

- (52) Formal Case Principle
 The assignment of a lower ranking case by a predicate P unilaterally implies the assignment of a higher ranking case by P; the higher the rank of a case is, the less restricted is the class of predicates that assign it.

The most important constraint in NHG is the Nominative-Requirement (53) (cf. Primus 2002c). Since it is ranked higher than every other case-commandment, it determines that if there is a case, it needs to be the nominative. As Primus states, “if one is interested in constructions without a nominative, it is more economical to start the evaluation with the strongest relevant constraint, which is 1C! [i.e. NOM! in nominative languages] and not *DAT” (2002c).

- (53) Nominative-Requirement (NOM!)
 A verbal syntactic argument structure requires a nominative.

The Genitive Constraint (54) is in NHG as high ranked as the Nominative-Requirement.

- (54) Genitive Constraint (*GEN)
 No genitives in a verbal syntactic argument structure.

As a relic of older stages, some isolated genitive arguments still exist in NHG (*jds. gedenken, jds. achten*). With respect to their rarity, we capture these verbs by the parochial lexical constraint (55.a), which ranks over *GEN (cf. Primus 2002c). For analogous reasons, the lexical constraints in (55.b) and (55.c) are introduced (cf. Primus 2002 for a detailed discussion).

- (55) Lexical Constraints
 a. $\text{LEX-}P^{\min}/\text{GEN}$ (\gg *GEN)
 b. $\text{LEX-}A^{\min}/\neg\text{NOM}$ (\gg NOM!)
 c. $\text{LEX-}[\neg A^{\min}/\text{DAT}]$ (\gg $\neg A^{\min}/\neg\text{DAT}$)

Case Markedness leads to numerous further constraints, depending on the Case hierarchy of a language. As to German, we get the constraints in (56).

- (56) a. *[ACC & $\neg\text{NOM}$]
 b. *[DAT & $\neg\text{ACC}$]
 c. *[DAT & $\neg\text{NOM}$]

The attribution of a case to a Proto-Role is equivalent to $\theta^{\max}/1\text{C}$ ranking over θ^{\max}/OBL (‘oblique’ designates all cases but the nominative).

The antagonist of the Principle of Lexical Economy (cf. (67) below) is the principle of Functional Expressivity (57).

- (57) Principle of Functional Expressivity
 Different [semantic] functions are represented by different structures.

Following Plank (1987), two functional expressivity constraints have to be dissociated. The first one is of a syntagmatic kind which has only one lexeme reading as input and which takes care that different co-occurring role-semantic functions are expressed by different cases (cf. (58)). The second is a paradigmatic constraint (cf. (59); for examples see section 4.2.3.1, (76) to (78)).

- (58) Case Distinctness (DIST)
No identical cases within the case frame of a predicate.
- (59) Paradigmatic Thematic Distinctness (PAR-DIST)
Lexical entries with different role-semantic functions have different case patterns.

We suggest the following ranking of the constraints mentioned above (the ranking can be supplemented by insignificant constraints like *ACC etc).

- (60) LEX- P^{\min} /GEN, LEX- A^{\min} / \neg NOM, LEX- $[\neg A^{\min}/\text{DAT}]$
 \gg DIST, NOM!, *GEN
 \gg A^{\max}/NOM , P^{\max}/ACC
 \gg A^{\min}/NOM , $A^{\min}/\neg\text{NOM}$, P^{\min}/ACC , $P^{\min}/\neg\text{ACC}$
 \gg $\neg A^{\min}/\neg\text{DAT}$

We may omit the evaluation of A^{\min}/NOM , $A^{\min}/\neg\text{NOM}$, P^{\min}/ACC , and $P^{\min}/\neg\text{ACC}$, since these constraints are equally ranked in German and thus do not lead to any asymmetry in optimality.

To conclude: The optimal case frame of a predicate depends on the thematic relations of its arguments, which are presumed to be part of its lexical configuration. The evaluation of the competing case frames for the two-place-predicates *schlagen* (to hit) and *heiraten* (to marry) is demonstrated in (61) and (62).

- (61) Thematic relations of the arguments of *schlag'*(x,y):
 $s = \text{schlag}'(x,y)$
 $\text{ctrl}(x,s) \wedge \text{phys}(x,y) \wedge \text{exp}(x,s) \wedge \text{exp}(x,y)$
 $\Rightarrow x$ is an A^{\max} , y is a P^{\max}

The evaluation of the optimal case frame operates as follows (due to shortage of space we restrict the table to some exemplary case frames and the most relevant constraints):

- (62) Table: *schlag'*(x,y), $x = A^{\max}$ & $y = P^{\max}$

	x	y	... ¹⁴	DIST	NOM!	*GEN	A^{\max}/NOM	P^{\max}/ACC	...
	N	N		*!				*	further evaluation not relevant ¹⁵
	A	A		*!	*		*	*	
	D	D		*!	*		*	*	
	G	G		*!	*	*	*	*	
☞	N	A							
	N	D						*!	
	A	N					*!	*	
	A	D			*!		*	*	
	D	A			*!		*	*	
	D	N					*!	*!	
	G	...				*!			
	...	G				*!			

As we see, the evaluation predicts the case-frame $\text{NOM}^x \ \& \ \text{ACC}^y$, which is the actual case-frame of *schlagen*.

¹⁴ We omit the higher ranked lexical constraints since they do not apply to this lexeme.

¹⁵ We reduce all evaluation-tables below to the relevant constraints without indicating it.

- (63) *Der Affe schlägt den Zoologen.*
 the monkey:NOM hit:3s:PRS the zoologist:ACC
 ‘The monkey hits the zoologist.’

Let us now turn to our second example, the two-place-predicate *heiraten* (to marry).

- (64) Thematic relations of the arguments of *heirat'(x,y)*:
 $s = \text{heirat}'(x,y)$
 $\text{ctrl}(x,s) \wedge \text{ctrl}(y,s) \wedge \text{exp}(x,s) \wedge \text{exp}(y,s)$
 $\Rightarrow x$ is an A^{max} and y is an A^{max}

- (65) Table: *heirat'(x,y)*, $x = A^{\text{max}}$ & $y = A^{\text{max}}$

	x	y	...	DIST	NOM!	*GEN	$A^{\text{max}}/\text{NOM}$	$P^{\text{max}}/\text{ACC}$...	$\neg A^{\text{min}}/\neg \text{DAT}$
	N	N		*!						
	A	A		*!	*		**			
	D	D		*!	*		**			**
	G	G		*!	*	*	**			
☞	N	A					*			
	N	D					*			*!
☞	A	N					*			
	A	D			*!		**			*
	D	A			*!		**			*
	D	N					*			*!
	G	...				*!				
	...	G				*!				

At the evaluation of $A^{\text{max}}/\text{NOM}$, only four case frames are left. They all violate this constraint. Eventually *DAT ranks out both NOM^x & DAT^y as well as DAT^x & NOM^y . NOM^x & ACC^y and ACC^x & NOM^y are equally good. Both arguments of *heiraten* are maximal agents, i.e. *heiraten* is a symmetric predicate. Thus no distinction can be made between these case frames. The outcome of the evaluation in table (65) is correct: The case frame of *heiraten* is NOM^x & ACC^y or NOM^y & ACC^x . Which of the two arguments takes which case depends on further, contextual variables like topicalisation, focusing, thema-rhema-structure etc.

To summarise the results of this section, let us have a look at table (1) again, which is repeated in a shorter version in (66). The constraints Nom! (55.b) and Dist (58) explain why several case frames do not occur at all (cells containing a constraint would violate this constraint).

- (66) Table of psych-verb constructions

Exp	Stim	A	B	C	D
		NOM	ACC	DAT	PP
1	–	<i>ich staune</i>	<i>mich friert</i> (PAR-DIST \gg NOM!)	<i>mir ist kalt</i> (PAR-DIST \gg NOM!)	<i>es bakt bei mir aus, ...</i>
2	NOM	DIST	<i>er begeistert mich</i>	<i>sie gefällt mir</i>	<i>die Lösung schlummert in mir</i>
3	ACC	<i>ich mag ihn</i>	DIST	NOM!	NOM!
4	DAT	<i>ich traue dir</i>	NOM!	DIST, NOM!	NOM!
5	GEN	<i>ich gedenke seiner</i>	NOM!	<i>mir ermangelt ...</i>	NOM!
6	PP	<i>ich hadere mit dir, ...</i>	NOM!	<i>mir graut (es) vor morgen</i>	NOM!
7	CP	<i>sie denkt, dass ...</i>	<i>ihn dünkt, dass ...</i>	<i>mir schwant, dass ...</i>	NOM!
8	split	<i>ich gönne dir ...</i>		<i>er macht mir Angst, ...</i>	

3.4 Dative Selection

As one can easily see, in this approach it is necessary to explain with respect to two-place-predicates why many predicates have a case-frame NOM-DAT in spite of the Case Markedness Principle (*[nC & \neg mC])). Dative case is brought in in two ways. First, dative is selected by ditransitive predicates since due to Case Distinctness a third case is required (which must be dative according to the Case Markedness Principle). Secondly, in most non-accusative languages

– e.g. in German – dative is the typical case of valence increase. If an intransitive predicate is extended by an additional non-core argument, this argument will select dative case (concerning typical valence increases cf. Wegener 1985: chap. 3, esp. 3.6). Since the first two cases of the Case Hierarchy are functionally blocked for the proto-roles already, dative is predestined for this function. In this respect, Primus (1999, 2002) points to the observation that in German and some other languages only A^{min} -arguments may take datives,¹⁶ as stated in the Dative Constraint (cf. (51)). Since valence increase is of special interest for the argument structure of psych-verbs, we will enter into this topic more extensively in section 4.2.3.

4 Psych-Verbs and Lexical Economy

4.1 The Principle of Lexical Economy and its Corollaries

Recurring to the findings of Primus (2002a, 2002c) case selection is due to the Thematic Involvement Scale; e.g., in German the more agentive properties an argument accumulates the more likely it is coded by NOM, and the greater the number of accumulated patient-properties the more likely it is coded by ACC. Psych-verbs belong to those verbs whose arguments do not accumulate a high number of proto-properties or whose arguments accumulate agentive properties as well as patientive properties. The case selection of those classes of verbs is therefore less predictable.

In order to be operative on psych-verbs, the procedure described in section 2 must be completed by a supplementary assumption, which is the core of our approach: Case selection of psych-verbs does not depend on their psychological reading at all. This is due to the Principle of Lexical Economy (67) and its corollaries:

- (67) Principle of Lexical Economy
Lexical entries are as simple as possible.
- (68) Corollary 1 to the Principle of Lexical Economy
Each verbal lexeme has only one case frame. This case frame holds for each reading of the lexeme and must therefore be compatible to all of its readings.

In reverse it follows that a verb that is part of two different constructions is lexically represented by two distinct lexemes. It is important to point out that the principle can be violated by individual lexemes, but then the principle predicts that either after some time of coexistence one of the case frames will disappear or that the two constructions will become semantically differentiated until finally two distinct lexemes emerge from the readings.

(69) illustrates such a rather marginal exception. The different constructions with *hungern* in (69.a) and (69.b) are usually traced back to the same lexeme while (69.c) is considered to belong to a different lexeme.

- (69) a. *mich* *hungert*
1s:ACC be.hungry:3s:PRS
'I am hungry.'
- b. *ich* *hungere*
1s:NOM starve:1s:PRS
'I am starving.' / 'I am fasting.'

¹⁶ A functional reason for this might be that in accusative languages it is only plausible and possible to extend the argument frame by an A^{min} -argument. One may ask whether P^{min} arguments without any A-properties do exist at all.

- c. *ich* *habe* *Hunger*
 1s:NOM have:1s: PRS hunger:ACC
 ‘I am hungry.’

The Exp/ACC-construction in (69.a) can be supplemented by an expletive (*es hungert mich*). However, both constructions are rather old-fashioned and out of use, whereas both (69.b) and (69.c) are common expressions. (69.a) to (69.c) differ in meaning. Only (69.b) may be used as controlling verb (‘I am fasting’, ‘I am dieting’). The construction in (69.c) focuses on an uncontrollable sensation of the experiencer, namely hunger. (69.a) *mich hungert* has no controlling experiencer either, but in NHG it focuses on a lasting situation, i.e. it bears a durative component, as the DWb (IV/II co. 1947) states: “doch wird in der neuern sprache diesz persönliche *hungern* [b.], gegenüber der unpersönlichen fügung [a.], immer mehr durativ verwendet”. That is, a semantic differentiation of a. and b. took place in which a. became a durative meaning ‘to lack food’, whereas b. means either ‘to dispense (willingly or unwillingly) with food’ or ‘to feel hunger’. The latter exactly corresponds to the meaning of the constructional variant c., which is nowadays much more frequently used to denote the experience than a. By contrast, the meaning ‘to lack food’ is more frequently expressed by b. than a. (e.g. *Die Kinder in Afghanistan hungern*. ‘The children of Afghanistan are starving.’), so that a. might get completely replaced by b. and c. one day.¹⁷ With respect to our purpose it is important, that, while b. and c. belong to different lexemes, one might find it plausible to trace a. and b. back to the same lexeme *hungern*. This then would imply that one single lexeme might have different case frames, depending on differing meanings. The need to distinguish different meanings by different constructions is due to Functional Expressivity (cf. (57)).

As stated in Corollary (68), the case frame of a verb must be compatible with all readings of the lexeme, meaning that the reading which puts the strongest restrictions on case selection is decisive for the selection:

(70) Corollary 2 to the Principle of Lexical Economy

For each verbal lexeme exists one reading which is decisive for the selection of its case frame. It is the reading putting the strongest restrictions on the selection of the case frame. This reading is called the “strongest reading” of a verb. Any case frame that is compatible with the strongest reading of a verb is compatible with any other reading, too.

The corollary in (70) also states, that there are never two different strongest readings of one and the same lexeme thereby imposing incompatible restrictions on the case frame. Such readings would force the expression to occur in two different case frames, with such cases then usually being considered as belonging to two distinct lexemes – not only because their formal representation differs, but also because their semantic content diverges considerably.

Let us illustrate the case selection of psych-verbs with some examples. We will divide the psych-verbs in subclasses related to their experiencer case and we will present a deduction of a typical representative of each class (section 4.2). Subsequently, we will turn to less obvious or problematic cases, in which we suggest a diachronic substantiation of the case frames (section 4.3).

4.2 Case Selection in Psych-Verbs

In the following we will illustrate the case selection for those psych-verbs that in contemporary German also have a concrete physical reading, i.e. ctrl (x,s) and phys(x) or phys (x,y). Psych-verbs

¹⁷ The distribution and standardisation of written literary language contributes to the preservation of ancient expressions as well. It is not very likely for a widespread expression like *mich hungert* to become extinct since it continues to exist in many literary works and therefore belongs to poetic language, which is often imitated or picked up.

are divided into subclasses according to their case frame; for each construction type the principles at work are illustrated with a representative example. In section 4.2.1, the case selection for Exp/NOM-verbs is exemplified with the polysemous verb *ausrasten*. In section 4.2.2, the polysemous verb *umbauen* is taken as an example for the case selection principles in Exp/ACC-verbs. Section 4.2.3.1 illustrates Dat as a means of Functional Expressivity, and section 4.2.3.2 argues for DAT as a case of valence increase.

4.2.1 Exp/NOM

(71) lists one-place predicates that synchronically alternate between a concrete and a psychical reading. The concrete reading denotes a physical activity or state (e.g. positional verbs); i.e., the basic verbal semantics contains the thematic relations ctrl (x,s) and phys (x). Hence, case selection for these verbs is regular since the controller subject in its physical reading is an A^{\max} that takes NOM.

- (71) *abfahren*, *abfliegen*, *ausklinken*, *ausrasten*, *durchdrehen*, *durchhängen*, *durchknallen*, *einrasten*, *einsteigen*, *fliegen*, *fühlen*, *hängen*, *platzen*, *schwärmen*, *stehen* ...

Some of these lexemes can be extended to two-place predicates (*eine Strecke abfahren* ‘to cover a route’), and in some cases they are particle verb derivations of these lexemes (*driüberstehen* ‘to be above sth.’). All of them also have a psychical reading. Some lexemes are combined with different prepositional phrases in the physical and psychical reading. The difference in reading can thus be distinguished by the variation in the preposition, e.g. *auf etw./jdn. abfahren*, *auf etw. fliegen* (both: ‘to be crazy about sth./so.’), *sich (um etw.) sorgen* (‘to worry (about sth.)’) as opposed to *vom Bahnhof abfahren* ‘to leave the station’, *nach Mallorca fliegen* ‘to fly to Mallorca’, *für jmdn sorgen* ‘to care for sb.’.

We illustrate the case evaluation of these verbs with *durchdrehen*. In the psychical reading, *durchdrehen* means ‘to crack up’, ‘to panic’ (cf. (35.a)); in the physical reading it means ‘to spin’ (e.g. wheels). (72.a) demonstrates the thematic structure of the psychical reading; (72.b) analyses the thematic structure of the physical reading.

- (72) *durchdreh*'(x)

a. Psychical reading

ich *drehe* *gleich* *durch*.
 1s:NOM spin:1s:PRS in a moment PFX
 ‘I am at panic stations.’

exp(x)
 $\Rightarrow x = A^{\min}$

	x	...	DIST	NOM!	*GEN	A^{\max}/\bar{NOM}	P^{\max}/ACC
☞	N						
	A			*!			
	D			*!			
	G			*!	*!		

b. Physical reading

die *Räder* *drehen* *durch*
 DET wheel:Pl:NOM spin:3p:PRS PFX
 ‘The wheels spin.’

phys(x)
 $\Rightarrow x = A^{\min}$

	x	...	DIST	NOM!	*GEN	A^{\max}/\bar{NOM}	P^{\max}/ACC
☞	N						
	A			*!			
	D			*!			
	G			*!	*!		

The evaluation of both readings of *durchdrehen*, the psychical reading as well as the physical reading, results in only one possible case frame, namely NOM^x. This is the actual case frame of the lexeme. The very high ranked Nominative Requirement (NOM!) dominates the case selection of one-place-predicates in German; verbs that violate this constraint are rather rare (but consider the systematic counterexamples *mir ist kalt/schlecht* and *mich friert/hungert/dürstet*, where nominative selection is outranked by PAR-DIST (cf. section 3.3 and 4.2.3.2).

More interesting is the evaluation of two-place-predicates like *fühlen* which have different thematic roles in their psychical and physical reading.

(73) *fühlen*(x,y)

a. psychical reading (e.g. feeling fear)

exp(x,y)

⇒ x ist A^{min} und y ist P^{min}

	x	y	...	DIST	NOM!	*GEN	...	¬A ^{min} /¬DAT
	N	N		*!				
	A	A		*!	*			
	D	D		*!	*			*
	G	G		*!	*	*		
☞	N	A						
	N	D						*!
☞	A	N						
	A	D			*!			*
	D	A			*!			
☞	D	N						
	G	...				*!		
	...	G				*!		

b. physical reading (e.g. feeling the surface of something)

phys(x,y) & exp(x,y)

⇒ x ist A^{max} und y ist P^{min}

	x	y	...	DIST	NOM!	*GEN	A ^{max} /NOM	P ^{max} /ACC	...	¬A ^{min} /¬DAT
	N	N		*!						
	A	A		*!	*		*			
	D	D		*!	*		*			**
	G	G		*!	*	*	*			
☞	N	A								
	N	D								*!
	A	N					*!			
	A	D			*!		*			*
	D	A			*!		*			*
	D	N					*!			*
	G	...				*!	*			
	...	G				*!				

While the physical reading (73.b) only allows for NOM^x & ACC^y, the psychical reading (73.a) is compatible with two further case frames, namely ACC^x & NOM^y and DAT^x & NOM^y. Because of lexical economy only the first case frame – NOM^x & ACC^y – is possible for the lexeme: it is the only case frame compatible with all readings of *fühlen*.

4.2.2 Exp/ACC

Of all Exp/ACC-verbs in our corpus, the verbs listed in (74) synchronically exhibit a sense alternation between a concrete controlling or physical reading (ctrl (x,s), phys(x,y)) and a psychical reading.

- (74) *abstoßen, ankotzen, anmachen, ansprechen, anziehen, anregen, aufbauen, aufrichten, belasten, berühren, bewegen, erdrücken, ergreifen, erinnern, erregen, jucken, kratzen, packen, peinigen, quälen, reizen, rühren, schaffen, scherzen, treffen, umbauen/schmeißen/stoßen/werfen, verletzen, verstimmen, zwicken, ...*

Therefore, we can find at least one physical reading with a controller subject (ctrl(x,s)). According to the principle of Lexical Economy and the Thematic Involvement Scale, case assignment for these verbs is regular. The controller subject is an A^{max} in its physical reading and takes NOM, the controlled object is a P^{max} in its physical reading and takes ACC¹⁸.

As an example, we evaluate the case frames of *kratzen* in (75). The psychical reading is given in (75.a), the physical reading in (75.b).

- (75) *kratzen*(x,y)
 a. psychical reading (*seine Tat kratzt mich nicht* ‘I don’t care about his deed’)

exp(x,s) ∧ exp(x,y)
 ⇒ x is an A^{min} and y is a P^{min}

	x	y	...	DIST	NOM!	*GEN	...	¬A ^{min} /¬DAT
	N	N		*!				
	A	A		*!	*			
	D	D		*!	*			*
	G	G		*!	*	*		
☞	N	A						
	N	D						*!
☞	A	N						
	A	D			*!			*
	D	A			*!			
☞	D	N						
	G	...				*!		
	...	G				*!		

- b. physical reading (*die Katze kratzt mich* ‘The cat scratches me’)
 ctrl(x,s)¹⁹ & phys(x) & phys(x,y) & phys(x,y) & exp(x,y)
 ⇒ x is an A^{max} and y is a P^{max}

¹⁸ Note that the metaphorisation of concrete action verbs as expressions of mental processes or states leads to a gradual process of lexicalisation. Thus some verbs exhibit a grade of ambiguity between concrete and psych-verb reading on a larger scale than others, cf. *Peter zieht mich an/spricht mich an/schmeißt mich um/baut mich um*, while for others only the psych-verb reading exists any longer. This gradual lexicalisation of psych-verb readings can be shown to have existed in the whole lifespan of the German language, e.g. *schrecken, entrüsten*, which in older varieties of German had physical readings.

¹⁹ Remember that control is a question of whether an agent is capable to control the kind of action denoted by the verb. The agent does not necessarily need to control the action in a specific context. We therefore do not need to discuss whether cats are able to carry out volitional acts or not (instead of *cat* you may just as well insert *the boy* to test the semantics of the lexeme).

	x	y	...	DIST	NOM!	*GEN	A ^{max} /NOM	P ^{max} /ACC	...	¬A ^{min} /¬DAT
	N	N		*!				*		
	A	A		*!	*		*			
	D	D		*!	*		*	*		**
	G	G		*!	*	*	*	*		
☞	N	A								
	N	D						*!		*
	A	N					*!	*		
	A	D			*!			*		*
	D	A			*!					*
	D	N					*!	*		*
	G	...				*!	*			
	...	G				*!		*		

Again we see that the physical reading only allows for a subset of those case frames which are compatible with the psychical reading, namely the case frame NOM^x & ACC^y that is actually selected by *kratzen*.

4.2.3 Exp/DAT

The motivation for Exp/DAT in German is twofold. For a large class of verbs the DAT-construction alternates with a NOM-construction with only the former having a psychical reading. For this class of verbs, the DAT is seen as a case for Paradigmatic Distinctness (cf. (59), details will be dealt with in section 4.2.3.1). In the second class of Exp/DAT-verbs, the DAT is seen as an extension of the basic construction, yielding a psychical reading of the new, extended construction. DAT then is considered a case of valence increase. Section 4.2.3.2 deals with this type of Exp/DAT-verbs in German.

4.2.3.1 DAT as Case for Paradigmatic Distinctness

In any language system, two major principles interact and are antagonistically interrelated, namely the economy of the language system (for behalf of the speaker) and the need to be expressive (on behalf of the hearer). As a consequence, lexical economy cannot be investigated without considering interactions with expressivity and its influences on the specific structure of a language. In this section we deal with some repercussions on the constructional variation this interaction has in the domain of psych-verbs.

As was demonstrated in section 3, a large amount of verbs exhibit at least two distinct readings one of which is a psychical reading. In addition, many of the verbs show a specific alternation in behaviour when used in their psych-verb reading. The hearer then can identify the psychical reading by the peculiarities of the psychical readings. In the following, the three main types of the behavioural peculiarities will shortly be illustrated. For the third type, the adjective + copula construction, DAT-selection plays a crucial role and is thus illustrated in more detail.

Many verbs with psychical readings differ from their physical counterparts in relation to the selectional restrictions of the arguments they take; e.g., most of the Exp/ACC-verbs with non-controlling stimuli can only select inanimate stimuli, while in its physical readings they select NOM-NPs referring to animate beings (e.g. *Hans packt mich* (only physical reading) vs. *das packt mich* (only psychical reading)). A morphosyntactic parallel is found in intransitive verbs, where the physical reading can be differentiated from the psychical reading by the variation of the preposition of the PP that expresses a spatial relation in the physical reading or refers to the stimulus in the psychical reading of the verb (e.g. *abfahren von* (only physical) vs. *abfahren auf* (only psychical readings)).

The adjective + copula construction is a very productive strategy for expanding the psych-verb lexicon in contemporary German. Case selection for this constructional type is motivated by another case selection principle, namely Paradigmatic Distinctness (cf. (59)). As (76) illustrates, adjective + copula constructions exhibit two distinct case frames that go along with a variation in the interpretation of the meaning of the predicate. The NOM-construction simply attributes a

property to the referent of the NOM-NP (cf. (76.a)), while the DAT-construction yields a psychological reading, with the referent of the DAT-NP being an experiencer of the situation expressed in the predicate (cf. (76.b)).

- (76) a. *ich bin schlecht (in Mathe).*
 1s:NOM COP bad in mathematics
 ‘I am bad at mathematics.’
- b. *Mir ist schlecht.*
 1s:DAT COP bad
 ‘I feel sick.’

The same holds for adjective + copula constructions which are extended by a DAT-Argument, i.e. for two-place adjective + copula constructions. At first sight, this constructional type shows a similar behaviour to the psych-verbs with valence increase (cf. (80) below); i.e., the referent of the DAT-NP is the newly added evaluator of the situation, and thus the psychological reading seems to be evoked by valence increase.

- (77) *Die Konferenz ist mir wichtig.*
 the conference:NOM COP 1s:DAT important
 ‘The conference is important to me.’

But, as (77) illustrates, adjective + copula constructions of this subclass allow for human NOM-arguments to which a property is attributed. Hence here, the variation in case selection helps to identify the psychological reading as well.

- (78) a. *Ich bin wichtig (für die Mannschaft.)*
 1s: NOM COP important for the team
 ‘I am important (for the team).’

Note that an adjective + copula construction can only have a psychological reading if the adjective allows for an evaluation of the situation expressed. Thus, adjectives in the psych-verb constructions denote physical perceivable properties like temperature (*kalt* ‘cold’, *warm* ‘warm’) or are evaluative adjectives from the start (*schlecht* ‘bad’, *egal* ‘indifferent’, *wichtig* ‘important’). Other types of adjectives can only evoke psych-verb readings if they are turned into evaluative expressions, e.g. by adding the comparative particle *zu*, as in (79.b):

- (79) a. *Der Schuh ist (*mir) groß.*
 the shoe:NOM Cop (1s:Dat) large
 ‘The shoe is large (*for me).’
- b. *Der Schuh ist mir zu groß.*
 The shoe: NOM Cop 1s:Dat too large
 ‘The shoe is too large for me.’

4.2.3.2 DAT as Case of Valence Increase

Predicates with an experiencer-NP in DAT are somewhat problematic with respect to the specification of their semantic and syntactic valence. In contrast to prototypical transitive verbs with argument NPs in the NOM and ACC case, so-called DAT-subject predicates show some syntactic peculiarities with respect to e.g. passivisation, reflexivisation or implicit subjects of complement clauses (cf. for details Haspelmath 2001:68-75). It is for these observations that DAT-psych-verbs in some approaches are analysed either as transitive predicates with non-canonical marking of the subject (cf. Onishi 2001) or as extended intransitive predicates, i.e. intransitive predicates with an additional non-core argument (cf. Dixon 1994:122ff). Given these uncertainties with respect to the argument status of the DAT-NP, we join Jacobs (1994) in arguing that valence is best understood as a cluster of features which may vary depending on the criteria used in individual definitions. With respect to psych-verbs we thus base our use of the

term valence increase on the following phenomenon: for most of the DAT-verbs in question we can show that the psych-verb reading is triggered by the addition of the DAT-NP, while the intransitive base verb denotes a concrete physical activity or state (cf. (80), below); i.e., ctrl (x,s), phys (x) holds. According to the valence features of Jacobs (1994), the DAT-NP in German thus fulfils at least two valence conditions: it is obligatory for the meaning and the grammatical usage of the predicate (Jacobs (1994:14) terms this feature “Notwendigkeit” ‘obligatoriness’), and it introduces a new participant (either experiencer or stimulus) to the event denoted by the verb (Jacobs (1993:15) terms this feature “Beteiligung” ‘participation’).

In German two subtypes of DAT-psych-verbs can be found: those where the DAT-NP refers to the experiencer and those where the DAT-NP refers to the stimulus of the mental event or state. Since the latter class is a rather marginal one in German, in this section we will focus on the Exp/DAT-verbs. But see section 4.3.4 for a short notice on Stim/DAT-verbs and the etymology of *trauern*.

The verbs listed in (80) can be used both as intransitive predicates as well as with an additional DAT-argument.

- (80) *aufstoßen, dämmern, einfallen, entfallen, erscheinen, langem, leicht/schwer fallen, passen, reichen, schmecken, stinken, vorkommen ...*

In intransitive use these verbs mostly denote concrete physical processes or states (cf. (81a)); i.e., ctrl (x,s), phys (x) holds. With an additional DAT-NP, the construction has a psych-verb reading with the DAT-NP taking the experiencer role (cf. (81b)).

- (81) a. *Der Morgen dämmerte langsam.*
 the morning:NOM dawn:3s:Past slowly
 ‘Dawn was breaking slowly.’
- b. *Es dämmerte mir langsam. / Es dämmerte mir, daß*
 Expl dawn:3s:Past 1s:DAT slowly / Expl dawn:3s:Past 1s:DAT Comp
 ‘It slowly came to my attention.’ / ‘It came to my attention, that’

The addition of the DAT-NP is crucial for the psych-verb reading with these verbs. If deleted, the verb can only be interpreted in its concrete physical sense (cf. (82a)) and vice versa the DAT-NP-construction only allows for a psych-verb reading (cf. (82b)).

- (82) a. *Es dämmerte langsam.*
 Expl dawn:3s:Past slowly
 ‘It dawned slowly.’
- b. **Der Morgen dämmerte mir.*
 the morning:NOM dawn:3s:Past 1s:DAT
 ‘Dawn was breaking for me.’

Note that for *dämmern* the change in semantics also leads to a change in construction in so far as it does not allow for a subject-NP denoting a stimulus (**Seine Lüge dämmerte mir* ‘His lie came to my attention’). *Dämmern* can only take an expletive subject or a sentential stimulus (cf. (second example in (81b))). Yet, for all other verbs in (80), the psych-verb reading allows for a subject-NP denoting a stimulus.

In German the DAT is the case form which is predestined for arguments that are added to the semantic valence of a base verb; cf. the DAT-marking of the possessor in external possessor constructions, where Jacobs’ valence feature of participation holds (cf. (83)).

- (83) *Ich wasche (ibr) die Haare*
 1s wash (3s:DAT) the hair:ACC
 ‘I wash her hair.’

Thus, the case frame of the verbs mentioned so far is well explained by morphosyntactic rules of German. In the contemporary language, NOM is the optimal case form that marks argument NPs of intransitive predicates (see Primus 2002). DAT is the case for valence increase. In contrast to intransitive Exp/NOM verbs (cf. section 4.2.1), verbs of this class do not evoke a metonymical or metaphorical expression of a mental state of its single argument in their concrete physical reading $\text{ctrl}(x,s)$, $\text{phys}(x)$. Thus, when the psychical reading evolves, an additional argument is needed to introduce an experiencer or evaluator of the process or state denoted by the verb²⁰.

Similar cases are psych-verbs consisting of the general action verb *tun* ‘to do’ and an evaluating adjective. This construction is derived from light verb constructions such as *etwas Gutes tun* ‘to do sth. good’, *ein Leid tun* ‘to do harm to’ (cf. (84.a)) and can be shown to have already been used in expressing psychical states in Middle High German (cf. (84.b)). Both examples are taken from the DWb (VI, col. 653).

- (84) a. *si tâten da vil leide den heiden ûf des meres îs*
 3p:NOM did there much harm:ACC the pagans:DAT on the sea:GEN ice
 ‘They did a lot of harm to the pagans on the frozen sea.’
 (livl. Chronik 7932, DWb, col. 654)
- b. *daz tuot mir leid unde wê z’allen stunden*
 that does 1s:DAT harm and pain to-all hours
 ‘This does me harm and hurts all the time.’ (minnesang 1, 282, DwbVI, col. 653)

For this type of psych-verb construction, the referent of the subject NP is the only referent which may be a sensitive being and thus a possible experiencer. But the subject-NP denotes the agent (x) of a physical manipulation ($\text{ctrl}(x,s)$, $\text{phys}(x,y)$), which gives way to a psych-verb reading only after it is evaluated by the object-NP or the adjective, respectively. The evaluator/experiencer, therefore, has to be newly introduced to the construction.

4.3 Psych-Verbs in Etymological Perspective

As demonstrated in the previous section, for verbs which are polysemous between a psychical and a physical reading in contemporary German case selection can easily be explained by the principle of Lexical Economy. However, there are many verbs which in contemporary German only have a psychical reading. For these verbs we argue that their case selection can be understood from an etymological perspective. In section 4.3.1 we examine Exp/NOM-verbs and give an etymological analysis for the verbs *sinnen* ‘to muse’, *trauern* ‘to mourn’, *vergessen* ‘to forget’, *hassen* ‘to hate’ and *(er)leiden* ‘to suffer’. In section 4.3.2 we investigate the etymology of the verbs *(er)schrecken* ‘to scare’, *ängstigen* ‘to frighten’, *(er)schüttern* ‘to shock’, *erbosen* ‘to annoy sb.’ and *wundern* ‘to surprise sb.’ in order to demonstrate the regular case selection for these Exp/ACC-verbs. In section 4.3.3 we take a diachronic perspective on DAT valence increase for the verbs *gefallen* ‘to enjoy’, *schmeicheln* ‘to flatter sb.’ and *nutzen* ‘to be useful to sb.’. We end section 4.3 by taking a look at the rather marginal class of Stim/DAT-verbs in contemporary German with a diachronic analysis of the Stim/DAT-verb *trauern* in section 4.3.4.

4.3.1 Exp/NOM & Stim/ACC

For the verbs in (85.a) we can show that they originated in physical activity verbs; i.e., $\text{ctrl}(x, s)$, $\text{phys}(x)$ for one-place predicates and $\text{ctrl}(x,s)$, $\text{phys}(x, y)$ for two-place predicates holds in older

²⁰ Processes of physical body perceptions like *schmecken* ‘taste’ are included here, which, as one may argue, denote a mental state of an experiencer. But the history of this construction shows (cf. Willems/Pottelberge 1998 and DWb IX, col. 961ff) that up to early modern German *schmecken* was polysemous. As the DWb IX points out, *schmecken* in the sense of ‘giving scent’ has been the starting point for the psych-verb reading (*Die Blumen schmecken hier so lieblich* ‘the flowers smell so lovely here’ DWb IX, col. 965). *Schmecken* then has a parallel in the emotive reading of *stinken* in *Das stinkt mir*.

varieties of German. We will give the etymology of some exemplary verbs below. The verbs listed in (85.b) have been psych-verbs as long as they can be traced back diachronically. However, they include a component of intentionality (i.e. ctrl(x,s)) at least in one of their readings (e.g. *eifern* ‘to strive’ in contemporary German and *achten* originating in the Old High German intentional perception verb *abtiôn* ‘to observe’).

(85) a. one-place:

denken, grübeln, hadern, hoffen, schwelgen, sinnen, streben, stutzen, trachten, trauern, wüten...

two-place:

beneiden, betrauern, empfinden erleiden, erschrecken, genießen, hassen, merken, schließen, spüren, verabscheuen, vergessen, wagen...

b. *achten, beachten, verachten, begehren, (be)staunen, eifern, gewahren, wollen, wünschen ...*

Reflexive Exp/NOM-verbs such as *sich ekeln, sich schämen, sich sehnen, sich erinnern, sich sorgen, sich freuen*, are not considered here. They are secondary constructions originating in Exp/ACC-verbs (e.g. *jemanden* (ACC) *erinnern* ‘to remind sb.’) or from transitive physical manipulation verbs (e.g. *sich sehnen* ‘to long for sb.’ originates in a verb meaning ‘to strip a body off its nerves, to weaken a body’ (cf. DWb (X/I)), thus being a parallel to the lexicalisation pattern of the psych-verb (*ent*)*nerven* ‘to annoy sb.’). See section 4.3.2 for a general argumentation on some of those Exp/ACC-verbs.

For the verbs listed in (86), sense alternations could be found neither diachronically nor synchronically; neither do they have a reading of intentionality.

(86) *lieben, fürchten, kennen, können, bedauern*

In the following sections, we illustrate details in the semantic change of some verbs which in contemporary German only exhibit a psych-verb reading. We chose the cognitive verb *sinnen* ‘to muse’ and the emotive verb *trauern* ‘to mourn’ as examples for one-place predicates and the cognitive verb *vergessen* ‘to forget’ and the emotive verb *hassen* ‘to hate’ as examples for two-place predicates. The exposition on the psych-verb (*er*)*leiden* ‘to suffer’ is provided to show that the process of semantic change is sometimes multidimensional in that it may not only be induced by semantic processes but also by phonological similarities.

***sinnen* ‘to muse’**

According to the DWb (X/I, col. 1156-1167) and Pfeiffer, modern German *sinnen* ‘to muse’ descends in Westgermanic **sinnan* < grm. **sinþan* ‘go, make a journey’, which is also the base for the causative derivation in *senden* ‘to send’ and the collective noun *Gesinde* ‘farmhand (collective)’ (‘those which are sent to work’ DWb (X/I, col. 1156). The DWb (X/I, col. 1156) emphasises that the verb *sinnen* has a long tradition in Germanic languages and that the verb *sinnen* is not a denominal derivation of *Sinn* ‘sense’ but a genuine motion verb going back to the Ie. verbal root **sentno-* and is related to Ie. **sentos* ‘path’. The motion verb reading is still active in Middle and Early High German, as the example from the Middle High German *Kaiserchronik* (87) illustrates.

(87) *war sol ich sinnen / nâch mînen lieben kînden*
 Whereto shall 1s:NOM go:INF to 1s:POSS beloved children
 ‘Where shall I go (to find) my beloved children?’

As the DWb argues, the cognitive reading ‘to muse’ can already be found in the Old High German particle derivation *gesinnan*. The local reference point of *gisinnun* in (88) is ‘heaven’ (*himil*), i.e. a place where only thoughts, but not the actual protagonists of the text can go.

(88) *thó sie thes bigunnun, zi himile gisinnun*
 then 3p:NOM that:GEN start:3p:PAST to heaven go:3p:PAST
 ‘Then they started to send their thoughts to heaven (lit.: they went to heaven).’
 (ad Hartm 69, DWb (X/I, col. 1158))

According to the DWb (X/I, col. 1158), the cognitive reading emerges from the Middle High German stages onwards (cf. (89)).

- (89) *wand er heim sinnete in sines oebeimes hūs*
 when 3s:NOM home go:3s:PAST in 3s:POSS uncle:GEN house
 ‘When he sent his thoughts towards home, (being) in the house of his uncle
 (lit.:he went home).’ (Lanzelet 5572, DWb (X/I, col. 1158)

As the examples in (88) and (89) illustrate, the semantic change of *sinnan* from a motion verb to a cognitive verb can best be explained as a metaphoric transfer with the sense ‘to virtually go towards a specific direction’ as a starting point. Thereby, the New High German psych-verb may still have a reading of a controlled cognitive action, as in (90). When *sinnen* is used in this sense, the stimulus may be a locative expression, cf. *darauf* ‘onto’ in (90).

- (90) *der geist der kaufmannschaft sinnt auf den erwerb der reichtümer*
 the mind:NOM of:the merchants muse:3s:PRS on the accumulation:ACC of wealth
 ‘The mind of the merchants is directed to the accumulation of wealths.’
 (Adelung, DWb X/I, col. 1159)

In New High German, the psych-verb may also be used to express a mere cognitive action, which is not directed to a specific target. This is illustrated in (91) where *sinnen* ‘muse’ is coordinated with *brüten* ‘ponder’, which is nearly a synonym to the mere cognitive reading of *sinnen*.

- (91) *nicht zeit ist’s mehr zu brüten und zu sinnen*
 not time is:it more to ponder and to muse
 ‘There’s no time left to ponder and to muse.’
 (Schiller, Wallenstein’s Tod 1,1, DWb X/I, col.1162)

trauern ‘to mourn’

According to J. Grimm, *trauern* ‘to mourn’ originated in the Old High German *trūren*, which as a starting point denoted the act of ‘lowering one’s eyes or head’, probably in reflection of the mourning process. Pfeiffer and Kluge agree with this etymological analysis, while the DWb lists Grimm’s etymology as a special interpretation of the data. The DWb (XI/I,1, col. 1382) adduces, however, a reading of *trauern* as ‘giving public signs of mourning’ (“äuszere bezeugung der totentrauer”), ‘wearing mourning clothes’, and thus agrees to J. Grimm’s analysis of *trauern* as denoting a public statement of mourning by a physical action. This reading of *trauern* then, apart from J. Grimm’s etymology as mentioned above, would also explain the Exp/NOM, since even in New High German *trauern* in its strongest reading has (ctrl(x, s) and (phys(x)) components.

vergessen ‘to forget’

According to the DWb (XII/I, col. 415), in all stages of German, *vergessen* ‘to forget’ had only a psych-verb reading of “unintentionally losing information out of one’s memory” (“vergessen ist seit seinem frühesten auftreten im germanischen nur als geistige thätigkeit nachweisbar, bedeutet also ein absichtloses verlieren aus dem sinne”). As the DWb, Kluge and Pfeiffer point out however, the verb root of *vergessen* originates in Old High German *gezzan* ‘to get’ and is cognate to old Norse *getan* and middle English *geten*. It originates in the Germanic strong verb *get-a-* ‘get’. It can be traced back to ie. **ghe(n)d-* ‘touch, seize’. According to the DWb, the prefix *ver-* (Old High German *fir-*) is used to reverse the semantic content of the verb base, resulting in the derived verb form OHG. *firgessan*, contemporary German *vergessen*. Thus, the meaning of OHG. *firgessan* by the authors of the DWb is seen as originally denoting a process of ‘letting go of sth.’, or of ‘not holding sth. any longer’. Considering the original meaning of the verb root *ges-* ‘get’ (i.e. a verb with ctrl(x,s), phys(x,y) components), the reading ‘intentionally not holding sth. any longer in one’s memory’ of the derived verbform *vergessen*, is well motivated.

hassen ‘to hate’

According to DWb (IV/II, col. 546) and Pfeiffer, *hassen* ‘to hate’ originated in an intentional motion verb meaning to ‘chase sb. due to hostile feelings’²¹. While the change in semantics from a physical action verb to a verb denoting a mental state took place before the 9th century, the original physical action verb reading was used up to Middle High German (cf. (92a) and early modern German (cf. (92b)).

- (92) a. *(ein teil sich dô ze lange der künec und sine man)*
versûmten, daꝛ dô Herwic des haꝛꝛes hie began
 miss:3p:PAST that then H. the fight:GEN here start:3s:PAST
 ‘The king’s men failed to realise for far to long that Herwic already had started the fight.’
- b. *sêlig sit ir, wan ûch di lûte (...) werden haꝛꝛin*
 blessed are you when 2p:ACC the men:NOM AUX hate:3p:FUT
 ‘Blessed are ye, when men shall revile you, and persecute you.’
 (Luther, DWb IV/II, col. 547)

The example in (92.a) is taken from the Middle High German epos Gudrun. In the verses before the one cited in (92.a) King Hettel, the father of Gudrun, denies Herwic to marry his daughter. Herwic leaves king Hettel’s palace fiercely and in verse 638 returns with his men to start a fight for Gudrun. The verbal noun *haꝛꝛes* ‘hate:GEN’ denotes the fighting that is started by Herwig’s army. The example sentence in (92.b) is taken from Martin Luthers translation of the verse Matthew 5, 11 of the New Testament. The verb *hassen* is used to translate the Latin expression *cum (...) persecuti vos fuerint* ‘they would have pursued you’.

(er)leiden ‘to suffer’

According to Pfeiffer and Kluge, *leiden* ‘to suffer’ originated in Old High German *lidan*, a cognate to old saxon *lîðan*, both going back to Germanic **leið-a-* ‘go away’. Due to the phonetic similarity to the noun *Leid* ‘suffering’²², a semantic blend had taken place before the 9th century, which gave way to the change in semantics.

The DWb (VI, col. 658) also states that the psych-verb *leiden* originated in the Germanic motion verb **leið-a-* ‘go away’, but in contrast to Pfeiffer and Kluge, the author of the DWb is of the opinion that the psych-verb reading emerged from the motion verb directly and did not result from a blend with the noun *Leid*. The DWb shows that from the 2nd half of the 9th century, the Old High German *lidan* was polysemous and used as motion verb as well as a psych-verb, while in some other Germanic languages the psych-verb reading did not emerge. In the case of *lidan*, the DWb (VI, col. 658) argues for a semantic change induced by conversational implicature, insofar as ‘making a journey’, i.e. living in a foreign surrounding, leads to bad feelings of fear, homesickness or endangerment. Here the DWb (VI, col. 658) sees a parallel in the semantic change of the noun *Elend* ‘misery’, which originally only meant ‘living abroad’ and then its meaning changed into ‘unhappiness’ or ‘bad luck’.

²¹ Note that the physical manipulation verb (ctrl(x,s), ctrl(x,y), phys(x,y)) *hetzen* ‘to race sb.’ is the causative derivation of *hassen*.

²² While Kluge emphasises that the noun *Leid* and the verb *leiden* are not cognate, Pfeiffer shows a possible connection between those two. In his view, the noun *Leid* goes back to a substantivation of the Germanic adjective **laitba* ‘damaging’, originating in the Indo-European verb root ie. *leit-* ‘to detest, to commit sacrilege’, which he considers as cognate also to the verb *leiden*.

4.3.2 Exp/ACC

For the verbs adduced in (93), we can show that diachronically they had a concrete reading of physical manipulation (ctrl (x,s), phys(x,y)) or physical action (ctrl (x,s), phys(x)) in older varieties of German, and some time had been polysemous. Thus, case assignment followed the same principles as stated for the verbs in (74). When the concrete reading was lost and the semantic change from physical to psych-verb reading was lexicalised to the psych-verb sense only, the case frame of the verb was well established. We illustrate the etymology of some verbs listed in (93) in the following paragraphs.

- (93) *anöden, anstinken, anwidern, ärgern, (be)ängstigen, bedrücken, beeindrucken, begeistern, bestechen, bestürzen, betriiben, demütigen, empören, (ent)nerven, entriisten, enttäuschen, erbosen, (er)freuen, ergötzen, erinnern, (er)schrecken, (er)schüttern, erstaunen, erzürnen, grausen, gruseln, langweilen, stören, trösten, überraschen, verbittern, verdrießen, verdutzen, verwirren, (ver)wundern, verzücken,...*

For a small amount of psych-verbs with Exp/ACC in our corpus we could find no data. They can be divided into two groups. The first group comprises genuine German psych-verbs such as physical sentience verbs (*frieren* ‘to be cold’, *hungern* ‘to be hungry’, *dürsten* ‘to be thirsty’)²³, *ekeln* ‘to disgust’ and *gelüsten* ‘to long for’, which may be cognate to the verbum dicendi *lustōn* ‘demand’, although Greule 1999 does not mention of this possibility. Paul (¹⁰2002:745), however, states that both *lustōn* and *lusten* are used as translations of Latin verbs for ‘demanding’ in the Old High German glosses. Hence, for *gelüsten* an original ctrl (x,s) event structure can be assumed.

The second group of problematic cases are loan words from Latin/French or English (*amüsieren* ‘amuse’, *demoralisieren* ‘demoralise’, *deprimieren* ‘depress’, *desillusionieren* ‘disillusionate’, *faszinieren* ‘fascinate’, *inspirieren* ‘inspire’, *irritieren* ‘irritate’, *provizieren* ‘provoke’, *schockieren* ‘shock’, *stimulieren* ‘stimulate’), for which it can be argued that they are taken from the giver language along with their case frames²⁴.

Unclear cases are for instance *aufmuntern* ‘to jolly’, *befremden* ‘to alienate’, *befriedigen* ‘to satisfy’, *beglücken* ‘to make happy’, *berubigen* ‘to disquiet’, *einlullen* ‘to lull’, *erheitern* ‘to exhilarate’, *stören* ‘disturb’, for which at least one can say that they all are process verbs allowing controller stimuli – i.e., ctrl(x,s) holds – and thus, according to the NOM-rule and the Thematic Involvement Scale, would result synchronically in a Nominative case assignment for the stimulus.

To illustrate the semantic change in a physical manipulation verb that evoked a psych-verb reading, we chose the verbs *schrecken* ‘to scare sb.’ and *ängstigen* ‘to frighten sb.’ as a model for verbs which in contemporary German can be used as a psych-verb with a controlling stimulus. The etymological development of *erschüttern* ‘to shock sb.’, *erbosen* ‘to annoy sb.’ and *wundern* ‘to surprise sb.’ as given below illustrates the emergence of a psych-verb reading with a non-controlling stimulus.

(er)schrecken ‘to scare sb.’

According to the DWb, Kluge and Pfeiffer, the psych-verb *(er)schrecken* ‘to scare sb.’ originates in the Old High German verb *screcchen* ‘to make sb. jump’, which is a causative derivation of the intransitive physical action verb *scricchen* ‘to jump’; i.e., for the transitive *(er)schrecken*, ctrl(x,s), ctrl(x,y), phys(x) holds. As the DWb (IX, col. 1668) points out, the physical reading was active in Middle High German up to the 18th century, and, for example, was used to denote the inciting of

²³ These verbs, however, show case variation between ACC and NOM even in the oldest texts of Old High German (cf. (5)).

²⁴ Possibly the same metaphorisations have taken place in the giver language, as can be seen in the German psych-verb *provizieren* ‘provoke’ which goes back to the Latin particle verb *provocare* ‘evoke’ with a verbum dicendi as a base. Here the participant who is calling is a Proto-Agent, and the participant who is being called for is a Proto-patient.

horses or the rousing of animals, as can be seen from a German – Italian dictionary of 1702, where the author gives the sentence in (94) as an illustration of the meaning of *schrecken*.

- (94) *die vögel schrecken*
 the birds:ACC rouse:INF
 ‘to rouse birds’ (Kramer, dt-ital. dict. 2, DWb (IX, col. 1669))

The original physical reading becomes also obvious with the base verb combined with several locative particles such as *auf* ‘up’, *entgegen* ‘towards’, *empor* ‘up’, *zurück* ‘back’, *zusammen* ‘together’, which even for psychical readings yield a directional sense, cf. (95).

- (95) (*sprich böser Vorbedeutung wort nicht aus!*)
und schrecke mich der Sorge nicht entgegen
 and scare:IMP 1s:ACC the sorrow:DAT not toward
 ‘Do not warn me of evil and do not scare me towards sorrow.’
 (Goethe 9, 290, DWb (IX, col. 1669))

ängstigen ‘to frighten sb.’

According to Pfeiffer, modern German *ängstigen* ‘to frighten sb.’ originated in the 16th century as a deadjectival derivation. The adjectival base *engstig* originated from the Old High German noun *angust* (germ. **angusti-* or **angustu-*), a (s)ti-abstractum to the Germanic adjective **angu-* ‘tight’. Old High German (s)ti-abstracta are nouns which denote what is connected to the base adjective; in the case of **angusti* this is the ‘state of something being tight’. Thus, the original meaning of the deadjectival verb *ängstigen* exhibits a sense of ctrl (x,s) and phys(x,y) and can best be translated as ‘put sb. in the state of being tight’. Compare also modern German expressions like *Beklemmungen haben, jmdm. schnürt sich die Kehle zu (vor Angst)* in which the metaphor that evoked the psych-verb *ängstigen* is still active. The same semantic change – ‘tight’ (ie. **anghú-*) → ‘frighten’ – took place in several Indo-European languages (e.g. Latin *angō* ‘I lace up, frighten sb.’) The Old High German adjective *ango*, *engi* was still polysemous between the concrete reading ‘tight’ and the psychical reading ‘be frightened’ (cf. Heidermanns 1993:100)²⁵.

(er)schüttern ‘unsettle, shock’

The transitive non-ctrl psych-verb *(er)schüttern*, first found in texts of the 16th century, originates in an iterative formation of the High German physical manipulation verb *schütten* ‘to pour out’.

According to the DWb (IX, 2115), in New High German the verb *schüttern* is mostly used to denote very intense movements (i.e. ctrl (x,s), phys (x,y)) as the quaking of the earth in (96.a), and can be used with inanimate controllers such as *Seufzer* ‘sigh’ in (96.b). This may be seen as the starting point of a metaphoric transfer like the one given in (96.c).

- (96) a. *schüttert er des berges wipfel*
 shake:3s:PRS 3s:NOM the mountain:GEN top:ACC
 ‘He shakes the top of the mountain.’ (Goethe 2, 28, DWb (IX, col. 2116))
- b. *viel seufzer von sich geben und schüttern ihre brust*
 many sighs from REFL give and shake:3p:PRS 3s:POSS breast:ACC
 ‘Many sighs she utters and (sighs) shake her breast.’
 (Opitz 1, 44, DWb (IX, col. 2116))
- c. *den busen des verebrers schüttert das gewaltge nahen*
 the breast the beau:GEN shake:3s:PRS the mighty approachment:NOM
 ‘The mighty approachment shakes the breast of the devotee.’
 (Goethe 2, 30, DWb (IX, col. 2116))

²⁵ According to the DWb (I, col. 358), the adjective *bange* and the psych-verb *bangen um* as a deadjectival derivation also are derivations of the adjective **angu*, starting from a *be-*prefixation *be-ange* (cf. contemporary German *be-angst*).

Also note that in contemporary German *erschüttern* – although only in the rather restricted contexts of denoting shaking grounds – can be used as a physical manipulation verb with non-controlling Proto-Agents (cf.(97)), i.e. phys(x,y), but not ctrl(x,s) and not ctrl(x,y) holds.

- (97) *Der Aufprall* *erschütterte* *die Erde*
 The impact:NOM shake:3s:PAST the earth:ACC
 ‘The impact rocked the earth.’ (Wahrig)

***erbosen* ‘to annoy sb.’**

As is shown by Kluge, *erbosen* ‘to annoy sb.’ and its English cognate *boast* originated in a verb meaning ‘to blow up sth.’ Because of the phonetic similarity to *böse* ‘bad’, it underwent a blend with the adjective *böse* before the second half of the 17th century, which gave way to the resulting contemporary psych-verb reading. Whether this blend with an adjective denoting a stative concept may explain the semantic change in *erbosen* from a physical manipulation verb ‘blow sth. up’ to a non-control psych-verb remains unclear. The fact that *erbosen* originates in a physical manipulation verb, however, makes the Exp/ACC-case frame plausible, although it cannot explain why the psychical reading of *erbosen* only allows for non-controlling stimuli.

***wundern* ‘to surprise’**

For *wundern* ‘to surprise’ the case is not as clear as with *erbosen* ‘to annoy’. According to the DWb (XIV/II, col. 1929-1943), the verb is a denominal derivation of the noun *Wunder* ‘miracle’, resulting in a verb denoting a mental state ‘being surprised’ as well as yielding the causative reading ‘putting sb. in the state of being surprised’ (“kennzeichnung eines (passiven) psychischen zustandes, in dem sich jem. befindet, oder zur bezeichnung des vorganges, dasz jem. in einen solchen Vorgang versetzt wird” DWb (XIV/II, col. 1930)). The second reading, however, only occurs in constructions with sentential or expletive subjects and does not allow for subject-NPs denoting human referents. From its early uses on the psych-verb *wundern* thus has been a verb that only allows for a non-controller stimulus²⁶.

Kluge supposes a more far reaching etymology of the verb in that he states the Germanic nominal root **wundra-* is possibly a *ro*-derivation of the verb *winden*²⁷. He draws a parallel to the lexicalisation process of the Latin word *perplexus*, which is the perfect participle of the verb *plectere* ‘to plait into one another’ and has developed a psych-verb reading meaning ‘tangled, obscure’. Note also that the same metaphoric process takes place in the modern German verb *verwirren* ‘entangle’, which denotes a physical manipulation (phys(x,y)) in its physical reading (cf. (98.a)). When used with an object-NP denoting an animate referent, the construction evokes a psych-verb reading with Exp/ACC (cf. (98.b)).

- (98) a. *Der Wind* *verwirrte* *sein Haar*
 the wind:NOM entangle:3s:PAST 3s:POSS hair:ACC
 ‘The wind entangled his hair.’ (Duden, Bd. 6)
- b. *Seine Gegenwart* *verwirrte* *sie*.
 3s:POSS presence:NOM entangle:3s:PAST 3s:ACC
 ‘His presence irritated her.’ (Duden, Bd. 6)

²⁶ The argumentation of the DWb can also be found in Kaliuščenko (1988). In his section on Old High German denominal verb derivation Kaliuščenko paraphrases the denominal derivation of *wundern* as “the first participant triggering the emotion as is denoted in the nominal base in the second participant” (“S1 löst bei S2 das Gefühl Sm [= motivierendes Substantiv, SK] aus” (Kaliuščenko (1988:77)), whereby the first participant (S1) has no control over the event (“S1 ist in diesem Fall nicht aktiv in bezug auf S2” (Kaliuščenko (1988:77)). The verb *wundern* is only one of several psych-verbs derived from nouns in this semantic subgroup of his third type (= the Sm denotes an action, process or state) of derivational mechanisms.

²⁷ *Ro*-derivations are of the weak grade, hence the vowel change /i/ > /u/.

In accordance with Kluge, we argue for the verb *wundern* to secondarily originate in a concrete physical manipulation verb.

4.3.3 Exp/DAT

Some Exp/DAT-verbs (cf. (100)) do only have psych-verb readings; i.e., the deletion of the DAT-argument for these verbs is only possible if the experiencer (i.e. the referent of the omitted DAT-NP) is retrievable from the context. But even when the DAT-argument is omitted, this does not cause a change in the meaning of the verb; i.e., it still allows for a psychological reading only (cf. (99)).

- (99) *Das leuchtet (mir) ein.*
 this shine:3s:PRS 1s:DAT in
 ‘This makes sense (to me).’

Thus, the features of Jacobs (1994) that are considered to be relevant in this article (obligatoriness and participation) still hold for these verbs.

Verbs of this class either are particle derivations of intransitive verbs (cf. (100.a)) or etymologically originate in physical manipulation verbs (cf. (100.b)) (i.e. with the exception of *fallen* ‘to fall’ - which is only phys(x) - ctrl(x, s) and phys(x) hold for these verbs).

- (100) a. *gefallen, mißfallen, bekommen, nahegeben, entgegen, nabeliegen, obliegen, fernliegen, fernstehen, einleuchten, widerstreben, zusprechen ...*
 b. *schmeicheln, dünken, behagen, aufdrängen, nutzen, schaden ...*

The Exp/DAT-verbs listed in (101) are problematic.

- (101) *behagen* ‘to feel cosy’, *grauen* ‘to be horrified’, *grausen* ‘to be horrified’

The case of the psych-verb *behagen* ‘to feel cosy’ is problematic since from the earliest data on, *behagen* has been only used in Exp/DAT-constructions and no good data on intransitive uses of *behagen* has been found (except from some few examples in poetry, where the intransitive use may result from rhyme techniques (cf. W/P:516)). Thus, the emergence of the Exp/DAT-construction by valence increase can be seen as doubtful. The DWb (I, 1318), however, argues for a possible origin in Old High German *hagan* ‘brushwood for fencing’ (“der hegende dorn”), *hac* ‘the cared for forest’ (“der gehegte wald”) and the causative verb *hegen* ‘to make a fence’. The causative verb *hegen* ‘to make a fence’ in Middle High German has spread to denoting situations where peace has to be kept like with court places (which are marked by a fence), or where plants and animals are kept (behind fences). Bearing that in mind, one can argue that *behagen* ‘to feel cosy’ expresses the feeling of possessing a safe place or a place that supplies oneself with food, with the DAT-NP denoting the possessor of the place that is fenced.

The verb *grausen* ‘to be horrified’ is an intensifying derivation of the psych-verb *grauen*. *Grauen* can be traced back as a psych-verb to Old High German *grûên* ‘to be horrified’. Kluge sees a possible cognate in Lat. *horrere* ‘to quake’. If one accepts this as a possible etymology of *grûên*, then *grauen* and *grausen* are expected to be similar to verbs like *erschüttern* (< *schüttern* ‘to shake’) in the EXP/ACC-class in section 4.3.2. Note also that the EXP/ACC-verb *gruseln* ‘to be horrified’ (cf. (102)) is cognate to the Exp/DAT-verbs *grauen* and *grausen*. According to Kluge it is parallel to *grausen* in that it is an intensifying derivation of the base verb *grûên*. Given the fact of cognacy and the probable physical manipulation reading of the original base *grûên*, *grauen* and *grausen* are expected to be EXP/ACC-verb. Thus the EXP/DAT-constructions for these verbs stay problematic.

In order to illustrate the mechanisms of evolving psych-verbs by valence increase, we now give some detailed expositions on the etymology of some contemporary psych-verbs. The verb *gefallen* ‘to enjoy sth.’ is chosen as an example of intransitive verbs, while *schmeicheln* ‘to flatter sb.’ and

nutzen ‘be useful to’ are taken to illustrate more complex semantic changes that have taken place in German Exp/DAT-verbs.

gefallen ‘to enjoy sth.’

According to Willems/Pottelberge 1998:506f *gefallen* is a derivation of the uncontrolled process verb Old High German *fallan* ‘to fall, topple’ with the intensifying particle *gi-*; it originally meant ‘to sink down’ as is illustrated in (103).

- (103) *ába déro éinuultun gágenuerti. Gefället si in dia únéntlichun mánegfalti*
 from the simple present sink:3s:PRS 3s:NOM in the infinitive variety
 ‘From the simple presence (the matter) sinks down towards the endless variety.’²⁸
 (Willems/Pottelberge 1998:507)

In this originally physical process reading *phys(x)*, *gifallan* is an intransitive predicate. From Old High German onwards, however, the prefixed verb *gifallan* has been polysemous and among other readings has been used to express a transfer of an unspecified possessor to a specified recipient. W/P in this use translate *gifallan* as *zuteil werden*, *zufallen* ‘get, to fall to’. In this use, the recipient of the transfer verb is added via a DAT-NP, as is illustrated in (104).

- (104) *in zórfsten téilen sint mír geuallen diú lantmezsêil.*
 in beautiful parts AUX 1s:DAT fall:3p:PFT the measure.bands:NOM
 ‘For beautiful landscapes I the measure bands fell to me (I got some beautiful lands).’²⁹
 (Willems/Pottelberge 1998:508)

According to Willems/Pottelberge (1998), the emergence of the psych-verb reading may then be explained by the fact that a transfer of possession is a positive event, which arouses positive feelings, hence giving way to the emergence of an evaluator. The original concrete reading of *gifallan* continues well into Middle High German, although the psych-verb reading is used more and more frequently throughout the period of Middle High German and finally gets lost in modern German (cf. Willems/Pottelberge 1998:508).

schmeicheln ‘to flatter sb.’

The Exp/DAT-verb *schmeicheln* ‘to flatter sb.’ goes back to the late middle ages and exhibits several different case frames throughout its history (cf. Willems/Pottelberge 1998, chap. IV.5 for details). According to the DWb (IX, col. 980f), *schmeicheln* was originally used as an intransitive predicate denoting motion in a secret manner and was the *l*-intensive derivation of the base form *schmeichen* ‘to snuggle, to caress by touching’. As the DWb illustrates, *schmeicheln* ‘to flatter sb.’ also took over meaning components of its base form *schmeichen* ‘to snuggle, caress’, thus being used as a transitive verb denoting a physical manipulation (ctrl(x,s), phys(x,y)). According to Kluge and Pfeiffer this construction gave birth to the psych-verb reading. Starting from external possessor constructions as given in (105), the psych-verb reading established the external possessor as the experiencer of the emerging psych-verb reading.

- (105) *was schmeichelst du mir um’s kinn*
 why caress:2s:PRS 2s:NOM 1s:DAT around:the chin
 ‘Why are you caressing me around my chin.’
 (G.A. Bürger, 18th century, taken from DWb IX, col. 981)

²⁸ The New High German translation of the Old High German text as given by Willems/Pottelberge (1998:507) is: “Und von der einfachen Gegenwart sinkt sie (die Beschaffenheit) herab in die unendliche Mannigfaltigkeit vergangener und zukünftiger Zeiten”.

²⁹ The New High German translation of the Old High German text as given by Willems/Pottelberge (1998:508) is: “In herrlichen Teilen sind mir die Meßschnüre zuteil geworden.” (lit. ‘herrliche Landstriche sind mir durch die Meßschnur zuteil geworden’).

A parallel in construction and in the metaphorisation process can be found in contemporary psych-verb expressions with similar meanings: *jmdm den Bauch pinseln* ‘to brush so.’s belly’, *jmdm um den Bart streichen* ‘to sweep so.’s beard’.

nutzen ‘to be of use to sb.’

According to Willems/Pottelberge (1998:354), the psych-verb *nutzen* (Low German and Standard German variant)/*nützen* (High German variant) originated in two different derivations of the Old High German noun *nuzzi* ‘use’. The low German *nutzen* is an *ón*-derivation of *nuzzi* and resulted in the physical manipulation verb *nuzzón* ‘to make use of sth/sb’ (ctrl(x,s), phys(x,y)). The High German variant apparently resulted from the causative *-jan*-derivation from *nuzzi* → **nuzzjan*, which can be seen in the resulting ablaut in the Middle High German verb form *nützen*, and had the same meaning ‘to make use of sth/sb’. Thus, in Old High German only transitive uses of *nutzen* are found, as is illustrated with an example from Notker.

- (106) *tíe sá nuzzônt mit kúotlichi.*
 of.what 3p:NOM use:3p:PRS with superbness
 ‘Of what they superbly make use.’³⁰

(Piper, I, 122, 13, zitiert nach W/P1998:354)

Elliptical intransitive uses, resulting in a change of semantics from a physical manipulation reading to a psych-verb reading ‘to be useful’, can only be found from Middle High German onwards. During this period, two different constructions of the psych-verb reading co-occurred: the Exp/DAT-construction with an additional experiencer-NP originating from the elliptical intransitive use of *nutzen* and the EXP/ACC-construction originating in the transitive base verb. Only from early High German onwards both constructions have been lexicalised to different readings, with the DAT-construction exhibiting the contemporary psych-verb reading ‘to be useful to sb.’ (for more details cf. Willems/Pottelberge (1998, chap. IV.13)).

4.3.4 Stim/DAT

While Exp/DAT-verbs denote events that are potentially open to an evaluation and, therefore allow the experiencer to be added with an emerging psych-verb interpretation of the base verb, Stim/DAT-verbs emerge the other way around. The base verb denotes a mental state of an experiencer denoted by a NOM-NP with no event-internal causer. The stimulus may then additionally be referred to by a DAT-NP. According to the Jacobsian valence feature of participation (“Beteiligtheit”, cf. 4.2.3.2 above), we consider this addition of a stimulus-NP a valence increase. (107) lists the Stim/DAT-verbs we find in contemporary German.

- (107) *neiden, verübeln, zürnen, gönnen, verzeihen, grollen, wünschen, (ver)trauen, misstrauen, glauben*

Stim/DAT-verbs are a rather marginal class of psych-verbs in contemporary German. Therefore, we restrict the exploration of the Stim/DAT-verbs to only one exemplary exposé, the emergence of the verb *trauen* ‘to trust sb.’, following Willems/Pottelberge (1998, chap. IV.1).

trauen ‘to trust sb.’

The Stim/DAT-psych-verb *trauen* ‘to trust sb.’ originated in the Old High German cognitive verb *trûren*, which was semantically similar to the cognitive verb *glauben* ‘believe’, as illustrated in (108).

- (108) *Íh netrûrên chád ih.*
 1s:NOM NEG:believe:1s:PRS say:1s:PRS 1s:NOM
 ‘I do not believe this, I said.’ (Willems/Pottelberge 1998:201)

³⁰ The New High German translation of the Old High German text as given by Willems/Pottelberge (1998:354) is: “wovon sie mit Herrlichkeit Gebrauch machen”.

- (109) *trürest du daz unser sêla durbuuâten*
 believe:2s:PRS 2s:NOM that our soul:NOM wade.through:3s:PFT
hâbe ûnehbtig uuazzer?
 AUX substanceless water
 ‘Do you believe that our souls have waded through water substanceless?’
 (Willems/Pottelberge 1998:202)³¹

In Old High German *trûren* could only be used in transitive constructions. Whereas in Middle High German *trûren* (then: *trûwen*) could be used in ditransitive constructions with the DAT-NP denoting an addressee of the mental state denoted by *trûren*. A new psych-verb reading emerged which expressed the experiencer’s believe in the addressee’s capability of a certain deed or property denoted by the ACC-NP. The example in (110) illustrates how this new reading emerged.

- (110) „*wir trûwen iu âller êren*“, *sprach dô Swemmêlin*.
 1p:NOM trust 2p:DAT all honour:GEN said then Swemmelin
 ‘We suppose that you are honourable’, Swemmelin then said’
 (Willems/Pottelberge 1998:207)

In case of the prefix verb *vertrauen* (Old High German *firtrûren*, Middle High German *vertrûwen*) the *ver*-prefix reinforces the semantics of the base verb. In contrast to the base verb *trûren*, which could mean both ‘trust in people’ and ‘trust in information’, the reinforced *firtrûwen* could only be used to denote ‘trust in people’. Similar to the diachronic development of its base verb, *vertrauen* has been used in transitive constructions from Old High German onwards, as is shown in (111), which is taken from the Middle High German novel *Tristan* by Gottfried von Straßburg (verse 10204).

- (111) *weist iht, waz ich vertriuwet hân?*
know sth what 1s:NOM promise:1s:PERF AUX
 ‘Don’t you know what I have promised?’
 (Willems/Pottelberge 1998:215)

As the example illustrates, *firtrûwen*, like its base verb *trûwen*, was semantically open to take an additional DAT-NP referring to the addressee of the act denoted by the verb.

5 Conclusion

The aim of our paper was to show that – at least for German – it is characteristic for psych-verbs to have other, non-psychical readings as well, and that the non-psychical readings determine the case selection of these verbs.

In section 1 we gave an overview of the high constructional variation in German psych-verbs. German psych-verbs exhibit a wide range of construction types in that the experiencer as well as the stimulus may appear in NOM, ACC, DAT and even in prepositional phrases (cf. table (1) in section 1). In section 2 we delineated the general idea of each of the three main approaches to argument linking – the syntactic, the event structure and the causal structure approach – and presented data on German psych-verbs that cannot adequately be dealt with in these approaches. We then argued for a different motivation for the great constructional variety of German psych-verbs by taking into consideration the lexical peculiarities of psych-verbs, namely the characteristic polysemy of a great number of psych-verbs in contemporary German.

Subsequently we suggested a comprehensive model of the argument linking in psych-verbs for German (sections 3 and 4). In section 3 we briefly introduced the theoretical background of our

³¹ The New High German translation of the Old High German text as given by Willems/Pottelberge (1998:354) is: „Glaubst du, daß unsere Seele Wasser ohne Substanz durchwatet hat?“ (Willems/Pottelberge 1998:202).

approach to argument linking, namely the proto-role approach as introduced by Dowty 1991 and modified by Primus (1999b, 2002a, 2002b, 2002c), and we delineated the main principles of proto-role-driven case selection for German, as developed by Primus.

In section 4.1 we argued for the importance of the principle of Lexical Economy, which states that entries in the mental lexicon are as simple as possible. As a consequence, verbal lexemes should exhibit as few case frames as possible, and case frames should only vary minimally. In section 4.2 we showed how this principle takes account of the case selection of psych-verbs. Since psych-verbs must satisfy the principle of Lexical Economy, their case frame must be compatible with the strongest reading, namely the reading with the strongest thematic distinctiveness of each argument, which in many instances is a reading with a maximal agent and a maximal patient. In section 4.3 we dealt with a great number of psych-verbs that in contemporary German do not exhibit a polysemy between psychical and non-psychical readings and thus on first sight are problematic to our approach. We illustrated that, from a diachronic perspective, the vast majority of psych-verbs in German had physical, i.e. non-psychical, readings in earlier stages of the language. We argued that the case frame of these verbs was well established at the stage when the verbs had a physical reading, due to the principles given in section 3; and we showed that psychical readings are secondary to other concrete, physical readings of verbal lexemes. Thus, we claim that German does not have genuine psych-verbs, and that, as a result, case selection of psych-verbs does not depend on their psychical reading at all.

6 References

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7 Symbols and Abbreviations

*	defective expression	MHG	Middle High German
<	etymological derivation	NHG	New High German
A (A ^{max/min})	proto-agent (maximal/minimal)	NOM	nominative case
ACC	accusative case	OHG	Old High German
Argument/CASE	represents that the given argument is coded in the given case	P (P ^{max/min})	proto-patient (maximal/minimal)
AUX	auxiliary	PASS	passive voice
COMP	complementiser	PAST	past tense
COP	copula	PFT	present perfect tense
DAT	dative case	PFX	verbal prefix
Exp	experiencer	POSS	possessive pronoun
EXPL	expletive	PPERF	perfect participle
FUT	future tense	PREP	preposition
GEN	genitive case	PRS	present tense
INF	infinitive	REFL	reflexive pronoun
KONJ2	past subjunctive	Stim	stimulus

Appendix I

The table in appendix I lists some Exp/NOM verbs in German that are either polysemous in the contemporary stage of the language or which in earlier stages had a physical (phys (x), phys (x,y)) or a control (ctrl (x,s)) reading. In the latter case a short etymology and the source of our information is given.

Exp/NOM verbs	Stim	PP	phys (x), Ctrl (x,s)	source : Kl(uge) Pf(eifer) Hei(der manns) DWb	etymology
<i>abfahren</i>		<i>auf</i>	+		<i>abfahren</i> (car)
<i>abfliegen</i>		<i>auf</i>	+		<i>abfliegen</i> (plane)
<i>ablehnen</i>	Acc		+		<i>an-lehnen</i> (ladder)
<i>abschnallen</i>			+		<i>abschnallen</i> (saddle)
<i>achten</i>	Acc		+	Kl	OHG <i>achtôn</i> ,beachten' =>[ctrl (x,s)]
<i>anhimmeln</i>	Acc		+	Kl	< <i>himmeln</i> ,look to the sky' =>[ctrl (x,s)]
<i>anschmachten</i>	Acc			Kl	<i>schmachten</i> ,get weak' + telic PP <i>an</i> ??
<i>ausklinken</i>			+		<i>ausklinken</i> (hook)
<i>ausrasten</i>			+		<i>ausrasten</i> (part of a machine)
<i>bangen</i>		<i>um</i>	+	Pf, Kl, Hei	OHG. <i>ango</i> ,tight' > V ->, to make tight, to bind tight' <i>bange</i> < <i>be-</i> + <i>ango</i> -> <i>beengt</i> ,be tight' ->V: <i>bangen</i> ,become tight'
<i>(be)fürchten</i>				Pf, DWb	< OHG. adjective <i>furhtan</i> ,be frightened', noun <i>furcht</i> ,fear' < <i>furche</i> ,furrow'
<i>(be)neiden</i>	Acc, Dat		+	Kl	OHG. <i>nîd(h)</i> < germ. <i>neitha-</i> ,envy, anger', Old Irish. <i>nith</i> ,fight' =>[ctrl (x,s)]
<i>(be)trauern</i>	Acc		+	Kl, DWb	OHG. <i>trûren</i> ,mourn, to look down (,die Augen niederschlagen') =>[ctrl (x,s)]
<i>bedauern</i>	Acc			Kl, DWb	cognat to <i>teuer</i> : <i>mich nimmt</i> <i>eines dinges tu:r</i> ,a thing is dear to me'
<i>begehren</i>	Acc		+	Kl, Pf	Kl: < OHG. adjective <i>ger</i> ,eager', Pf: also: ,demanding' =>[ctrl (x,s)]
<i>bemitleiden</i>	Acc				=>[ctrl (x,s)]

<i>bestaunen</i>	Acc		+	Kl, Pf	cognate to MLG. <i>stunen</i> ,to withstand, to stare' =>[ctrl (x,s)]
<i>denken</i>		<i>an</i>	+	Pf, Kl	Pf: (weak grade to <i>dünken</i>) < Ie. * <i>tong-</i> ,think, feel', Kl: < * <i>teng-</i> ,drag', Slav. ,weigh' -> Germ. Originally 'ponder, weigh'
<i>drüberstehen</i>	Acc		+		<i>stehen</i> 'stand'=>[ctrl (x,s)]
<i>durchdrehen</i>			+		<i>Drehen</i> 'turn'=>[ctrl (x,s)]
<i>durchhängen</i>			+		<i>hängen</i> ,hang'=>[ctrl (x,s)]
<i>durchknallen</i>			+		<i>knallen</i> 'to bang' => Vdic
<i>eifern</i>		<i>nach</i>	+	Pf	,pursue a goal' => [ctrl(x,s)]
<i>einrasten</i>			+		cf. <i>ausrasten</i>
<i>einsteigen</i>		<i>auf</i>	+		<i>einsteigen</i> (vehicle) =>[ctrl (x,s)]
<i>empfinden</i>	Acc	(Als)	+	Kl	< <i>ent-finden</i> , therefore originally ,find out, perceive' =>[ctrl (x,s)]
<i>erinnern</i>	Acc	(An)	+	Kl	< OHG. adjective <i>innaro</i> ,inner' V-> ,make sth to become the inner part'
<i>erleiden</i>	Acc		+	Kl Pf, DWb	< OHG. <i>lidan</i> ,go, make a journey' cognate to <i>leiten</i> ,lead'
<i>erschrecken</i>		<i>vor</i>	+	Kl, Pf, DWb	OHG. <i>scriccan</i> ,jump up' (cf. <i>Heuschrecke</i> ,locust')
<i>fliegen auf</i>		<i>auf</i>	+		<i>fliegen</i> (bird) =>[ctrl (x,s)]
<i>fühlen</i>	Acc		+	Kl. Pf	OHG. <i>fuolen</i> ,to palm' =>[ctrl (x,s)]
<i>genießen</i>	Acc		+	Pf	< Germ * <i>neutan</i> < Ie. * <i>neud-</i> ,to use'
<i>gewahren</i>	Acc		+	Pf	< OHG. <i>wahren</i> ,to realize, to observe' OHG. <i>wara</i> ,shelter, attention' -> <i>wahrnehmen</i>
<i>gönnen</i>	Dat		+	Pf	OHG. <i>giunnan</i> ,to allow' => [ctrl (x,s)]
<i>grübeln</i>		<i>über</i>	+	Pf	Iterative derivation to <i>graben</i> ,to dig'
<i>hadern</i>		<i>mit</i>	+	Kl	< Grm. <i>hathu</i> ,fight'
<i>hassen</i>	Acc		+	Kl, Pf, DWb	Kl: <i>haz</i> < Ie * <i>kedos</i> (Gr. <i>Kedos</i> ,sorrow, mourning' DWb, Pf: ,persecute out of hostile feelings' cf. causative <i>hetzen</i> 'to hunt, race'
<i>hoffen</i>		<i>auf</i>	+	Pf, Kl	Pf: possibly a cognate to <i>hüpfen</i> ,jump' Kl: ,to lean forward' -> ,to look into the future'

<i>kennen</i>	Acc			Pf	- <i>jan</i> -PRS to <i>können</i> (<i>kann-jan</i>) können : < idg. <i>wellen</i> < germ. * <i>gen(e)</i> - ,recognize, know'
<i>lieben</i>	Acc		?	Kl, DWb	DWb: MHG. adjective <i>liep</i> -> V: ,to become dear to sb., to make oneself dear to sb.' =>[ctrl (x,s)]?
<i>merken</i>	Acc		+	Pf	< ,to mark by a sign'
<i>mögen</i>	Acc		?		< ,can' -> =>[ctrl (x,s)]
<i>platzen</i>		<i>vor</i>	+		<i>platzen</i> (balloon)
<i>s. verzehren</i>		<i>nach</i>	+		<i>verzehren</i> (food) =>[ctrl (x,s)]
<i>schätzen</i>	Acc			Pf	,to estimate a price' =>[ctrl(x,s)]
<i>schauern</i>		<i>vor</i>	?	Kl	< ,shake', cf. Exp/ACC, Appendix II
<i>schließen</i>	Acc		+	Pf	,to close with a hook' beschließen : <i>bisliozan</i> ,to close sth', in MHG. Also ,to bring to an end'
<i>schwärmen</i>		<i>für</i>	+		<i>schwärmen</i> (bees), -> Vact =>[ctrl (x,s)]
<i>schwelgen</i>		<i>in</i>	+	Pf	< OHG. <i>swelgan</i> ,to gulp down' < idg. * <i>suel</i> ,to gulp'
<i>sinnen</i>		<i>auf</i>	+	Pf	OHG. <i>sinnan</i> ,go, make a journey' (-> <i>senden</i> 'to send sb.', <i>Gesinde</i> 'farmhand'). < idg * <i>sent-</i> ,path, direction'
<i>sorgen</i>		<i>um</i>	+	Pf, Kl	< possibly Old Indic <i>surksati</i> ,s/he cares for < Ie. * <i>suergh-</i> ,to care for' => [ctrl(x,s), phys (x,y)]
<i>spüren</i>	Acc		+	Pf	,to keep a track (on a hunt) -> 'perceive' -> 'feel' => [ctrl(x,s)]
<i>stehen auf</i>	Acc		+		<i>stehen</i> ,stand' =>[ctrl (x,s)]
<i>streben</i>		<i>nach</i>	+	Pf	OHG <i>streben</i> , <i>strebon</i> ,to move'
<i>stutzen</i>		<i>vor</i>	+	Pf	,to obstruct by bumping' <intensive derivation to <i>stoßen</i> ,to bump'
<i>trachten</i>		<i>nach</i>	+	Pf	< MHG. <i>trahten</i> ,look at, think about, to attend to, <loan from Lat. <i>tractare</i> ,to treat' <i>tractare</i> is an intensive to <i>trahere</i> ,drag'
<i>übelnehmen</i>	Expl CP		+		<i>nehmen</i> ,take' =>[ctrl (x,s)]

<i>(ver)abscheuen</i>	Acc		+	Kl, Pf	Kl: <i>scheu</i> : k-derivation to <i>schauen</i> , Pf: <i>scheuen</i> ,to bounce back' (-> causative: <i>scheuchen</i>) =>[ctrl (x,s)]
<i>(ver)achten</i>	Acc		+	Kl	OHG. <i>ahtôn</i> , MHG. <i>ahten</i> ,to observe' (vgl. got. <i>ahjan</i> ,to mean', <i>aha</i> ,mind, sense') =>[ctrl (x,s)]
<i>vergessen</i>	Acc		+	Kl, Pf, DWb	< OHG. <i>gezzan</i> ,achieve' Old Nordic <i>getan</i> ,create' > ME <i>geten</i> ,to get', < idg * <i>ghe(n)d-</i> ,to touch to grasp' + <i>ver-</i> ,NEG'
<i>wagen</i>	Acc		+	Pf	,to put on the scale' => [ctrl(x,s)]
<i>wollen</i>	Acc		+		OHG. <i>wellen</i> < Germ. <i>waljan</i> ,to choose', OHG. <i>wollen</i> (Germ <i>wiljan</i>) Old Indic. <i>vrnati</i> ,s/he choses' < Ie. * <i>uel-</i> ,want, chose' => [ctrl(x,s)]
<i>wünschen</i>	Dat		+	Kl	< Ie. * <i>wene-</i> ,desire' cf. <i>gewinnen</i> . gewinnen : Germ * <i>wenn-a</i> ,to toil', <i>gewinnen</i> thus means to achieve by toilment'.
<i>wüten</i>		<i>gegen</i>	+	Pf	OHG. <i>wuoten</i> ,be obsessed, be violent' => [ctrl(x,s)]

Appendix II

The table in appendix II lists some Exp/ACC verbs in German that are either polysemous in the contemporary stage of the language or which in earlier stages had a physical (phys (x), phys (x,y)) or a control (ctrl (x,s)) reading. In the latter case a short etymology and the source of our information is given.

Exp/ACC verb (Stim/Nom)	Ctrl(x,s) Phys (x) Phys (x,y)	Source [Kl(uge) Pf(eifer) Gr(eule) DWb]	Etymology
<i>abstoßen</i>	+		<i>stoßen</i> (hand)
<i>(an)ekeln</i>	?	Kl	possibly ,shame', or < Lat. <i>aeger</i> ,sick, ill-minded'
<i>(an)öden</i>	+	Kl	< OHG. <i>*authja</i> ,barren', OE. <i>ithan</i> ,to waste' [-> <i>ver-öden</i>]
<i>(an)stinken</i>	+	Kl	Germ. <i>*stenkwa-</i> ,to bump', > ,smell' (,a smell strucks me')
<i>ankotzen</i>	+		<i>kotzen</i>
<i>anmachen</i>	+		<i>anmachen</i> (fire)
<i>anregen</i>	+		< <i>regen</i>
<i>ansprechen</i>	+		< <i>sprechen</i>
<i>anwidern</i>	+	Kl, Gr	OHG: <i>widarôn</i> ,to refuse'
<i>anziehen</i>	+		<i>anziehen</i> (clothes)
<i>Ärgern</i>	+	Pf	< OHG. <i>argoron</i> , <i>ergiron</i> ,to seduce so. to do evil'. MHG <i>ärgern</i> , <i>ergern</i> ,make worse' < a deadjectival derivation to the comparative of the adjective <i>arg</i> , <i>arg</i> ,bad, evil' < Germ <i>*arga-</i> ,recreant, bad, evil', cognate to Ie. <i>*ergh-</i> ,shake, agitate => [ctrl(x,y)]
<i>aufbauen</i>	+		<i>aufbauen</i> (house)
<i>aufrichten</i>	+		<i>aufrichten</i> (upper part of the body)
<i>(be)trüben</i>	+	Kl	OHG adjective <i>truobi</i> 'blear' -> V: ,to make blear'
<i>bedrücken</i>	+		< <i>drücken</i>
<i>bedrücken</i>	+		< <i>drücken</i> (hand)
<i>begeistern</i>	+	Kl	denominal prefix derivation to <i>Geist</i> ,spirit' -> 'to fill with spirit' => [ctrl(x,y)]
<i>belasten</i>	+		<i>belasten</i> (a sprained ankle)
<i>berühren</i>	+		<i>berühren</i> (hand)
<i>bestechen</i>	+		<i>stechen</i> (knife)

<i>bestürzen</i>	+	Kl	< OHG. <i>bisturzen</i> intensive derivation to <i>stürzen</i> ,to knock over'
<i>bewegen</i>	+		<i>bewegen</i> (thing)
<i>dauern</i>		DWb	cognate to <i>teuer</i> ,expensive'
<i>empören</i>	+	Kl	MHG. <i>enbaeren</i> ,to rise' < MHG. <i>bôr</i> ,riot'
<i>(ent)nerven</i>	+	Pf	< Lat. <i>enervare</i> ,to take out the nerves'. <i>nerves</i> : < Lat. <i>nervus</i> ,muscle, sinew, power'
<i>enttäuschen</i>	+	Kl	Lehnprägung zu frz. <i>désabuser</i> und <i>détromper</i> . ,to pull so. out of an delusion'=> [(ctrl (x,s))]
<i>entrüsten</i>	+	Kl	< MHG. ,to help so. out of the armament'
<i>(er)freuen</i>	+	Pf	originally ,make happy' < <i>froh</i> < Ie. * <i>preu</i> ,jump'
<i>(er)schrecken</i>	+	Kl	< OHG. <i>scriccen</i> ,jump', <i>screccen</i> ,to make jump'
<i>erbosen</i>	+	Kl	cognate to ME <i>boosten</i> , NE <i>boast</i> -> ,to inflate'
<i>erdrücken</i>	+		< <i>drücken</i>
<i>ergötzen</i>	+	Kl	< OHG. <i>irgezzen</i> , MHG. <i>ergezzen</i> ,make forget' -> ,to recreate'
<i>ergreifen</i>	+		<i>ergreifen</i> (hand)
<i>erregen</i>	+		< <i>regen</i>
<i>erschüttern</i>	+	Kl, DWb	<i>r</i> -intensive to OHG. <i>(ir)scuttan</i> ,shake, pour'
<i>grauen, grausen, gruseln</i>	+	Kl	< OHG. <i>grûwen</i> ,fear', cognate to Ie. * <i>ghers-</i> and Lat. <i>horrêre</i> ,to quake', <i>gruseln</i> : intensive to <i>grausen</i> <i>grausen</i> : intensive to <i>grauen</i>
<i>jucken</i>	+		<i>jucken</i> (body part)
<i>kratzen</i>	+		<i>kratzen</i> (hand)
<i>packen</i>	+		<i>packen</i> (hand)
<i>reizen</i>	+		<i>reizen</i> (acid)
<i>reuen</i>	?		< Grm * <i>hreww-a</i> ,to hurt' < Ie. * <i>kreus</i> ,to grind'
<i>rühren</i>	+		<i>rühren</i> (liquid)
<i>schaffen</i>			< ,create'
<i>schaudern</i>	+	Kl	LG <i>schuddern</i> , MLG. <i>schodern</i> < <i>schoden</i> ,to shake'
<i>scheren</i>	+		<i>scheren</i> (hair)
<i>treffen</i>	+		<i>treffen</i> (target)

<i>trösten</i>	+	Pf	< OHG. <i>trosten</i> , MHG <i>troesten</i> ,to appease, to grant shelter' => [ctrl (x,s)]
<i>überraschen</i>	+	Pf	[cf. lemma <i>über</i> , pp. 1481], < adjective <i>rasch</i> , V: to suddenly come over so., to suddenly attack so. '
<i>umhauen</i>	+		<i>umhauen</i> (tree)
<i>(ver)wundern</i>	?	Kl	< Germ. <i>*wundra-</i> ,wonder' possibly <i>ro-</i> derivation to <i>winden</i> ,to twine', cf. Lat. <i>perplexus</i> to <i>plectere</i> ,to braid'
<i>(ver, ent)zücken</i>	+	Kl	< MHG. <i>enzücken</i> ,drag away' a prefix derivation to <i>zucken</i> , <i>zücken</i> , an intensive to <i>ziehen</i> ,drag'
<i>verbittern</i>	+	Kl	->,make bitter' [(ctrl(x,s), ctrl(x,y)) bitter: Germ. <i>*bit-ra</i> ,bitter' cognate to verbal root Germ <i>*beit-a-</i> ,bite'
<i>verdrießen</i>	+	Kl	< <i>drücken</i> . cf. Lat. <i>tru:dere</i> ,bump, push'
<i>verdutzen</i>	+	Kl	MLG <i>vordutten</i> ,irritate'. In High German the word blends with <i>vertutzen</i> ,to offend so.' < <i>tuz</i> ,bump'
<i>verstimmen</i>	+		<i>(ver)stimmen</i> (piano)