Form, use and meaning of *ge*-prefixed predicative participles in German

Abstract

The analysis of German predicative participle constructions that describe a state has been subject to intense debate in the literature. We argue that in the discussion of adjectival participles in predicative constructions, the intimate relation between morphology and semantics has not received the attention it deserves. We develop an analysis of German predicative participles that explains their semantics in parallel to their morphology. In particular, we present a novel analysis of *ge*-prefixed adjectival participles in copula constructions by considering participle predicatives as a subclass of the more general class of predicative constructions, the prime example being adjectival predicatives. We argue that whereas adjectival predicatives describe individual properties, participles of *ge*-prefixed predicatives describe states derived from event properties. We provide a fine-grained analysis of the morphosemantic make-up of German participles involving the *ge*-prefix and conclude by relating our proposal to previous analyses of participles in which event properties have been rendered as event kinds or (Neo-)Davidsonian states.

1 Introduction

This paper is about German participles. More specifically, the focus of the present study is to approach an analysis of predicative uses of German participles in which the participle is the main predicate of a sentence and follows the copula *sein* ('be') as in (1).

(1) Die Wäsche ist getrocknet.
the laundry BE ge-PRFX.dry.t-PTCP

'The laundry has dried.'[1]

As in other languages, like English, what makes German participles particularly challenging is that they are hybrids that conflate morphological, syntactic and semantic features of both verbs and adjectives. Thus, German participles are difficult because their analysis spans across different modules of the grammar that are traditionally considered in separate. On the one hand, it has been suggested that the morphology of German participles is by and large determined semantically, but how exactly semantics is relevant to the formation of German participles is still an open question. On the other, explicit proposals for a semantics of German participles often consider participles as ready-made linguistic forms and postulate their semantic interpretation on the basis of their grammatical behavior in sentences and discourse, independent of their morphological make-up. The current state of the debate on German participles is thus downright paradoxical. There are elaborate semantic theories of German participles that relate to their morphological make-up only by appeal to intuition or through stipulation, and there are theories of the morphological make-up of German participles that consider semantics to be relevant to their formation without considering the semantic contribution that participles make to phrases and sentences. With the present paper, we aim to bring together insights previously made about the morphology and the semantics of German participles in separate, in an analysis the pivotal point of which is the joint treatment of the morphology and semantics of German participles. To provide the reader with an intuition of what to expect in the following we would like to sketch the punchline of our analysis. The literature on German predicative participles of which we are aware (and a similar observation obtains to our knowledge for the literature on English predicative participles) explains the meaning of predicative participles by focusing on the properties of the participle by itself, at the expense of downplaying the fact that copula constructions with participles belong to and pattern with a larger class of predicative constructions. The example par excellence of a predicative construction, in the sense we understand it, is one in

[1]We use the following glossing conventions for German examples: NMLZ = Nominalization, PRFX = Prefix, PRTC = Particle, PTCP = Participle, SPL = superlative, CMP = comparative, ADJ = adjectivizer, BE = copula. If there is a suitable translation of a German prefix or particle into English, we use this translation in the morpheme gloss.

which an underived lexical adjective is the main predicate and follows the copula *sein* as in (2).

(2) Die Wäsche ist trocken.
the laundry BE dry
'The laundry is dry.'

The starting point of the analysis we aim to develop in the present paper is to explain the properties of predicative participles like (1) by analyzing the requirements imposed on participles in predicative constructions in parallel to the requirements imposed on underived adjectives in predicative constructions to other predicative constructions, like the adjectival predicative in (2). That is, whereas traditional approaches to predicative participles aim to explain the properties of predicative participles like their graded grammaticality or the licensing of adverbial modifiers by making special assumptions about the lexical semantics of participles, the present paper derives these properties from the requirement that the participles be predicative expressions.
In the remainder of this introduction, we illustrate the state of the art in the analysis of German predicative participles with the discussion of two representative treatments of the morphology and semantics of such participles, Rathert (2009) and Kratzer (2000), respectively.

1.1 The morphology of German participles

There are two participle morphemes in German, a suffix *-t* and a suffix *-en*. Weak and mixed verbs systematically form their participle with *-t* (3), strong verbs with *-en* (4). In the following we refer to participle morphology simply as the '*-t* morphology'.

(3) a. malen
'to paint'
b. gemalt
ge-PRFX.paint.t-PTCP
'painted'

(4) a. schlafen

‘to sleep’

b. geschlafen
ge-PRFX.sleep.en-PTCP
‘slept’

Verbs like those in (3)/(4) require an additional morphological operation, prefixation with a dedicated morpheme *ge-*, to form a participle whereas verbs that already have a prefix like (5-a) do not.

(5) a. bemalt
be-PRFX.paint.t-PTCP
‘painted with sth.’

b. verschlafen
ver-PRFX.sleep.en-PTCP
‘sleepy’

(3)/(4) show that *ge*-prefixation is independent of the weak/strong distinction and that the participle suffixes *-t* and *-en* are independent of the *ge*-prefix. But the requirement for *ge*-prefixation to form a participle is also independent of morphological complexity, or so it seems, as morphologically complex verbs like those in (70)/(7) also require *ge*-prefixation of the verb stem.

(6) a. anmalen
on-PRTC.paint
‘to paint sth. on sth.’

b. angemalt
on-PRTC.ge-PRFX.paint.t-PTCTP
‘sth. is painted on sth.’

(7) a. einschlafen
into-PRTC.sleep
‘to fall asleep’

b. eingeschlafen
into-PRTC.ge-PRFX.sleep.t-PTCTP
‘fallen asleep’

The difference between (5) on the one hand and (3)/(4) as well as (6)/(7) on the other correlates with the separability of preverbal morphemes. In verb second

configurations in main clauses (e.g. when the complementizer is *denn* ('since')), verbal particles like *ein* ('into') are dislocated whereas verbal prefixes like *be-* remain *in situ* in subordinate clauses (e.g. when the complementizer is *weil* ('because')).

(8) a. ... denn er bemalt die Wand.
... since he be-PRFX.paint the wall

b. ... weil er die Wand bemalt.
... because he the wall be-PRFX.paint

c. ... denn er malt die Wand an.
... since he paint the wall on-PRTC

d. ... weil er die Wand anmalt.
... because he the wall on-PRTC.paint

An additional complexity of participle formation in German is that other verbal prefixes like *be-* are in mutually exclusive distribution with the prefix *ge-*.

(9) a. *begemalt
be-PRFX.ge-PRFX.paint.t-PTCP

b. *gebemalt
ge-PRFX.ge-PRFX.paint.t-PTCP

Providing an explanation for the distribution of *ge-* has proved a notorious problem of German linguistics. To illustrate the current state of research, we consider the proposal of Rathert (2009). Rathert argues that a purely phonological analysis of the distribution of *ge-* like the one proposed in (Neef, 1996) fails to account for two systematic exceptions to the standard distribution of *ge-*. First, unprefixed loan words that end with *-ieren* do not form their participles with *ge-*. Second, in verbs derived from compounds like (10-b) or (10-c), *ge-* may either prefix the whole construction or intervene between the components of the verb.

(10) a. studiert
study.t-PTCP
'studied'

b. geliebäugelt
ge-GE-love.eye.t-PTCP

‘ogled at sth.’

c. hausgehalten
home.ge-PRFX.keep.en-PTCP
‘budgeted’

To predict the distribution of *ge-* even for the exceptional cases in (10), Rathert (2009) (in turn an improvement of (Geilfuß-Wolfgang, 1998)) draws upon a combination of phonological and morphosemantic features. In Rathert's optimality-theoretic ranking of features the phonological factor is subordinate to morphosemantics and serves as a kind of last resort option to deal with the special behavior of verbs that end on *-ieren*. The main work is done by the morphosemantic analysis of the distribution of *ge-*, which Rathert (2009) explains with three general assumptions about the properties of German inseparable prefixes.

(11) a. *ge-* belongs to the class of inseparable prefixes like *be-* or *ver-* and has a perfective meaning.
b. Inseparable prefixes in German determine the Aktionsart of a verb.
c. A verb can be specified for only one Aktionsart, thus only one inseparable prefix per Verb is possible.
d. Inseparable prefixes always attach to the root of a complex verb.

A central observation of Rathert (2009) is that inseparable prefixes often come in pairs with opposed aspectual meanings. For example, the prefix *er-* is often associated with an inchoative Aktionsart (12-a) and the prefix *ver-* (12-b) is often associated with a terminative Aktionsart, and these two types of Aktionsart are semantically incompatible, see (12-c).

(12) a. erblühen
er-PRFX.blossom
‘to blossom’

b. verblühen
ver-PRFX.blossom
‘to wither’

c. *erverblühen
er-PRFX.ver-PRFX.blossom

If *ge-* is associated with perfective aspect as in assumption (11-a), then according to Rathert this explains why *ge-* is in mutually exclusive distribution with the other German prefixes. With respect to the positioning of *ge-*, Rathert proposes to define the root of a complex verb in terms of the syntactic separability of constituents under meaning preservation. The example which Rathert discusses is the verb *bleiverglasen* ('to glaze with lead glass'), which is derived from the nominal compound *Bleiglas* ('lead glass'). Rathert argues that the prefix *ver-* intervenes between the constituents of the nominal compound because the underlying nominal compound is compositional: lead glass is a kind of glass. Thus Rathert reasons that *glass* is the smallest word-like constituent that can be syntactically separated under meaning preservation and consequently, *ver-* attaches to *glass* instead of the whole compound.

(13) a. Bleiglas
lead.glass
'lead glass'

b. bleiverglasen
lead.ver-PRFX.glass
'to glaze with lead glass'

If *haushalten* as in (10-c) is compositional, then *ge-* intervenes, and if *liebäugeln* as in (10-b) is not compositional, then *ge-* attaches to the whole construction.
The implementation of Rathert's assumption about the meaning of *ge-* faces a quandary. If *ge-* is associated with a perfective meaning, then what is the contribution of the participle morphology *-t* which is present independently of whether or not a verb is prefixed with *ge*? If the participle morphology is associated with perfective aspect, then the same argument that Rathert invokes to explain the complementary distribution of *ge-* and other prefixes applies to *ge-* and participle morphology. If *ge-* already specifies perfective aspect, why would one need an additional operation like suffixation with *-t*/*-en*? The analysis of participles Rathert argues for simply excludes the question for the semantics. She proposes that participle morphology and the *ge-* prefix are just formal reflexes of a participle feature associated with the verbal root. But if *ge-* is just a formal reflex and thus semantically empty, then semantic features of *ge-* cannot be drawn upon in the explanation of its distribution, which would be a relevant factor to the decision

when a stem is associated with a feature that is formally reflected as *ge-* and when it is not.

The problem with Rathert's separation of morphology and semantics in the analysis of the distribution of *ge-* generalizes to her analysis of the other German prefixes. When verbal prefixes in general are morphologically irrelevant, their positioning has to be explained independent of their morphological function. This is why Rathert invokes the notion of compositionality to explain the distribution of prefixes. But explaining the distribution of prefixes independent of their morphosemantic function misses an important point. Reconsider Rathert's explanation of the positioning of *ver-* in the verb *bleiverglasen* (13-b). She assumes that *bleiverglasen* is derived from the compound noun *Bleiglas* and that *ver-* intervenes between the compounds because the compound noun is compositional. This analysis, according to which the morphosemantic contribution of *ver-* is irrelevant to its positioning runs counter to fact. There is no verb **bleiglasen*, because there is no verb **glasen*, see (14-a). It is the dedicated function of *ver-* to derive the denominal verb *verglasen* (14-b), which in turn is the basis for the derivation of the complex denominal verb *bleiverglasen*.

(14) a. *glasen

b. verglasen
ver-PRFX.glass
'to glaze'

That is, *ver-* does not simply intervene in the compound *Bleiglas* but is required to derive a verb from the noun *Glas* at first. The compositionality of a complex verb like *bleiverglasen* reflects that it is derived compositionally, not the other way round. Taking the semantics of German prefixes serious as Rathert does is certainly relevant to the distribution of *ge-*. But the conclusion which we want to draw from the critical evaluation of Rathert's proposal (which we consider to represent the state of the art) is that the morphology of German participles cannot be considered in separate, and the same conclusion holds for the morphology of the construction from which the a participle is derived. In the next section, we argue that the same conclusion arises when the starting point of the analysis is not the morphology (as in the work of Rathert) but the semantics of participles.

1.2 The semantics of German predicative participles

When German participles are used in predicative constructions with the copula *sein* ('be'), they describe states. Thus it stands to reason to approach the meaning of predicative German participles through a closer investigation of the states they describe. The semantics of German predicative participles has been intensively studied in the literature (major works are Rapp (1997); Maienborn (2007); Gehrke (2015). In this section, we discuss one particularly influential analysis of the meaning of German predicative participles – Kratzer (2000). Kratzer proposed that German predicative participles can be used to describe two fundamentally different types of states that are individuated by their compatibility with the modifier *immer noch* ('still') where (15) and (16) are some of the examples Kratzer employs to illustrate her claim.

(15) a. Die Geisslein sind immer noch versteckt.
the goats BE still ver-PRFX.hide.t-PTCP
'The little goats are still hidden.'

b. Das Gebäude ist immer noch geräumt.
the building BE still ge-PRFX.evacuate.t-PTCP
'The building is still evacuated.'

c. Die Reifen sind immer noch aufgepumpt
the tyres BE still up-PRTC.ge-PRFX.pump.t-PTCP
'The tyres are still pumped up.'

(16) a. Das Theorem ist (*immer noch) bewiesen.
the theorem BE (*still) be-PRFX.prove.en-PTCP
'The theorem is (*still) proved.'

b. Der Briefkasten ist (*immer noch) geleert.
the mail box BE (*still) ge-PRFX.empty.t-PTCP
'The mail box is (*still) emptied.'

c. Die Töpfe sind (*immer noch) abgespült.
the pots BE (*still) up-PRTC.ge-PRFX.t-PTCP
The pots are (*still) washed up

Adopting a terminological distinction introduced in Parsons (1990), Kratzer calls the states described by participles that allow for modification with *immer noch* as 'target state' participles and those that don't 'resultant state' participles. The

intuition behind the distinction of these two states is that target states are alterable, hence allow modification with *immer noch* but resultant states are not. From the data in (15) and (16) it appears as if the distinction between target states and resultant states is independent of the morphological realization of the participle, and in particular of the distribution and position of *ge-*. Thus, one might conclude that the semantics of participles is independent of their morphological make-up, and this is in fact the position that Kratzer adopts. She assumes that regardless of how participle morphology is analyzed, "the overt participle morphology would be meaningless" (Kratzer, 2000, p. 391), and thus is safe to ignore. When the semantics of participles is considered to be independent of their morphology, this of course doesn't help in solving the open question for the semantic constraint on the distribution of *ge-* that was central to the last section. But nevertheless, are more detailed look at Kratzer's proposal is helpful to see what is at stake in the semantic analysis of German participles.

To explain the difference diagnosed with the *immer noch* diagnostics, Kratzer assumes two different types of inputs to the derivation of participles. She proposes that participles that describe a target state are derived from stems the lexical representation of which involves a state argument. Kratzer illustrates the representation with the lexical representation (17-a) of the stem *aufpump-* ('pump up') that underlies the participle *aufgepumpt* ('pumped up') in (15-c). Participles that describe a resultant state are derived from lexical representations of stems that do not make available a state argument. Kratzer illustrates the resultant state stem class with a lexical representation of the stem *beweis-* ('prove') in (17-b) that she proposes to underly the participle *bewiesen* ('proved') in (16-a).

(17) a. aufpump- $\rightarrow \lambda s \lambda e.pump(e) \wedge event(e) \wedge inflated(the-boat)(s) \wedge cause(e)(s)$

b. beweis- $\rightarrow \lambda e.prove(the-theorem)(e)$

Kratzer proposes that the participle of resultant state stems like (17-b) is derived by an operation that perfectivizes the event described by the stem. The participle of stems that make available a state argument is derived by an operation that existentially binds the event argument, see (18-a).

(18) a. Target stativizer: $\lambda R \lambda s \exists e.R(s)(e)$

b. Resultant stativizer: $\lambda P \lambda t \exists e.P(e) \wedge \pi(e) \leq t$

While Kratzer's proposal makes the correct predictions when lexical stem representations of the type she proposes are assumed, the correlation of lexical result states and target states runs into deep trouble when participles of deadjectival verbs are considered. Reconsider for example the participle of the deadjectival verb *leeren* (to empty) in (16-b). According to Kratzer's *immer noch* diagnostics, (16-b) describes a resultant state although deadjectival verbs make available a state argument (and thus should have a lexical representation as in (17-a)). To save the only data point in favor of target state participles – incompatibility with *immer noch* – Kratzer proposes that deadjectival verbs like *to empty* should be analyzed as periphrastic causatives, in which an adjective incorporated into a light verb *machen* ('make').

The example with which Kratzer motivates her analysis of deadjectival participles is (19), where according to Kratzer *zumachen* ('to make close') and *schliessen* ('to close') are synonyms.

(19) a. *Die Tür ist immer noch zugemacht.
the door is still close-PRTC.ge-PRFX.make.t-PTCP
'The door is still made closed'

b. Die Tür ist immer noch geschlossen.
the door is still ge-PRFX.close
'The door is still closed'

Following Kratzer, deadjectival verbs like *leeren* ('to empty') in (16-b) would have to be analyzed as a *machen*-causative and thus as in (20).

(20) *Der Briefkasten ist immer noch leergemacht.
the mail box is still empty-PRTC.ge-PRFX.make.t-PTCP
'The mail box is still made empty'

On the basis of these assumptions and the ungrammaticality of (20), Kratzer proposes that target state participles of deadjectival verbs are ruled out for independent reasons. She assumes that verbs derived through incorporation into a light verb never license target state participles (and in particular light verb constructions

with *machen*) when the denotation of the category V "could be an operator that existentially quantifies the target state argument – if there is one" (Kratzer, 2000, p. 396). The resulting lexical representation Kratzer stipulates for deadjectival verbs like *leeren* is given in (21).

(21) leer- $\rightarrow \lambda x \lambda e \exists s.empty(x)(s) \wedge cause(s)(e)$

Besides bringing up new problems (i.e. whether a periphrastic causative analysis of deadjectival verbs is viable, see e.g. the competing and established proposals by Hale and Keyser (1993); Kennedy and Levin (2008)), Kratzer's patch falls short of accounting for deadjectival verbs in general: for the overwhelming majority of deadjectival verbs, the participle is compatible with *immer noch*, although the correspond periphrastic causative is ungrammatical, see (22) and (23).

(22) a. *Die Tür ist immer noch aufgemacht.
the door is still open-PRTC.ge-PRFX.make.t-PTCP
'The door is still made open'

b. Die Tür ist immer noch geöffnet.
the door is still ge-PRFX.open.t-PTCP
'The door is opened'

(23) a. *Der Briefkasten ist immer noch vollgemacht.
the mail box is still full-PRTC.ge-PRFX.make.t-PTCP
'The mail box is still made full'

b. Der Briefkasten ist immer noch gefüllt.
the mail box is still ge-PRFX.full.t-PTCP
'The mail box is still filled.'

We conclude that Kratzer's addendum cannot save the proposed correlation between a lexical result state and target states in participles.

Kratzer's analysis is flawed also with respect to the purported correlation between the lack or presence of a lexical result state and the description of a target or resultative state. Kratzer stipulates that the lexical representation (17-b) of the verb *beweisen* does not involve a result state. But this is in plain contradiction to the established tests for the lexical entailment of a result state (Beavers, 2010; Rappaport Hovav and Levin, 1998), according to which *beweisen* is a result verb and differs in its entailments from manner verbs like *to wipe*, cp. (24).

(24) a. Er wischte den Tisch, aber er ist nicht sauber.
'He wiped the table but it was not clean.'
b. #Er bewies das Theorem, aber es ist nicht bewiesen.
'He proved the theorem but it wasn't proved.'

To reinforce the point, consider two further result verbs that aren't compatible with *immer noch*, although Kratzer's analysis would predict they are.

(25) a. Das Papier ist (*immer noch) verbrannt.
'The paper is (*still) burnt.'
b. #Das Papier ist verbrannt, aber (es ist nicht verbrannt/aber nichts an ihm ist anders).
'The paper is burnt, but (it isn't burnt/nothing is different about it).'
c. Peter ist (*immer noch) gestorben.
'Peter is (*still) died.'
d. #Peter ist gestorben, aber (er ist nicht tot/aber nichts an ihm ist anders).
'Peter has died, but (he isn't dead/nothing is different about him.)'

An analysis of participles of causative verbs like *to burn* or *to die* that would be in accordance with Kratzer's proposal would have to deny that causative verbs entail a result state. Such a patch would run counter to one of the basic assumptions of lexical semantics and thus, to save her only data point in favor of resultant state participles (incompatibility with the *immer noch* diagnostics), Kratzer quite seriously suggests that for verbs like *to die* modification with *immer noch* as in (25-c) is fine in "contexts in which people are assumed to come back to life" (Kratzer, 2000, p. 387). But allowing for such a redefinition of the meaning of a verb renders uninformative the *immer noch* diagnostics. Why is redefinition of *to die* allowed, but not of *to prove* or *to empty*?
Parson's target state/resultant state distinction is certainly relevant to the meaning of participles, but the availability of target states and resultant states (in participles and elsewhere) does not correlate with the presence or absence of a result state in a verb. There simply is no correlation between the target/resultant state distinction and the manner/result distinction (and Parsons never intended such a

correlation). Whatever the *immer noch* test shows (see e.g. Mueller-Reichau and Irmer (2018) for discussion), it cannot be used to motivate a correlation between the availability of result states and target/resultant states. The lexical representations of Kratzer are at best ad-hoc and at worst misleading. In fact, given that the pivotal point of Kratzer's analysis of the semantics of participles is the content of lexical-semantic representations, Kratzer (2000) remains remarkably silent on how these lexical representations are determined (if not in a way that post-hoc explains the acceptability of the *immer noch* diagnostics). One goal that we have set ourselves for the present paper is to approach lexical representations in a more systematic and empirical fashion, in the spirit of well established frameworks of lexical semantics like that of Rappaport Hovav and Levin (1998). The other problem of Kratzer's proposal concerns the ignorance of participle morphology, and in particular of the distribution of *ge-*: the careful data selection of Kratzer (2000) easily gives rise to the impression that there is nothing systematic about the morphology of participles and their meaning. With the present paper, we aim to show that this impression is superficial and does not withstand a more systematic inspection of the data.

1.3 Goals and outline of the paper

The point we wanted to make with the abridged discussion of the morphological and semantic problems that German participles pose is that a theory of German participles should develop the semantics of predicative participles in accordance with their morphology, and vice versa. Accordingly, the main goal of this paper is to take both the morphology and the semantics of participles serious and thus to relate the observable properties of predicative participles with their internal structure and meaning. To this end, in the next section 2 we compare predicative constructions in which the main predicate is a participle with predicative construction in which the main predicate is an underived adjective. On the basis of this comparison, we argue that German predicative participles decompose into two subclasses, only one of which patterns with adjectival predicatives. We explain the difference between the two classes by showing that German predicative participles can predicate two different types of properties, which we label individual

and event properties, respectively. We propose a number of tests to distinguish between the two and ultimately correlate the predication of event properties with the presence of the prefix *ge-*. In section 3 we spell out our analysis of the semantic function of *ge-* in formal detail and discuss the semantic interaction of *ge-* and verbal particles. We corroborate our analysis by pointing out that our proposal correctly predicts the graded grammaticality of German predicative participles, allows for an explanation of the licensing of event-related modifiers (much in the spirit of Gehrke (2015)) and can be used to derive a split semantics of stative copula sentences that captures the distinction between Kimian and Davidsonian states proposed to be relevant to German copula constructions in Maienborn (2005) and subsequent work. Section 4 concludes.

2 Property predication strategies

We argued in the introduction that the semantics and morphology of German participles cannot be considered in separate, regardless of whether the focus of the analysis is on the semantics or the morphology. The goal of this section is to investigate the systematic aspects of the relation between the morphology and the semantics of German participles. Considering the analysis of Kratzer, we argued that there is no systematic correlation between the absence or presence of a target or resultant state in participles and the absence or presence of result states in the lexical representations of those constructions from which a participle is derived. But then (assuming that the meanings of participles are not stored ready-made in the lexicon but are derived), how does the state described by a participle relate to the lexical representation of the meaning of the verb with which the participle is associated? In this section, we approach an answer to this question by taking a closer look at the ontology underlying the linguistic description of states. If an individual x is in a certain state s iff x has a certain property p for the temporal duration of s, then what state x is in depends on what properties p are predicated of x. On these premises, we approach the ontology of states in the following by examining linguistic strategies for the predication of properties. Typically, the main predicate of clauses that predicate properties is not a verb but an adjective or a noun. Following terminological convention, we called such linguistic expressions

predicative expressions.

A natural starting point for the investigation of predicatives is when the main predicate is a lexical (i.e. underived) adjective like *trocken* ('dry')[2]. A widely accepted view is that adjectives predicate a property of an individual by determining a value on a scale with respect to some contextual standard (see e.g. (Kennedy and Levin, 2008)). The contextual standard of comparison relative to which an individual property is predicated by an adjective can be made explicit with a comparative construction (27-b) or a superlative construction (27-c).

(27) a. Die Wäsche ist trocken (relativ zum relevanten Standard für Trockenheit)
'The laundry is dry (relative to the relevant standard for dryness)'

b. Das Hemd ist trockener als die Hose.
'The shirt is drier than the trousers.'

c. Das Hemd ist am trockensten.
'The shirt is the most driest.'

One reason for why a contextual standard of comparison is required to predicate a value on a nominal scale of length, width, or dryness of an individual is that scales cannot be directly predicated of individuals. see (28).

(28) a. *Die Hose ist Weite.
'The trousers are width.'

b. *Die Hose ist Trockenheit.

[2]We chose *trocken* as a running example although as an absolute adjective it is maybe not the prime example with which one would illustrate a theory of adjectives based on degrees. The reason why we nevertheless chose *trocken* is that we wanted to rule out, as far as possible, the impact of lexical competition on the grammaticality judgments of the participle of the corresponding degree achievement: the main use of many German degree achievements is derived with the help of inchoative morphology like the prefix *er-* and thus is in competition with the semantically less precise and morphologically more simple degree achievement, compare (26).

(26) a. Peter erwärmte das Wasser.
Peter er-PRFX.warm the water
'Peter warmed up the water.'

b. Peter wärmt das Wasser.
'Peter warmed the water.'

'The trousers are dryness.'

Given that values on a scale relative to a standard of comparison but not scales by themselves can be predicated of individuals, (overt or non-overt) comparative morphology is required to turn a (nominal) scale into a value that can be predicated with an adjective of an individual. In the following we refer to properties that are predicated with copula constructions relative to a standard of comparison as *individual properties*. Individual properties contrast with what we refer to as *event properties*. Consider participles derived from deadjectival verbs like *getrocknet* ('dried') in (29).

(29) Die Wäsche ist getrocknet.
the laundry BE ge-PRFX.dry.t-PTCTP
'The laundry is dried.'

Participles as in (29) also predicate properties in constructions with the copula *sein*, but comparative constructions are ungrammatical with these properties[3].

(31) a. *Die Hose ist getrockneter als das Hemd.
the trousers BE ge-PRFX.dry.t-PTCP.er-CMP than the shirt
'(Intended:) The trousers are drieder than the shirt.'

b. *Die Hose ist am getrocknetsten.
the trousers BE most ge-PRFX.dry.t-PTCP.er-SPL
'(Intended): The trousers are the most driedest.'

The difference between (27-a) and (29) pertains to the way in which the property of being dry is linguistically predicated of the pants. The truth of (27-a) depends just on whether or not the pants are dry (relative to a standard of comparison for dryness). In contrast, the truth of (29) depends on whether or not there was an event of drying the pants. That is, (29) can be false even if the pants are dry, e.g. when the pants were never dried but always dry. Thus, the truth-conditions of

[3]Examples like (30) from Rapp (1997) seem to contradict our claim about the lack of comparatives with *ge*-prefixed participles. The morpheme *ge-* in (30) is not a prefix of the type under discussion, as there is no base verb **fährden*.

(30) a. Diese Region ist noch gefährdeter.
this region BE more ge-PRFX.fähr.t-PTCP.er-CMP.
This region is more endangered.

the predication of individual properties only depend on properties of the relevant individual, whereas the truth-conditions of the predication of event properties only depend on properties of the relevant event. Consequently, the truth-conditions of the predication of an event property are independent of the truth-conditions of individual properties. This observation is reinforced by participles of non-core transitive verbs (in the sense of Levin (1999); Kratzer (2005)) like *kochen* ('to boil') in (32).

(32) ??Die Kartoffel ist gekocht.
the potato BE ge-PRFX.cook.t-PTCP
'The potato is cooked.'

The participle in (32) predicates an event property of the potato: the truth of (32) depends only on whether or not the potato has been cooked. But the event property of being cooked is not related in any obvious way to an individual property of the entity that has been cooked: some things get hard when cooked, others soft, some things get tasty when cooked, others stale (see also Rappaport Hovav (2008)). If the function of the copula *sein* is the same in adjectival predications and participial predications, and the basic function of *sein* is the predication of individual properties (as with underived adjectives), then we expect that the predication of pure event properties as in (32) is somewhat strange out of the blue. In fact, it has been previously noted that participles of verbs that predicate event properties, like (32), are odd without an appropriate context (see e.g. (Kratzer, 2000, p. 388)), and the same conclusion holds for unprefixed non-deadjectival core transitive verbs like *kaufen* in (33).

(33) ??Der Apfel ist gekauft.
the apple BE ge-PRFX.buy.t-PTCP
'The apple is bought.'

The strangeness of participles of otherwise unprefixed verbs like *kochen* or *kaufen* contrasts with the perfect acceptability of otherwise unprefixed deadjectival verbs like *trocknen*. Deadjectival verbs are derived from adjectives that predicate individual properties, and according to the established analysis of Kennedy and Levin (2008), the event denoted by deadjectival verbs compares a change of individual

properties over time. For example, the event described by the verb *trocknen* compares the degrees of dryness of the direct object of *trocknen* at a time t_0 and a time t_1, where $t_0 < t_1$ and requires that the degree of dryness at t_1 is higher on the scale of dryness than it is at t_0. The truth-conditions of the event property predicated with a participle of a deadjectival verb are thus evaluated in terms of the degree of difference of individual properties: (29) is true iff the laundry is drier now than it was. Consequently, if the function of the copula *sein* is to predicate individual properties, this explains why participles of deadjectival participles are fully grammatical out of the blue. Interestingly, participles of verbs that are not associated with the predication of individual properties can be pragmatically rescued when the event property by itself is reinterpreted as a comparable individual property, for example with the help of a comparative construction as in (34) (see also Rapp (1996)).

(34) Der Apfel ist gekauft und nicht gestohlen.
the apple BE ge-PRFX.buy.t-PTCP and not ge-PRFX.steal.t-PTCP
'The apple is bought and not stealed.'

Another way to improve on the grammaticality of participles of verbs that are not associated with the predication of an individual property is to enforce a purely perfective interpretation with a "duty-done" reading in which *sein* is a perfect auxiliary and not a copula. For example, in a context where items on a buying are checked off, (35) is fully acceptable as a statement according to which the apple on the list does not need to be bought.

(35) Der Apfel ist bereits gekauft.
the apple BE already ge-PRFX.buy.t-PTCP
'The apple is already bought.'

We discuss pragmatic strategies for improving the grammaticality of predicative participles in more detail in section 3.5.

The data considered so far are participles constructed by prefixation of the (otherwise unprefixed) base verb with *ge-*. We argued that these *ge*-prefixed participles predicate event properties in copula constructions, and that the acceptability of *ge*-prefixed participles in copula constructions depends on whether or not the base

verb is associated with the predication of individual properties. The hypothesis that emerges from the correlation of the prefix *ge-* and the predication of event properties is that the semantic function of *ge-* could be to derive a property of the event described by the verb to which it attaches. The test cases for this hypothesis are the other two constructions types of participles in German besides the participles of otherwise unprefixed verbs we already considered, i.e. participles of morphologically complex verbs.

As already noted in the introduction, German prefix verbs do not form their participles with *ge-*, and if *ge-* correlates with the predication of an event property, we thus expect that participles of German prefix verbs predicate individual properties. For the sake of ease of discussion, we consider the prefix *be-*, a "remarkably simple and regular prefix" (Dewell, 2015, p. 53). We argued that the relevant feature of an individual property that sets it apart from an event property is that individual properties allow for comparative constructions. As predicatives generally disallow for comparatives, we test this prediction by using participles explicitly as adjectival attributes in prenominal position. Consider the data in (36).

(36) a. die trockenste Hose
'The driest trousers.'

b. *die getrocknetste Hose
the ge-PRFX.dry.t-PTCP.ste-SPL
'(Intended:) The most dried trousers'

c. *die gekochteste Kartoffel
the ge-PRFX.cook.t-PTCP.ste-SPL
'(Intended:) The most cooked potatoe'

d. ??Das Bild ist gemalt.
the picture BE ge-PRFX.paint.t-PTCP
'The picture is painted.'

e. *das gemalteste Bild
the ge-PRFX.paint.t-PTCP.ste-SPL
'(Intended:) the most painted picture'

f. Die Wand ist bemalt.
the wall BE be-PRFX.paint.t-PTCP
'The wall is painted (with sth.)'

g. die bemalteste Wand
the be-PRFX.paint.t-PTCP.ste-SPL

'The most painted wall'

The basic case is again the underived adjective *trocken*, which is perfectly acceptable both in the copula construction and as a superlative attribute in prenominal position. The participle of the *ge*-prefixed verb *trocknen* is acceptable in a copula predication but ungrammatical as a superlative prenominal attribute. The participle of the *ge*-prefixed verb *kochen* is questionable in a copula predication and ungrammatical as a superlative prenominal attribute, and the same holds of the non-core transitive verb *malen* (36-d). In contrast, the *be*-prefixed verb *bemalen* is acceptable both in a copula construction and as a superlative in prenominal position (36-g). We conclude from this that *be*-prefixed constructions are associated with the predication of individual properties even in their participles. *be*-prefixed constructions thus differ fundamentally from participles formed by prefixation with *ge-* but pattern with underived adjectives in regard to the predication of individual properties. Because deadjectival verbs are associated with the predication of individual properties, we expect that deadjectival verbs pattern with *be*-prefixed verbs in constructions other than participles. This expectation is borne out for the licensing of *ung*-nominalizations, in which the prefix *ge-* never occurs. Dedjectival and *be*-prefixed verbs generally license *ung*-nominalizations (see e.g. Roßdeutscher (2010); Roßdeutscher and Kamp (2010); Pross (2018)) but non-core transitive verbs never do. For diachronic reasons (see e.g. **?**), the situation for unprefixed core transitive verbs is more complicated, *kaufen* ('to buy') has no *ung*-nominalization whereas *prüfen* ('to examine') has an *ung*-nominalization, a rule of thumb being that transitive result verbs but not transitive manner verbs license *ung*-nominalizations, see (37).

(37) a. die Trocknung
the dry.ung-NMLZ
'the drying'

b. die Bemalung
the be-PRFX.paint.ung-NMLZ
'the painting'

c. *die Kochung
the cook.ung-NMLZ

d. *die Kaufung
the buy.ung-NMLZ

e. *die Prüfung
the examine.ung-NMLZ
'the examination'

What is important here is that *be*-prefixed constructions pattern with deadjectival verbs in regard to *ung*-nominalizations, which Pross (2018) argues to reflect that fact that both deadjectival verbs and *be*-prefixed constructions are derived from constructions that predicate an individual property.
In parallel to the requirement that comparative morphology is required to predicate a value on a scale as an individual property, Francez and Koontz-Garboden (2017) argue that possessive morphology is required to predicate what they call a quality (like *wisdom* or *Hunger* ('hunger')) as an individual property.

(38) a. *Peter ist Hunger.
Peter BE hunger.

b. Peter hat Hunger.
Peter HAVE hunger
'Peter has hunger.'

c. Peter ist hungrig.
Peter BE hunger.ig-ADJ
'Peter is hungry.'

Pross (2018) applies the analysis of Francez and Koontz-Garboden (2017) to *be*-prefixed constructions, arguing that *be-* functions as a possessive morpheme that predicates a nominal quality (like *Mal* ('mark, spot')) of an individual. If the participle of a *be*-prefixed constructions predicates an individual property, a further parallel between deadjectival verbs and *be*-prefixed constructions that suggests itself is that like deadjectival verbs are derived from adjectives predicating individual properties, *be*-prefixed verbs are derived from participles predicating individual properties. This is the analysis of *be*-prefixed participles that Pross (2018) argues for: *be*-prefixed verbs are derived from the associated participle, whereas *ge*-prefixed participles are derived from the associated verb. Empirical evidence for such an analysis of *be*-prefixed verbs comes from the reasonable number of

be-prefixed participles for which there is no associated verb.

(39) a. Der Redner ist begabt.
the speaker is be-PRFX.gift.t-PTCP
'The speaker is gifted.'

b. Der Berg ist bewaldet.
the mountain is be-PRFX.forest.t-PTCP
'The mountain is forested.'

c. Der Mann ist befrackt.
the man is be-PRFX.tailcoat.t-PTCP
'The man is tailcoated.'

d. Die Witwe ist begütert.
the widow is be-PRFX.asset.t-PTCP
'The widow is prosperous.'

The idea that a certain class of verbs is derived from a participle instead of the other way round is in fact embodied in many lexical-semantic analyses of non-deadjectival result verbs like *break*, where the predicate constant identifying the result state of *break* is the associated participle *broken*, cp. e.g. Levin and Rappaport Hovav (1995).

(40) x [CAUSE y [BECOME *BROKEN*]]

Possession has also been argued to be involved in *break*-type verbs, consider for example the analysis of Beavers and Koontz-Garboden (2017) of the verbal root *to crack* in (41).

(41) $[\![\sqrt{crack}]\!] = \lambda x \exists s.[has - fissure'(x,s) \wedge \exists e'[\text{BECOME}'(e',s)]]$

(41) involves a morphologically silent possessive predication $has - fissure$ of a nominal quality $fissure$. Pross argues that the preciation of individual properties with *break*-type verbs is thus in parallel to the morphologically overt predication of an individual property via possession of nominal quality with *be-*. The point we want to make here is that there are two ways to predicate individual properties (as in Francez and Koontz-Garboden (2017)), depending on whether the predicate is derived from an adjectival scale or a nominal quality. In contrast, event properties are not derived from adjectives or nouns but from verbs. In turn, if

the function of the copula *sein* is to predicate an individual property, the acceptability of copula constructions with *sein* is thus graded. Lexical adjectives and denominal possessives are acceptable in copula constructions because they predicate individual properties. Manner verbs and alternating transitives that form their participles with *ge-* do not predicate individual properties at any stage of their derivation and thus in copula constructions are bad out of the blue (but can be rescued pragmatically). Deadjactival verbs are between the two ends of acceptable and unacceptable participles. They form their participles with *ge-* and thus the participle ascribes an event property but the copula construction is generally acceptable because the event described is by itself derived from an individual property. In summary, the three classes of participles we have considered so far give support to our hypothesis that the function of *ge-* is to derive an event property and that copula constructions are acceptable only when individual properties are predicated. Before we assess our hypothesis about *ge-* with respect to the remaining class of particle verbs, a note on intransitives is in place.

First, *ge*-prefixed constructions with unergative verbs are unacceptable in copula constructions with *sein* but receive a perfect interpretation in which they select the auxiliary *haben*. According to our hypothesis, the reason for the unacceptability of (42-a) is that there is no individual of which a property could be predicated at all, as unergatives only have an agentive interpretation.

(42) a. *Peter ist geschlafen.
Peter BE ge-PRFX.sleep.en-PTCP

b. Peter hat (seit 2 Minuten) geschlafen.
Peter HAVE (since 2 minutes) ge-PRFX.sleep.en-PTCP
'Peter has slept (since 2 minutes).'

Second, it is an open question whether or not unaccusative verbs as in (43) have an interpretation as a predicative adjectival participle besides the perfect interpretation in constructions with *sein*. As (Gehrke, 2015, fn.12) argues, there is no reliable test that would tease apart the perfect and predicative interpretation of (44), as diagnostics for a stative interpretation like modification with the temporal adverbial *seit* ('since') in (43) is also possible for unambiguous perfect constructions like (42-b).

(43) Peter ist (seit 2 Minuten) verreist.
Peter BE (since 2 minutes) ver-PRFX.trip.t-PTCP
'Peter is out of town (since 2 minutes).'

What is interesting to note, however, is that for unprefixed unaccusatives that form their perfect with *ge-*, the diagnostics of a state with *seit* is ruled out, and the difference between (43) and (44) obviously has to do with the fact that prefixed unaccusatives do not form their participles with *ge-* but unprefixed unaccusatives do.

(44) Peter ist *(seit 2 Minuten) gestolpert.
Peter BE *(since 2 minutes) ge-PRFX.stumble.t-PTCP
'Peter has stumbled *(since 2 minutes).'

If the function of *ge-* is to derive an event property, then we would expect that a predicative interpretation of unaccusative participles is bad when no individual property can be reconstructed, just as we saw for the other cases of *ge*-prefixed participles like unergatives (42-a), non-core transitives (32) or transitives (33). In turn, this suggests that the full grammaticality of constructions like (44) is due to a temporal perfect interpretation and thus does not fall within the scope of the present investigation of predicative constructions.
Next, we consider the remaining case of participle constructions in German, i.e. when *ge* intervenes in a particle verb. One important difference between particle verbs and prefix verbs is that diachronically, German prefixes have undergone a process of semantic blending and bleaching, see e.g. Dewell (2015) for an overview. As a consequence, German particles but not German prefixes have an independent use as a preposition, even if German prefixes developed out of prepositional elements. The semantic autonomy of particles is reflected in the relatively clear-cut contribution that they make to the formation of a complex verb, where in the basic case, particles retain their prepositional spatial meaning (e.g. as in (45)). For unergative and unaccusative verbs, the particle often licenses a direct object with respect to which the goal or result of the event is described (e.g. (46)).

(45) a. Peter pumpte.
'Peter pumped.'

b. Peter pumpte das Wasser ab.
Peter pump the water off-PRTC
'Peter pumped out the water.'

(46) a. Peter kam.
'Peter came.'

b. Peter kam an.
Peter come at-PRTC
'Peter arrived.'

Another main use of particles besides the basic spatial use is when particles combine with a deadjectival verb like *wärmen* ('to warm') in (47). In this case, the particle often specifies a (difference) degree on the adjectival scale from which the base verb is derived (see e.g. Roßdeutscher (2016) for details).

(47) a. Peter wärmte das Wasser.
'Peter warmed the water.'

b. Peter wärmte das Wasser auf.
Peter warm the water up-PRTC
'Peter warmed up the water.'

When a non-core transitive or intransitive verb is combined with a particle, the verb is obligatorily transitive and the particle often determines the affectedness of the incremental theme (48).

(48) a. Peter arbeitete.
'Peter worked.'

b. Peter arbeitete die Akte ab.
Peter work the file up-PRTC
'Peter worked through the entire file'

The point in which we are interested here is not so much the specific contribution of particles to complex verbs but – as has already been stated in the introduction – the fact that all particle constructions form their participles with *ge-*. Interestingly, while *ge*-participles were said to highly vary in their acceptability, *ge*-participles of particle verbs are generally acceptable. According to our hypothesis, the acceptability of copula constructions with participles depends on whether or not an

individual property can be reconstructed for predication[4]

We capitalize on the observation that particle predicatives pattern with adjectival predicatives with respect to the grammaticality in predicative constructions when developing our analysis of *ge-* in the next section. Before we move on, however, we want to state the main conclusions of this section.

The goal of this section was to investigate different strategies for the predication of properties, as a basis for the analysis of those states described by adjectival participles in constructions with the copula *sein*. We argued that participles of verbs prefixed with *ge-* predicate event properties and that participles of other verbs which do not involve *ge-* or where *ge-* is an infix predicate individual properties. Before we turn to the question how event properties and individual properties relate to the states described by participial predicatives, we note that the decisive point of our analysis is the function of *ge-*, which we argued to identify with the predication of event properties. But whereas there is an abundance of literature on the predication of individual properties, event properties have not received the attention they deserve, and in this section event properties were only discussed informally. In the next section, we will thus investigate event properties in formal detail.

3 Individual properties and event properties

In the last section, we distinguished the predication of event properties with adjectival copula constructions by considering how event properties differ in their predicative use from the more established concept of a gradable and comparable individual property. We argued that the predication of event properties systematically correlates with the presence of the prefix *ge-*, and that the acceptability of event predicatives depends on whether or not an individual property can be recon-

[4]One point in favour of this observation is that particle constructions can license comparative uses, at least in ad-hoc uses.

(49) Ich war im wahrsten Sinne des Wortes aufgepumpter als diese Möchtegern-Bodybuilder.
'I was literally more pumped up than this wannabe-bodybuilder.'
(https://marvinsfitnessblog.com/category/fitness/)

structed from the lexical semantics of the base verb. The goal of this section is to cast the observations about the role of *ge-* with respect to the predication of event properties into a formal semantics of *ge-*, and to explore how this semantics of *ge-* interacts with the semantics of the base verb and the semantics of particles.

3.1 Individual property predicatives and the function of participle morphology

3.1.1 Adjectival predicatives

In parallel to the informal discussion of event property predicatives in the last section, we approach the formal semantics of *ge-*predicatives by contrasting event property predicatives with already established analyses of individual property predicatives. Accordingly, we first consider individual properties expressed by sentences in which the main predicate is an underived lexical adjective, like (27-a).
The logical form formalism which we use to make precise event property predicatives is a variant of Discourse Representation Theory (DRT, Kamp et al. (2011)). Our choice of DRT is mainly motivated by the requirement to represent quite complicated operations on predicates and arguments in a simple and accessible form. While we believe that the principles we use in the following to combine semantic representations associated with distinct morphological material can be expressed in more rigid frameworks like logical form frameworks that directly assign logical forms to truth-conditions, we believe such purely formal restrictions unnecessarily complicate the matter. This being said, the basic unit of semantic representation we use in the following is a so-called Discourse Representation Structure (DRS). A DRS is a pair $\langle U, Con \rangle$, where U is the discourse universe and Con a set of conditions on individuals of the discourse universe. A DRS is often graphically demarcated by drawing a box around U and Con. The discourse referents in U come in different sorts, among them discourse referents e for events, discourse referents x for objects and discourse referents Q for properties. According to the standard model-theoretic semantics of the DRS language, discourse referents in the universe of a DRS K are bound by existential quantification. We call the set of discourse referents of a DRS K that are not existentially bound the set of free

discourse referents of K and represent this set in the form of a binding list L of discourse referents in front of a DRS K: $\langle L, K \rangle$. We refer to the binding list L of a DRS K as the 'store' of K. In a manner of speaking, we use a store as a flexible and convenient way to represent the more traditional array of λ-abstracted variables. Among the elements in a store, we distinguish one particular type of unbound discourse referents by underlining. Underlined discourse referents stand in for grammatical argument slots of the predicate (i.e. verb, adjective or participle) that the DRS represents. As an illustration, consider (50), a simplified DRS for the analysis of gradable adjectives like *trocken* ('dry') as proposed in Kennedy and Levin (2008).

(50) $trocken \rightarrow \langle \underline{x}, \boxed{dry(\underline{x}) \succeq \textbf{stnd}(dry)} \rangle$

According to Kennedy and Levin, gradable adjectives like *trocken* identify the degree to which the internal argument of the adjective manifests the property measured by the adjective relative to a standard of comparison. That is, the condition $dry(\underline{x})$ in (50) represents the degree of dryness which manifests in $\underline{x}$ and **stnd** provides the standard of comparison according to which the dryness of the grammatical argument $\underline{x}$ of the adjective is evaluated.

3.1.2 Denominal possession predicatives

Before we discuss the semantics of the *ge*-predicative derived from *trocknen*, which we argued to predicate an individual property, we consider the other main strategy for predicating an individual property with what Francez and Koontz-Garboden (2017) analyze as quality-possession predicatives. In quality-possession predicatives, the main predicate is an adjective *hungrig* ('hungry') derived from a quality-denoting noun (like hunger) with the help of possessive morphology as in (38-c). The representation in (51) is a simplified variant of the analysis of quality-possession predicatives in Francez and Koontz-Garboden (2017), according to which (38-c) is true of the internal argument x iff there is a portion z of the nominal quality **hunger** that x possesses.

(51) hungrig (adjective)$\rightarrow \langle \underline{x}, \boxed{\begin{array}{l} z \\ z \subset \textbf{hunger} \\ \text{POSS}(\underline{x}, z) \end{array}} \rangle$

3.1.3 be-prefixed possession predicatives

Importantly, quality-possession predicatives do not make reference to an event, a point which is central to the analysis of *be*-prefixed constructions in Pross (2018) . He argues that *be*-prefixed predicatives are quality-possession predicatives, where *be*- functions as possessive morphology that allows to predicate a nominal quality as an indivdual property. While such an analysis of *be*-prefixed predicatives accounts for the adjectival properties of these constructions and their full acceptability in predicatives with the copula *sein*, there is an important difference between the adjectives discussed by Francez and Koontz-Garboden (2017) and *be*-prefixed predicatives. A closer look at the morphology of *be*-predicatives shows that the morphological makeup contains the participle morpheme *t*, see (52).

(52) Die Wand ist bemalt.
the wall BE be-PRFX.paint.t-PTCTP
'The wall is painted.'

For an analysis of *be*-prefixed predicatives as quality predicatives, the presence of participle morphology in these constructions has to be taken into account. Pross proposes that the function of participle morphology in *be*-prefixed predicatives is to derive, in the terminology of Francez and Koontz-Garboden (2017), a quality from a noun. As Francez and Koontz-Garboden (2017) only discuss lexical qualities, Pross argues that one way to formally approximate the transformation of a noun into a quality is by intensionalization. This proposal is inspired by the analysis comes of individual concepts in Higher-Order Intensional Logic Montague (1973), where intensionalization is used to turn the individual denotation of a noun like *man* into the proposition of having characteristic properties of a man (a function from individuals to possible worlds) that returns for each time and world the extension of the predicate *man*. Following Pross, we understand this proposition as expressing an individual property Q (in the sense of Francez and Koontz-Garboden (2017)), for the case of *man* the property of being *male*.

(53) a. man $\rightarrow \langle x, \boxed{\text{man(x)}} \rangle$

b. male $\rightarrow \boxed{\begin{array}{l} Q \\ Q = \lambda x.^{\wedge} man(x) \end{array}}$

The operand of the intensional abstraction in (53-b) is a DRS K, where x is free in K, i.e. $\langle x, K \rangle$. We thus represent the operation of intensional abstraction as in (54), according to which intensionalization takes as an argument a DRS K with a store containing x and returns the intension of K relative to x.

(54) $\lambda \langle x, K \rangle . \boxed{Q = \lambda x.^{\wedge} K}$

Pross (2018) argues to analyze the participle morpheme *-t* in (52) as an intensional abstraction operator that derives a quality **Q** when applied to the semantic representation of a noun. Pross proposes that the *be-* prefix functions as a possessive morpheme that allows to predicate a portion z of the quality **Q** as an individual property, where for (52), the quality **Q** could be paraphrased as *Bemaltheit* ('paintedness'). According to these assumptions, a simplified semantic representation of the *be*-prefixed construction *bemalt* in predicatives like (52) is given in (55).

(55) bemalt (participle) $\rightarrow \langle \underline{y}, \boxed{\begin{array}{l} z, \mathbf{Q} \\ z \subset \mathbf{Q} \\ \text{POSS}(\underline{y}, z) \\ \mathbf{Q} = \lambda x.^{\wedge} paint(x) \end{array}} \rangle$

According to Pross, a verb derived from a *be*-prefixed construction describes an event that causes the internal argument y to be in the state s of having the property predicated by the *be*-predicative which we represent as in (56). Following Kratzer (1996), we assume in the following that the external argument of verbs is introduced in a separate Voice projection above the actual verbal phrase.

(56) bemalen (verb) $\rightarrow \langle \underline{y}, e, \boxed{\begin{array}{l} s, z, \mathbf{Q} \\ e \text{ CAUSE } s \\ s : \text{POSS}(\underline{y}, z) \\ z \subset \mathbf{Q} \\ \mathbf{Q} = \lambda x.^{\wedge} paint(x) \end{array}} \rangle$

3.2 Event predicatives and the function of *ge-*

3.2.1 Degree achievements

Against the background of the predicating individual properties with gradable adjectives and quality-possession participles, we are now ready to return the question for the semantics of *ge*-predicatives as in (57).

(57) Die Hose ist getrocknet.
the trousers BE ge-PRFX.dry.t-PTCTP
'The trousers are dried.'

We follow Kennedy and Levin (2008) in assuming that a verb (more precisely a degree achievement) is derived from a gradable adjective like *trocken* by defining defining a function m_Δ that measures "the amount that an object changes along a scalar dimension as a result of participating in an event". Such measures of change m_Δ take an internal argument x and an event e and return the degree that represents the amount that x changes in the property measured by m_Δ as a result of participating in e. We thus represent the verb *trocknen* ('to dry') derived from the adjective *trocken* ('dry') as in (58), according to which describing the change in the degree of dryness of the direct object as a drying event is justified if the change in the dryness of the object is greater than the contextual standard of change of dryness in drying events.

(58) trocknen (verb) $\rightarrow \langle \underline{x}, e, \boxed{dry_\Delta(\underline{x})(e) \succeq \mathbf{stnd}(dry_\Delta)} \rangle$

As in *be*-predicatives, *ge*-predicatives involve the participle morpheme *-t*. As a working hypothesis, let us assume that the function of participle morphology in *ge*-predicatives is the same as in *be*-predicatives, i.e. that participle morphology intensionalizes its input. According to this hypothesis, in (57) the participle suffix *-t* takes as an input the event description represented by (58) and returns the intension of that event, i.e. a function from events to possible worlds. We thus propose that participle morphology *-t* is associated with a semantic operation as in (59), where we use α as a placeholder for a discourse referent of type event e or individual x. When the input to intensionalization is an individual, we call the resulting intension a quality, when the input to to intensionalization is an event,

we call the resulting intension an event property. The operation we associate with the participle morphology takes a DRS K with an unbound discourse referent α as an argument and returns the intension of K relative to α: $\lambda\alpha.^{\wedge}K$. We represent the property so derived with a discourse referent Q and put this referent in the store of the output DRS for further processing.

(59) participle morphology *-t* $\rightarrow \lambda\langle\alpha, K\rangle.\langle Q, \boxed{Q = \lambda\alpha.^{\wedge}K}\rangle$

Now let us further assume that the function of *ge-* is that of an adjectivizer that allows to predicate an event property of the internal argument x of the verb. The resulting representation for (57) would then look as in (60). In anticipation of the goal of our analysis, we represent the relation between the event property Q and the internal argument of the verb x with a two-place relation which we label RES.

(60) getrocknet (participle) $\rightarrow \langle Q, \underline{x}, \boxed{\begin{array}{l}\text{RES}(\underline{x}, Q) \\ Q = \lambda e.^{\wedge} \boxed{dry_{\Delta}(\underline{x})(e) \succeq \textbf{stnd}(dry_{\Delta})}\end{array}}\rangle$

(60) represents the contribution of participle morphology as intensionalization of the event described by the degree achievement *trocknen*. The prefix *ge-* relates the internal argument to the output of the participle morphology with the RES-relation. Concerning the contribution of *ge-*, whereas there are clear intuitions concerning the relation between the internal argument and a quality in possessive predicatives as well as the relation between an internal argument and a measure of change in degree achievements, the RES-relation between the internal argument of a degree achievement and the event property in *ge-* predicatives of degree achievements which we we aim to associate with *ge-* is more difficult to pin down. To make more precise the role of the RES-relation, we next consider *ge*-predicatives of non-core transitive verbs like *malen* ('to paint').

3.2.2 Manner verbs

We follow Rappaport Hovav (2008) and Kennedy (2012) and assume that non-core transitive verbs are manner verbs in which a direct object is only optional. Accordingly we represent non-core transitive verbs like *malen* ('to paint') in their intransitive use as in (61).

(61) malen (intransitive) $\rightarrow \langle e, \boxed{paint(e)} \rangle$

As has been noted previously, the participle of the intransitive use of *malen* does not license a predicative in the absence of context, but only a perfect with the auxiliary *haben* ('have'), see (62).

(62) a. *Peter ist gemalt.
'Peter is painted.'
b. Peter hat gemalt.
'Peter has painted.'

To illustrate what is going wrong with (62-a), consider the representation (63) that would be output if we apply the proposed meanings of the participle *-t* and the *ge*-prefix to the representation of the manner verb in (61).

(63) gemalt (intransitive, participle) $\nrightarrow \langle Q, \boxed{\begin{array}{l} \text{RES}(x, Q) \\ Q = \lambda e.^{\wedge} paint(e) \end{array}} \rangle$

As it stands, (63) is an incoherent representation because there is no argument of which the property Q could be predicated with the RES-relation. It is for this reason that we purport (62-a) to be ungrammatical. To avoid the production of incoherent representations like (63), we restrict the application of the RES-relation associated with the *ge*-prefix to event representations that provide an underlined grammatical argument to which RES can attribute a property. In prose, the operation we want to associate with the prefixation of a verb with *ge-* is that *ge-* takes a DRS K with an unbound discourse referent for a property Q and an open argument slot $\underline{x}$ as an argument and relates $\underline{x}$ and Q by the relation RES. The new RES-condition os merged with the input DRS K to which *ge-* was applied and the discourse referents in the store of the input DRS are retained for further composition steps that operate on and eventually bind these discourse referents. In sum, the operation we associate with *ge-* is given in (64).

(64) ge- $\rightarrow \lambda \langle Q, \underline{x}, K \rangle . \boxed{\text{RES}(\underline{x}, Q)} \cup \langle Q, \underline{x}, K \rangle$

(64) is more complex than the instances of λ-abstraction we have used to model the intensionalization we associated with participle morphology. In (64), we use

λ-abstraction over a DRS K and its store L – $\lambda\langle L,K\rangle$ – to indicate the requirements for the composition of an input DRS $\langle Q,\underline{x},K\rangle$ and the operand DRS $\boxed{\text{RES}(\underline{x},Q)}$. The operation in (64) should thus be interpreted as follows: the application of the RES-operation requires as input a DRS K the store of which contains a property Q and an argument $\underline{x}$ and relates $\underline{x}$ and Q with the relation RES. The new RES-relation is then merged with the input DRS K. The variable store of K is passed over to the ouput DRS for further processing. The main purpose of variable stores is thus not only to ease representation, but also to allow for the composition of semantic representations without 'using up' arguments as it would be the case when β-reduction of λ-abstracted argument arrays is the only admissible composition operation.

3.2.3 Incremental theme verbs

Next, we turn to the analysis of the transitive usage of non-core transitive verbs as in (65).

(65) Peter malte eine Blume.
'Peter painted a flower.'

Traditionally, the direct object in (65) is analyzed as an incremental theme that measures out the progress of the event described by the verb. That is, the relation between the theme and the event described by the verb is a thematic relation of incrementality. The exact nature of this incrementality relation has been subject to controversial debate in the literature, see e.g. Krifka (1992); Kratzer (2004); Kennedy (2012) for some opposing proposals. As the goal of the present paper is rather independent of the exact specification of the incrementality relation, in the following we represent the relation between the incremental theme and the activity event in transitive uses of non-core-transitive verbs as a relation ASP between an individual x and an event e, leaving open the exact formalization of the incremental semantics of the ASP-relation. We define the morphologically empty ASP-operation involved in incremental theme verbs as in (66).

(66) ASP (incremental) $\rightarrow \lambda\langle e,K\rangle.\langle\underline{x},\boxed{\text{ASP(e,x)}}\rangle \cup \langle e,K\rangle$

Applying the ASP-operation associated with incrementality introduces an unbound grammatical argument $\underline{x}$, takes a DRS with an unbound event discourse referent $\langle e, K \rangle$ as an argument and returns a relation between the event e and the new grammatical argument $\underline{x}$ that is added to K. That is, the application of the ASP-operator extends the argument structure of the underlying manner verb with a direct object and the representation that results from the application of (66) to (61) is given in (67).

(67) malen (transitive) $\rightarrow \langle \underline{x}, e, \boxed{\begin{array}{l} \text{ASP}(e, \underline{x}) \\ paint(e) \end{array}} \rangle$

In turn, the representation in (67) can be input to the hypothesized participle and *ge-* meaning to derive the semantic representation of the *ge*-predicative of (65). The application of the intensionalization operation associated with participle *-t* to (67), however, leads to an interesting effect. According to our assumptions, intensionalizaton of a discourse referent α operates on all conditions in which α is free. Thus, for the case of the intensionalization of the event e occuring free in (67), not only the manner event description is targeted by the intensionalization but also to ASP-relation. When the RES-relation is applied on top of ASP, the resulting representation of the *ge*-predicative of (65) is (68).

(68) gemalt (transitive, participle) $\rightarrow \langle Q, \underline{x}, \boxed{\begin{array}{l} \text{RES}(\underline{x}, Q) \\ Q = \lambda e.^{\wedge} \boxed{\begin{array}{l} mal(e) \\ \text{ASP}(e, \underline{x}) \end{array}} \end{array}} \rangle$

In (68) there is no event argument accessible, but only an event property. Given that a predicative is restricted to individual properties, we expect that the *ge*-predicative (69) of (65) is odd out of context, which is exactly what has been observed in the literature.

(69) ??Die Blume ist gemalt.
'The flower is painted.'

In the light of the graded grammaticality of *ge*-predicatives our hypothesis thus predicts a correlation of the grammaticality of predicatives with the availability and status of the individual argument of the RES-relation. In degree predicatives

like (60), the target of the RES-relation is an internal argument of the verb that undergoes a change of its properties as a result of the event described, and thus the copula construction is fully grammatical. Intransitive constructions like (63) fail to provide an argument that RES could target and thus the corresponding predicatives are ungrammatical. Finally, thematic predicatives like (68) provide an argument that RES could target; but that argument is linked to the event description only via an additional, non-overt aspectual relation. We thus expect that thematic predicatives like (69) can be rescued if a degree relation between the event and the theme or an aspectual (perfect) relation is overtly specified by the context (in this respect, recall the discussion of examples (34) and (35)). Concerning the role of overt aspectual markers for the grammaticality of *ge*-predicatives, it is telling to finally turn to particle verb constructions.

3.3 Prepositional and aspectual predicatives

Particle verbs form their participle with the *ge*-prefix. The first thing to note is that when a particle is added to an intransitive verb, the verb becomes obligatorily transitive, regardless of whether or not the verb alternates with a transitive construction. Consequently, the internal argument of *ge*-predicatives of particle constructions with incremental theme verbs is also an internal argument of the verb. As such, according to what has been said so far we would expect that when a *ge*-predicatives of a particle construction can be grounded in an individual property of the internal argument licensed by the particle, the predicatives is grammatical even if the predicative of the base verb is not. But how can the addition of a particle induce such an effect? To approach an answer to this question, it is important to recall that in the previous section, we distinguished two basic meanings of particles: a basic preposition-like spatial meaning and a complex aspectual meaning of particles.

3.3.1 Prepositional particle predicatives

Consider first (70), where the particle determines a spatial interpretation of the non-subject arguments according to which some implicit material (presumably paint) ends up *on* the wall as a result of a painting event.

(70) Peter malte die Wand mit Farbe an.
Peter paint the wall with paint on-PRTC
'Peter painted on the wall with paint.'

The meaning of (70) resembles the with-variant in the English locative alternation, where both alternates express the same meaning (although with a different information structure), see (71-a)/(71-b)[5].

(71) a. Peter malte die Wand *(für zwei Stunden) mit einer Blume an.
'Peter painted the wall *(for two hours) with a flower.'
b. Peter malte *(für zwei Stunden) eine Blume an die Wand.
'Peter painted *(for two hours) a flower on the wall.'

An additional effect of the particle is that it renders the underlying activity description telic, as the established diagnostics with *for*-phrases in (71) shows.
Ignoring the details of morphological derivation, which we discuss below, we consider (71-a) as indicating the basic structure of the meaning of the alternates in (70). That is, we assume that the predicative underlying (70) is the construction in (72), where the main predicate is the preposition *an* ('at', 'on') that follows the copula *sein*.

(72) Die Farbe ist an der Wand.
'The paint is on the wall.'

In contrast to adjectival predicatives, the main predicate of (72) is not an adjective but a preposition that determines an individual property – the spatial location of an individual. Following established convention, we analyze the prepositional arguments of the verb *malen* as figure and ground, respectively. The relation between figure and ground in the prepositional phrase has been argued to determine the aspect of that event description which subcategorizes the prepositional phrase in a way similar to how other verbal aspectual operators determine telicity or atelicity (see in particular Zwarts (2005) and subsequent work). For the case of *anmalen* (70), the relevant aspectual condition would be that the figure moves along the spatial trace of the event and ends up *on* the ground. Grossly simplifying (but see e.g.

[5]Note that we intentionally chose a singular figure rather than a plural or mass term to avoid the well known effect that plural and mass nouns can render telic descriptions atelic.

Rossdeutscher (2014) for a detailed discussion of 'ground promotion'-alternations with German prepositional particles), we represent the aspectual relation between figure and ground with the same ASP-relation that we already used for incrementality. The grossly simplifying representation we thus propose for the aspectual contribution o the prepositional particle *an* is given in (73).

(73) an (prepositional particle) $\rightarrow \{y\}\lambda\langle e,K\rangle.\langle \underline{x}, \boxed{\begin{array}{l}\text{ASP}(e,y)\\ on(y,\underline{x})\end{array}}\rangle \cup \langle e,K\rangle$

According to (73), the prepositional particle *an* licenses the (implicit) figure argument which RES targets and also licenses the ground argument which functions as the direct object of the base verb. In (73), we represent the implicit figure argument y as a presupposition (in curly brackets '{}') of the application of aspectual *an*. Application of (73) to the intransitive representation (61) gives rise to the semantic representation of (71-a) in (74).

(74) anmalen (verb, transitive) $\rightarrow \{y\}\langle \underline{x}, e, \boxed{\begin{array}{l}\text{ASP}(e,y)\\ paint(e)\\ on(y,\underline{x})\end{array}}\rangle$

Earlier, we constrained the application of the RES-meaning associated with the *ge*-prefix to inputs that provide a suitable target argument for the predication of the RES-relation. Because the predicative (75) is grammatical, we can thus conclude that *ge-* can be applied only after the particle *an* has licensed the prepositional argument to which an individual property can be attributed.

(75) Die Wand ist angemalt.
the wall BE on-PRTC.paint.t-PTCTP
'The wall is painted (with sth.).'

Now assume as for (67) that intensionalization of a discourse referent operates on all free occurrences of that discourse referent. Importantly, the ASP-relation but not the prepositional relation *on* in (74) contains a free occurrence of e. Thus, the ground argument $\underline{x}$ of (74) is not intensionalized by the application of the participle semantics and remains available as a target for the predication of the RES-relation. The resulting representation of the participle in (75) is given in

(76).

(76) angemalt (participle) $\rightarrow \{y\}\langle Q, \underline{x}, \boxed{\begin{array}{l}\textsc{res}(\underline{x}, Q) \\ Q = \lambda e.^{\wedge} \boxed{\begin{array}{l} paint(e) \\ \textsc{asp}(e, y)\end{array}} \\ on(y, \underline{x})\end{array}}\rangle$

The grammaticality of particle predicatives thus is explained in parallel to the explanation of the ungrammaticality of thematic predicatives. Unlike in thematic predicatives, where the argument is intensionalized together with the ASP-relation, the ground argument of spatial particle verbs remains available as a target for individual property predication.

For particles to contribute a prepositional figure-ground relation, the activity described by the underlying manner verb must be conceptualizable in space in terms of involving movement. Broadly speaking, when a manner verb does not describe an activity in space, then the contribution of the particle is often also non-spatial but aspectual. In the next subsection, we consider predicatives of particle verbs in which the particle makes a non-spatial aspectual contribution in more detail.

3.3.2 Aspectual particle predicatives

When the manner verb on which a particle operates does not describe a spatial motion, then often the particle does not modify the aspect of the event description through the licensing of a figure-ground relation but modifies the internal structure of the event description by itself. One indicator for such an aspectual meaning of a particle is that in contrast to prepositional particles there is no alternate construction in which the particle heads a prepositional phrase. As an example, consider (77-a), where the particle *ab* ('off') is combined with the manner verb *arbeiten* ('to work'). The base verb *arbeiten* describes an atelic activity (77-b). The addition of a particle makes the verbal construction obligatorily transitive (77-c) and the predicative is fully grammatical (77-d).

(77) a. Peter arbeitet den Stapel in zwei Stunden ab.
'Peter worked off the pile in two hours.'

b. Peter arbeitete für zwei Stunden.

Peter worked for two hours.

c. *Peter arbeitet ab.
Peter worked off-PRTC

d. Der Stapel ist abgearbeitet.
'The pile is worked off.'

Given the data in (77), the aspectual effect of the particle *ab* can be captured as the determination of an endpoint of the activity described by (77-b) which renders the event description as a whole telic. In terms of the theory of incremental themes, and adopting the terminology of Beavers (2013), the telicity of an event description corresponds to the total affectedness of the direct object. Grossly generalizing, we represent the aspectual interpretation of the particle *ab* as in (79), according to which all subparts z of the partioning $\mathbf{m}$ of the prepositional object $\underline{x}$ have a certain event property Q.[6]

(79) ab (aspectual particle) $\rightarrow \lambda\langle Q,e,K\rangle.\langle \underline{x}, \boxed{\begin{array}{l}\text{ASP}(e,\underline{x})\\ \forall z \in \mathbf{m}(\underline{x}) \rightarrow Q(z)\end{array}} \rangle \cup \langle Q,e,K\rangle$

To approach an analysis of the predicatives of aspectual particle constructions, note first that there are no predicative constructions with intransitive non-spatial manner verbs.

(80) a. *Peter ist gearbeitet.
'Peter is worked'

b. Peter hat gearbeitet.
'Peter has worked.'

In parallel to intransitive uses of incremental theme verbs (see (62)), the ungrammaticality of the *ge*-predicative (80-a) is predicted by the restrictions on the application of the participle semantics, because the manner verb *arbeiten* does not

[6]Another aspectual function that particles in German regularly exhibit resembles terminative aspect in Russian Kagan (2016), where some but not all parts of the direct object are affected, see e.g. (78).

(78) Peter sägte den Ast an.
'Peter sawed the limb at-PRTC'.

We leave a further systematic and more fine-grained exploration of aspectual particles in German to future research.

provide an open argument slot for the application of the RES-relation.
Against the background of the ungrammaticality of (80-a) and the grammaticality of the particle predicative (77-d), we propose that the decisive function of the particle *ab* is that it allows the RES-relation to predicate an individual property of the theme it licenses, see the semantic representation for the particle verb (81) and its predicative (82).

(81) abarbeiten (verb, transitive) $\rightarrow \langle Q, \underline{x}, e, \boxed{\begin{array}{l} work(e) \\ \text{ASP}(\underline{x}, e) \\ \forall z \in \mathbf{m}(\underline{x}) \rightarrow Q(z) \end{array}} \rangle$

(82) abgearbeitet (participle) $\rightarrow \langle Q, \underline{x}, \boxed{\begin{array}{l} \text{RES}(\underline{x}, Q) \\ Q = \lambda e.^{\wedge} \boxed{\begin{array}{l} work(e) \\ \text{ASP}(\underline{x}, e) \end{array}} \\ \forall z \in \mathbf{m}(\underline{x}) \rightarrow Q(z) \end{array}} \rangle$

Similar to the prepositional particle construction, the contribution of the particle is not intensionalized by the participle. Consequently, we expect that predicatives of aspectual particle constructions are as grammatical as prepositional particle constructions.

3.4 The ontology of states

Having discussed the predication of event properties with the example of *ge*-predicatives and individual properties with the example of *be*--predicatives, the final step of our analysis of is to return to the initial question for the ontology of states, the starting point for the investigation of property predication strategies in the previous section. The two types of property predication we distinguish may be correlated to the familiar distinction between target and resultant states as follows. When individual property are stativized, the resulting state is a target state and when event properties are stativized, the resulting state is a resultant state. Notably, the distinction we draw between target states and resultant states is motivated differently than in Kratzer's analysis. Whereas Kratzer solely relies on the *immer noch* diagnostics and defines target states and resultant states independent of the lexical semantics of a verb and the morphological make-up of its partici-

ple, in our approach the distinction between target states and resultant states is grounded in the lexical semantics and morphology of a verb and its participle. In fact, according to our analysis, and in opposition to the analysis of Kratzer, the predication of resultant and target states cuts across the distinction between result and manner verbs. Deadjectival verbs entail a result state and their *ge-* participles describe a resultant state. Prefix-verbs entail a result state but their participles describe a target state. Particle verbs entail a result state but their *ge-* participles describe a target state. Unprefixed verbs do not entail a result state but their participles, as far as they are acceptable, describe a resultant state. In turn, if there is no correlation of target and resultant states on the one hand, and result and manner on the other, applying Parson's distinction between target and resultant states in perfects to copula predicatives may not be as plausible as Kratzer's proposal suggests. Instead, the boundary between states based on event and individual properties we propose to draw it more naturally corresponds to the distinction between 'Davidsonian' and 'Kimian' states that Maienborn (2005) proposes to be central to copula sentences. Kimian States à la Maienborn do not make reference to an event, but "are to be understood as reifications for the exemplification of a property Q at a holder x and a time t." (Maienborn, 2009, p. 41), which corresponds well with how we grounded states in individual and event properties. Neo-Davidsonian states are defined relative to a (Neo-)Davidsonian event, which in our analysis corresponds to a state derived from an event property. In parallel to how Pross (2018) derives a state from the POSS-relation between an argument and an individual property, we propose to derive a state from the RES-relation predicating an event property of an individual as in (83). The stativization operation takes as an argument the RES-relation, turns this relation into a state and existentializes the property Q which the RES-relation underlying the state attributes.

(83) $\lambda\langle Q,\underline{x},\boxed{\text{RES}(\underline{x},Q)}\rangle.\langle s,\underline{x}\,\boxed{\begin{array}{l}Q\\ s:\text{RES}(\underline{x},Q)\end{array}}\rangle$

A final note is in place concerning the intervention of the prefix *ge-* in participles of particle verbs. We said that the ASP relation associated with the particle introduces the argument necessary for the RES relation we associated with *ge*. Accordingly, from a semantic point of view ASP and consequently the particle has to

precede the application of *ge-* to the base verb. We also proposed that *ge-* operates on the output of the intensionalization operation we associated with the participle morphology *-t*. In sum, this suggests an order of application of the aspectual, participle and RES operation as in (84).

(84) base verb $<$ aspectual particles and incrementality ASP $<$ intensionalization with participle morphology *-t* $<$ RES-predication of event property with *ge-*

The order of operations in (84) is not only suggested by our semantic analysis, but also by the well-known fact that only adjectives can be prefixed with *un-*. Consider (85-a).

(85) a. Die Halbmaske ist unangemalt.
the half.mask BE un-PRFX.an-PRTC.ge-PREFX.paint.t-PTCP
'The halfmask is unpainted.'[7]

b. *Peter unanmalt die Halbmaske.
'(Intended:) Peter unpaints the halfmask.'

If the topmost operation of the derivation of *ge-*predicatives of particle verbs were the ASP operation, then to explain data as in (85-a) ASP must be an adjectival head. But the assumption that ASP is an adjectival head cannot be viable, as we would then expect *un-*prefixation of non-participle constructions with particle verbs is possible, which it is not, as (85-b) shows. We thus propose that the intervention of *ge-* in between the particle and the verb is triggered by purely morphological reasons. To render the intervention of *ge-* morphologically once could assume that the spell-out location of *ge-* must be adjacent to the verb and that this requirement triggers morphological lowering and dislocation of *ge-* similar to the way past tense morphology in English has been argued to undergo lowering and dislocation within a syntactic approach to morphology in Embick and Noyer (2001), or any combination of lexical operations to the same effect. We leave the details of such an analysis to future research.

[7] https://www.dein-larp-shop.de/masken-und-schminke/latexapplikationen/halbmasken/1234/troll-halbmaske

3.5 Situating our proposal in the literature

In this section we argued that *ge-* is an adjectival head the function of which is to predicate an event property of an internal argument or theme. The consequent constraint on the grammaticality of *ge*-predicatives thus reproduces generalization 1 of (Gehrke, 2015, p. 908), according to which "only verbs with internal (theme or experiencer) arguments can appear in German adjectival passives." Furthermore, we argued that the event property predicated by *ge-* is derived by participle morphology *-t* through an intensionalization operation applied to the event provided by the base verb. The ungrammaticality of *ge*-predicatives of manner verbs follows from the lack of a suitable individual argument of which the RES operation associated with *ge-* could predicate the derived event property. Consequently, in our analysis Gehrke's generalization 2 – that "only verbs that are associated with a change of state along a (unique, one-dimensional) scale can appear in German adjectival passives" (Gehrke, 2015, p. 909) – boils down to the more general requirement that there is an appropriate argument of which the property underlying the state described by the predicative can be predicated, regardless of whether or not the state results from a change in individual properties (e.g. as in degree achievements) or simply equals the possession of an individual property for a certain amount of time (e.g. as in underived adjectives).

The starting point of our investigation of copula constructions with participles was to consider copula constructions with participles as a subcase of predicative constructions, where we used the prime example of predicatives with underived adjectives as a guide for our analysis of participle predicatives. Considering participle predicatives as a subclass of the more general class of adjectival predicatives is also interesting with respect to the much-debated problem of the licensing and role of so-called event-related satellites as in (86), compare the famous contrasts of Rapp (1997) in (86).

(86) a. Die Zeichnung ist *(von einem Kind)
the painting BE *(by a child)
angefertigt.
an-PRTC.ge-PRFX.make.t-PTCP
'The painting is made *(by a child).'

b. Der Mülleimer ist (*von meiner Nichte) geleert.

the trash bin BE (*by my niece) ge-PRFX.empty.t-PTCP
'The trash bin is emptied (*by my niece).'

The traditional view is that "we find event-related modification with adjectival passives, such as instruments, by-phrases and manner adverbials, modifiers that do not appear with genuine adjectives" (Gehrke, 2015, p.898). As Maienborn and Herdtfelder (2017) show, this is not true. Consider the examples in (87), where according to Maienborn and Herdtfelder (2017) the preposition *von* has an eventive causation interpretation in (87-a) and a stative causation (87-b), although the main predicate of the sentences is an underived adjective.

(87) a. Peter ist müde von der Reise.
'Paul is tired from the trip.'
b. Der Platz ist weiß von den Hagelkörnern.
'The square is white from the hailstones.'

The fact that *von*-phrases are licensed in predicatives with underived adjectives is insofar interesting, as it shows – pace the literature we are aware of – that the licensing of *von*-modifiers is independent of whether or not the the main predicate describes an event[8]. That is, the analysis of *von*-phrases in participle predicatives that the data in (87) suggests is that *von*-phrases in participles do not target events by themselves but rather those properties of the internal argument that underly the state described the predicative. Given that we distinguished between states that involve the predication of event properties and states that involve the predication of individual properties, it is interesting to see that our analysis of these two types of properties bears a close parallel to the analysis that Maienborn and Herdtfelder (2017) offer for the two readings of *von*. Maienborn and Herdtfelder propose that stative *von* operates on tropes, understood as in Moltmann (2007) as particular property manifestations that depend on their bearer and do not make reference to an event. We argued that *be*-predicatives do not make reference to an event and describe the possession of a portion of a quality. Thus, we believe

[8]Of course, data as in (87) undermines any attempt to employ *von*-phrases to argue for the presence of verbal projections like Voice in participial predicatives.

that our approach to *be*-predicatives closely resembles or may even be another way to describe what the bearing of a trope is like. Even more so, if tropes function as implicit arguments of underived adjectives and can be explicitly referred to by adjective nominalizations like *beauty* or p*paleness*, just like qualities function as implicit arguments of possession predicatives and according to Francez and Koontz-Garboden (2017) can be referred to by nominalizations like *wisdom*. If this parallel is on the right track, then *von*-modifiers in *be*-predicatives describe stative causation in the same way they do in underived adjectival predicatives. Concerning eventive *von*-modification, Maienborn and Herdtfelder assume that eventive *von* in (87-a) requires the accommodation of a "becoming event that is dependent on the given state." (Maienborn and Herdtfelder, 2017, p. 311). In turn, if the accommodation of such a becoming event fails, then we expect that *von*-modification is ungrammatical. This characterization of the conditions under which event-related modification with *von* is possible closely resembles the overall approach that (Gehrke, 2015, p. 929) follows, where "the participle and the noun together name the state that could have resulted (in a broad sense) from an institutionalised activity, which I propose to model as an event kind." We believe that event kinds, as Gehrke (2015) understands them, are in their properties quite similar to what we dubbed event properties. In particular, event kinds and event properties are different from event tokens. The main difference between what we called event properties and Gehrke's event kinds is that whereas Gehrke assumes that event kinds are fundamental sorts of natural language metaphysics in the sense of Bach (1986) (similar to how Francez and Koontz-Garboden (2017) assume that qualities are fundamental sorts) we proposed that event properties are derived from event tokens. The option that a participial event property or event kind is derived from a verb denoting an event token, notably, is not excluded by Gehrke's analysis (as for event variables we can either "assume that they range over both kinds and tokens (of states, events, entities), or we make the stronger claim that VPs and NPs are predicates of kinds" (Gehrke, 2015, p. 919)). We leave a further comparison of these two options to model the ontology of events to future research, but would like to note that the analysis of *von* proposed by Maienborn and Herdtfelder (2017) may also be decisive in this respect. One of the main properties of *von*-modifiers that Gehrke cites in support of an event kind analysis

is that "the complements of [the] unacceptable by-phrases [...] are definite noun phrases that refer to a particular entity in the discourse, whereas those in acceptable ones [...] are indefinite NPs or bare nouns." But Maienborn and Herdtfelder argue that causal *von*-relations always indicate direct causation. We thus expect that natural and direct causes are good modifiers although they are particular entities. This expectation is borne out, as (88) shows (and interestingly, introducing the cause is grammatical in English with both *from* and *by*).

(88) a. Die Tomate ist von der Sonne getrocknet.
'The tomato is dried (from/by) the sun.'
b. Die Hände sind von der Kälte gerötet.
'The hands are reddened (from/by) the cold. '

Returning to the data in (86) we propose to explain the grammaticality of *von*-phrases in adjectival predicatives in parallel to the grammaticality of participle predicatives. When the participle predicative by itself is ungrammatical, the addition of a *von*-phrase can improve the grammaticality if it licenses the inference of an event property that can be attributed to the internal argument. That is, we propose to analyze the shift in grammaticality from (89-a) to (89-b) in a similar, albeit conceptually driven way as the shift from (89-a) to (89-c) (where the relevant property required for the predicative is explicitly contributed by the adjective *krakelig* ('clumsily')). For the example in case, the relevant conceptual inference necessary to explain the grammaticality of (89-b) could be based on the premise that children write clumsily, and consequently that as a result of children having written the letter, the letter is written clumsily.

(89) a. ??Der Brief ist geschrieben.
'The letter is written.'
b. Der Brief ist von Kindern geschrieben.
'The letter is written by children.'
c. Der Brief ist krakelig geschrieben.
'The letter is written clumsily.'

4 Summary and Outlook

We developed an analysis of German *ge*-prefixed participles in copula constructions by considering participial predicatives as a subclass of the more general class of predicative constructions, the prime example being adjectival predicatives. We showed that there is a systematic correlation between the presence or absence of the prefix *ge-* and the type of state described by the predicative. We explored the interaction between the prefix *ge-* and verbal particles and argued that when the semantics of participles is correlated with their morphological make-up, the observations about the graded grammaticality of predicative participles find a systematic explanation. We developed our analysis of *ge-* by comparing the properties of *ge*-predicatives with predicatives prefixed with *be-*. The main reason for this was that in comparison to the other German prefixes like *ver-*, *be-* has a rather uniform and systematic function. But we believe our analysis can in principle be extended to account for the other prefixes as well, based on the observation of Rathert (2000) that prefixes often have an aspectual function. From this point of view, prefixes like *ver-* may be analyzed as RES-operators that do operate on events (like *ge-* does), but rather on those scales or paths in terms of which the result of the event described is conceptualized. A further exploration of such a semantics of prefixes other than *be-* and *ge-* is left to future research, pointing out that work like Dewell (2015) shows that a systematic account of the semantics of German prefixes is not as hopeless as is sometimes suggested, e.g. in Kratzer (2004). One point we haven't addressed yet is the open question for why no more than one prefix can occur on a German verb. Given that we associated prefixes with the predication of a property, a possible explanation may be that more than one prefix is disallowed for general semantic reasons, i.e. that predicates can only predicate one property of an argument at a time. Thus, when a prefix is applied to a verb, further prefixes are blocked because there is no property bearer available that the predication operation associated with the prefix could target. Such an explanation would be very much in the spirit of Rathert (2009), albeit locating the relevant explanatory feature at the more fundamental level of predication in general rather than making assumptions about the semantics of specific prefixes. Needless to say, the considerations of the present paper are just one initial step

towards a unified theory of German participle forms and their meaning and usage. In particular, we did not say anything about other uses of German participles, e.g. as prenominal attributes, in perfect tense constructions or in participial constructions of the second status. However, we think that the shift in perspective on participles from their verbal properties towards their predicative function we aimed to motivate with the present paper may also be helpful in analyzing uses of participles other than in those predicative constructions we considered.

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