# Events in Adjectival Passives[*]

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**Abstract.** The paper presents a new analysis of the semantics of adjectival passives mainly concentrating on the status of the implicit event, its agent participant and the dependency relation between eventive base and derived property. On the basis of data from two questionnaire studies it proposes an adjectival $\varnothing$-affix, modifying Maienborn's (2009) analysis in two respects: First, it does not involve existential quantification over an event particular but reference to an event kind. Second, the dependency relation between the event kind and the property denoted by the participle of an adjectival passive sentence is not a causal or temporal one. It is a relation of lexical supervenience in the sense of Kim (1990) which leaves room for the pragmatic character of adjectival passives, for their specific 'surplus in meaning'.

## 1    Introduction

Adjectival passives such as (1) are combinations of a form of the copula *to be* plus an adjectivized past participle. In German, copula and auxiliary differ in form: Adjectival passives use the copula *sein* ('to be') whereas verbal passives are built with a form of *werden* ('to become').

(1)  Die Tür ist        geschlossen.
     *The door is*[COP]  *closed*
     'The door is closed.'

(2)  Die Tür  wird          geschlossen.
     *The door becomes*[AUX] *closed*
     'The door is closed.'

Semantically, copula adjective sentences are property ascriptions to their subject referent (Maienborn 2005). What is special in adjectival passives, in contrast to copula sentences with genuine adjectives, is that the ascribed property is a complex property which has to be derived from the verbal base of the participle. Most semantic accounts assume that the property causally results from the occurrence of the event denoted by the adjectival passive's verbal base (cf., e.g., Maienborn 2009, Kratzer 2000; for an exception see Gehrke 2010). There are three problems with this assumption.

First, the possibility of *schon immer* ('always') modification, as in (3) and (4), and other non-event-based uses of adjectival passives, such as (5),[1] cast some doubt on whether we really have to deal with a causal relation between an event particular and its resulting state.

(3)   Die linke Bronchie war schon immer verengt.
      'The left bronchial tube had always been[COP] constricted.'

(4)   Der Bildhauer meißelt aus dem Stein Figuren hervor, die nach seinem
      Verständnis dort schon immer verborgen waren.
      'The sculptor carves shapes out of blocks of granit that he believes have
      always been[COP] hidden inside of them.'

(5)   Bei den Glattnasen sind die Lidspalten bei der Geburt noch geschlossen.
      'The eye-lid slits of the vesper bat are[COP] still closed at birth.'

Second, adjectival passives, contrary to verbal passives, do not regularly combine with agent modifiers (cf. (6) vs. (7)). The acceptability of agentive modification depends on whether or not it is relevant for the ascribed property (cf. Rapp 1997, Maienborn 2010, for more details on this). These restrictions cannot be easily accounted for if we assume that adjectival passives contain an event particular with agent participant as their base.

(6)   Der Brief wurde         von Gabi / von einem Experten geschrieben.
      *The letter became*[AUX]  *by Gabi / by an    expert    written*
      'The letter was written by Gabi / by an expert.'

(7)   Der Brief ist         ???von Gabi / von einem Experten geschrieben.
      *The letter is*[COP]   *???by Gabi / by an    expert    written*
      'The letter was written by Gabi / by an expert.'

Third, there is some evidence that the relation between the eventive base and the derived property cannot be a classical causal one. Typical causal relations

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[1] The sentences (3) – (5) are adapted from real occurrences found in the world wide web.

(cf. Engelberg 2005, for more details on this) hold between events but not between states. Adjectival passives with stative base verbs such as (8) do not fit into this pattern. Moreover, causal relations normally correlate with temporal succession. This doesn't hold for adjectival passives like (9) in which the relation is one of simultaneity.

(8)   Das Haus ist       von Studenten bewohnt.
      *the house is*[COP]  *by*    *students*   *occupied*
      'The house is occupied by students.'

(9)   Die Gefangenen sind      streng    bewacht.
      *the prisoners*   *are*[COP]  *strongly*  *guarded*
      'The prisoners are closely guarded.'

Examples like (3) to (9), *schon immer* ('always') modification, restrictions on agent modification and properties inconsistent with classical causal relations pose three questions that will be our starting point in this paper: (i) whether the occurrence of the event is in fact a necessary part of the truth conditions of adjectival passives, (ii) what role the agent plays and (iii) how event and ascribed property can be related, if not by a CAUSE or RESULT predicate. After a short presentation of the formal account which constitutes the background of the investigations and the analysis carried out in this paper, section three presents two questionnaire studies with a truth value judgment task (TVJT) which investigate the status of the event and its agent participant in adjectival passives. The results of these studies point towards an analysis relying not on event particulars but on event kinds. The remaining part of the paper concentrates on formalizing the relation between this event kind and the derived property. Borrowing a dependency relation widely used in the philosophy of mind, section four argues for analyzing the link between eventive base and derived property as a case of lexical supervenience. Supervenience allows connecting the derived property to an event kind and captures the intuition that the derived property is 'more' than the result state of the eventive base. It leaves room for the specific role pragmatics plays in the formation of adjectival passive by capturing the rather subjective, pragmatic nature of the derived property.

## 2   Background

Maienborn's (2009) account of the formal semantics of adjectival passives sets the frame for the investigations and modifications presented in this paper. Modeling the semantics of an adjectival passive sentence as the ascription of

an underspecified property to its subject referent, Maienborn (2009: 44) proposes the following adjectival affix:

(10)  Adjectival $\varnothing$-affix: $\lambda P \, \lambda x \, \lambda s \, \exists e \, [s: Q(x) \, \& \, result \, (e,s) \, \& \, P(e)]$

In (10) the underspecification of the ascribed property is rendered by using the free variable Q for which pragmatics has to provide a suitable value. The only restriction on Q is that it results from the event denoted by the verbal base of an adjectival passive. There are mainly three reasons which speak in favour of an underspecification account and against an account which identifies the ascribed property with the result state contained in the event structure of an adjectival passive's eventive base. First, the formation of adjectival passives is not restricted to verbs with lexically given result states (which should be the case if their semantics relied on result states), cf. (11).[2]

(11)  Er war geschmeichelt, als der Personenkult um ihn schließlich groteske Formen annahm.
      ‚He was flattered when the cult of personality surrounding him finally veered into the grotesque.'          (*Der Spiegel* 40/1994, 10/3/1994)

Second, adjectival passives and genuine adjectives are not distributed in a complementary way, cf. (12) and (13). As „the output of a lexical rule may not be synonymous with an existing lexical item" (Kiparski 1983: 15), blocking should occur if adjectival passives referred not to an underspecified property but to the lexically given result state. Third, some sentences show a clear meaning difference between derived property and lexically given result state. In (14) *geöffnet* ('opened') cannot be identified with its result state *offen* ('open'). The value assigned to Q by the context is not 'open', it is the property of 'not being in the original packaging state'.

(12)  Die Tür ist geöffnet.
      'The door is opened.'

(13)  Die Tür ist offen.
      'The door is open.'

(14)  Das Spiel ist geöffnet, aber unbespielt und absolut neuwertig.
      'The game is opened but unplayed and in pristine condition.'

                                                  (Maienborn 2010: 9, my translation)

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[2] In general, these constructions with non-resultative base verbs need contextual support, cf. Gese, Stolterfoht & Maienborn (2009: 136), Kratzer (2000: 4), Rapp (1998: 243).

In Maienborn's formulation of the $\varnothing$-affix involved in adjectival passive formation the only constraint on the ascribed property Q is that its value result from the occurrence of the base verb's event referent. In (10), this is rendered by existential quantification over an event particular. Yet, as already suggested by the non-event-based uses of adjectival passives referred to in the introduction, there are some reasons for doubting that this formalization is on the right track.

## 3 Experiments on the Status of the Event

### Experiment 1: "Status of the Event"

To test whether the occurrence of the event denoted by the verbal base of an adjectival passive sentence is indeed a necessary ingredient of its truth conditions – as it is in the case of a verbal passive – a questionnaire study with a truth value judgment task (TVJT) was conducted (see, e.g. Crain and Thornton 1998, for more details on this method). The study tested how the judgments of verbal passives and adjectival passives can be affected by a context which excluded the occurrence of the events denoted by their base verbs. It compared adjectival passives, verbal passives and, in a control condition, copula sentences with genuine adjectives as utterances in two types of context: an eventive one and a purely stative one, in which any eventive component is excluded:

Eventive context:

(15) Pünktlich um 17 Uhr leert der Postbote den Briefkasten. Anna, die das vom Fenster aus beobachtet, freut sich, denn sie ist pleite und hat morgens einen Brief an ihren reichen Onkel eingeworfen. Zufrieden sagt sie zu Erwin: „Der Briefkasten ist geleert / wurde geleert / ist leer."
'At 5 p.m. right on schedule the mailman empties the mailbox. Anna, watching from her window, is glad to see this because she is broke and she had put in a letter addressed to her rich uncle that morning. She tells Erwin: "The mail box is[COP] emptied / is[AUX] emptied / is empty."'

Stative context:

(16) Soeben ist der fabrikneue Briefkasten an der Eugenstr. aufgestellt worden. Der Bürgermeister darf feierlich den allerersten Brief einwerfen. Die Frage, ob er denn wirklich der erste sein wird, der einen Brief in diesen Kasten einwirft, bejaht der anwesende Postfilialleiter und sagt: „Der Briefkasten ist geleert / wurde geleert / ist leer."

'A brand new mailbox has just been installed in Eugenstr. The mayor is expected to post the very first letter as part of a small ceremony. The manager of the post office who is in attendance confirms when asked whether the mayor will in fact be the first one to put a letter in this mailbox: "The mail box is[COP] emptied / is[AUX] emptied / is empty."'

Given the existence of adjectival passives with *schon immer* ('always') modification noted at the beginning of this paper the following hypotheses were formulated for Experiment 1:

(H1) Adjectival passives should be less dependent on the occurrence of the events denoted by their base verbs than verbal passives. Compared to verbal passives, they should receive more TRUE ratings in purely stative contexts.

(H2) (control condition) As the semantics of genuine adjectives does not contain any eventive component there should be no difference between the two sorts of contexts in the ADJ condition.

**Method**   Fourty-two undergraduate students of Tübingen University participated for course credits or monetary reimbursement. All participants were native speakers of German.

Materials consisted of thirty-six experimental sentences in six versions and thirty-six filler sentences. All experimental items began with a context in which the occurrence of an event is described in condition EVENT or denied in condition NOEVENT and ended with the utterance of an adjectival or verbal passive or with a copula sentence with a genuine adjective. The base verbs of the adjectival and verbal passive utterances matched the event used in the EVENT-context. The copula adjective sentences contained genuine adjectives which corresponded to the result state of this event (e.g. EVENT-context: *X leert Y* ('X empties Y'), target-utterance: *Y ist geleert / wurde geleert / ist leer* ('Y is[COP] emptied / is[AUX] emptied / is empty')). The filler items presented different sorts of sentences in contexts: filler sentence plus context were either tautologous or contradictory, or the sentence was true but pragmatically odd in the context.

Six presentation lists were constructed in which the 36 experimental items were randomly mixed with the 36 filler items. The six lists were counterbalanced across items and conditions: Each participant saw only one version (AP / VP / ADJ) of each of the target utterance embedded in one type of context (EVENT or NOEVENT). The questionnaires were distributed in an introductory linguistics class. Participants had one week to complete the questionnaire. They were told to read the narratives carefully and to judge the

truth value of the sentence in the described situation ("Is the utterance in the described situation true?"; possible answers: *yes* / *no*).

**Results and Discussion**   The results of the questionnaire study are presented in Table 1.

| context type | sentence type | | |
|---|---|---|---|
| | AP | VP | Adj |
| Event | 84,1% | 86,1% | 83,3% |
| NoEvent | 20,6% | 5,2% | 80,6% |

Table 1. Percentage of TRUE responses to the TVJT

A repeated measures ANOVA revealed a significant main effect of context type and sentence type and, more importantly, a significant interaction of the two factors ($F1(2,82) = 161.89$, $p1 \leq .001$; $F2(2,70) = 155.18$, $p2 \leq .001$). As predicted by (H2), for copula sentences with genuine adjectives (adj) there was no significant difference between the event and the NoEVENT contexts (all Fs < 1). For the two other conditions, the judgments differed significantly depending on sentence type in the NoEVENT contexts ($F1(1,41) = 17.25$, $p1 \leq .001$; $F2(1,35) = 21.83$, $p2 \leq .001$) but not in the event contexts (all Fs < 1). As predicted by (H1) adjectival passives were judged true more often than verbal passives in NoEVENT contexts ($F1 (1,41) = 31.74$, $p1 \leq .001$; $F2 (1,35) = 20.90$, $p2 \leq .001$). Even though, descriptively, the percentage of true judgments for adjectival passives in purely stative contexts is not very high, the difference between adjectival and verbal passives is highly significant. Moreover, participants' judgments of the filler items in contradictory context (which were judged true only in 8,7% of the cases) were clearly different from the judgments for adjectival passives in the NoEVENT condition but not from verbal passives. Even if event-occurrence is strongly preferred in adjectival passives, this difference from contradictory sentences calls the truth-conditional relevance of event-occurrence into question.

## Experiment 2: "Status of the Agent"

The experiment reported in this section focuses on the agent participant. A first hint to the status of the agent in adjectival passives comes from the restrictions on agent modification alluded to in the introduction. As agent modification serves to make explicit the implicit agent argument, the question is whether the restrictions on agent modification point to the absence of implicit agents in the semantics of adjectival passives.

In order to test this assumption another TVJT experiment was conducted. Participants judged conditional sentences such as (17) to (19) which contained in their consequent either an adjectival passive or a copula sentence

with a genuine adjective. The antecedent of the experimental sentences referred either to the whole event denoted by the base verb of the adjectival passive (17) or the participation of an agent was excluded (18). In a third condition which parallelled the NoEVENT-condition of Experiment 1 the antecedent referred to a non-event-based state (19).

(17) Wenn Karla gerade alle Rollläden in ihrem Zimmer heruntergelassen hat, dann ist das Zimmer abgedunkelt / dunkel.
'If Karla just lowered all the blinds of her room, the room is[COP] darkened / dark.'

(18) Wenn es in einem Zimmer keine Beleuchtung gibt und nach Sonnen-untergang kein Licht mehr von draußen reinscheint, dann ist das Zimmer abgedunkelt / dunkel.
'If there is no light source in the room and, after sunset, no light falls through the window from outside, the room is[COP] darkened / dark.'

(19) Wenn ein Kellerzimmer schon immer weder Fenster noch Beleuchtung hat, dann ist das Zimmer abgedunkelt / dunkel.
'If a basement room never had a window or any kind of indoor lightning, the room is[COP] darkened / dark.'

The hypotheses tested in Experiment 2 were based on the restriction on agentive modification in adjectival passives and on the results of Experiment 1 which call into question the truth-conditional relevance of event-occurrence and thus the necessity of identifying event participants:

(H1) Adjectival passives should receive more TRUE judgments in non-agentive contexts than in non-eventive contexts.

(H2) (control condition) There should be no differences between the three sorts of contexts in the genuine adjective condition.

**Method**   Thirty-six undergraduate students of Tübingen University partici-pated and received a monetary reimbursement. All participants were native speakers of German and none of them participated in Experiment 1.
Materials consisted of 36 experimental sentences in six versions and 36 filler sentences. Filler as well as experimental sentences were of the type *Wenn X, dann Y* ('If X than Y') where Y was in condition AP an adjectival passive sentence and in condition ADJ a copula sentence with a genuine adjective. In condition EVENT X referred to the whole event denoted by the base verb of the adjectival or verbal passive, in condition NoAG the participation of an agent was excluded and in context NoEVENT the whole event was missing.

The base verbs of all adjectival passives were causative accomplishments such as *abdunkeln* ('to darken'), *zähmen* ('to tame'), *kürzen* ('to shorten'), *verschönern* ('to embellish') or *räumen* ('to evacuate'). In the control condition (ADJ), the adjective denoted the result state of the corresponding adjectival passive's base verb (e.g. *abdunkeln – dunkel* ('to darken' – 'dark')). Filler sentences were either tautologous or contradictory, or they were true but required, in their consequent part, the cancellation of an implicature which contradicted the antecedent of the sentence (e.g. *If all students passed the exam some students passed it.*).

**Design and Procedure**   Six presentation lists were constructed in which the 36 test items were randomly mixed with the 36 fillers. The six lists were counterbalanced across items and conditions: Each list included only one version of each experimental sentence. Sentences were presented in a self-paced fashion on a PC using E-Prime software (Psychology Software Tools, Inc.). After each sentence the participants were asked to judge its truth by answering the question "Stimmt das?" ('Is it right?') by *yes* or *no*.

**Data Analysis and Results**   Reading times and truth-value judgments were analyzed. Reading times for the adjectival passive sentences were significantly higher in the two non-standard context conditions NoAG and NoEVENT (EVENT 1125 ms., NoAG 1648 ms., NoEVENT 1595) whereas there were no significant differences in the ADJ condition. Due to space limitations and lack of theoretical relevance, I will not report the reading times in detail here. The results of the TVJT are presented in Table 2.

| context type | sentence type | |
|---|---|---|
| | AP | Adj |
| Event | 92,1% | 88,9% |
| NoAG | 59,7% | 87,0% |
| NoEvent | 31,0% | 86,6% |

Table 2. Percentage of TRUE responses to the TVJT

For the TVJT, a repeated measures ANOVA revealed a significant main effect of context type and of sentence type. More importantly, the interaction of context type and sentence type was highly significant ($F_1(2,70) = 47.68$, $p_1 \leq .001$; $F_2(2,70) = 49.900$, $p_2 \leq .001$). Whereas, as predicted by (H2), there were no significant differences in the genuine adjective condition (all Fs < 1), in the adjectival passive condition the judgments differed significantly depending on context ($F_1(2,70) = 75.47$, $p_1 \leq .001$; $F_2(2,70) = 81.25$, $p_2 \leq .001$): Adjectival passive sentences received more TRUE judgments in the EVENT condition than in the two other conditions and, as predicted by (H1),

they received more TRUE judgments in condition NoAG than in condition NoEVENT ($F1(1,35) = 31.35$, $p1 \leq .001$; $F2(1,35) = 35.51$, $p2 \leq .001$).

**Discussion**        In Experiment 1, participants gave more TRUE judgments for adjectival passives in NoEVENT contexts than for verbal passives in the same contexts (20,6% vs. 5,2%). In both experiments, there were clearly more TRUE judgments for adjectival passives in the NoEVENT condition than for contradictory filler sentences (Experiment 1: 20,6% vs. 8,7%; Experiment 2: 31% vs. 5,2%). In Experiment 2, the percentage of TRUE judgments increased if not the whole event but only the agent component of the base verb's event structure was excluded by context. Interestingly, adjectival passive sentences in such NoAG condition received even more TRUE judgments than the filler sentences which were true but contained a generalized implicature which contradicted the antecedent of the sentence (59,7% vs. 51,5%).

There are two major conclusions which can be drawn from the two experiments presented above. First, adjectival passives in event-occurrence excluding contexts are no clear cases of contradiction. In the light of existing formal accounts of the semantics of adjectival passives, this result is somewhat surprising: The adjectival affixes proposed in the literature (e.g., Maienborn 2009, Kratzer 2000) all involve existential quantification over an event particular, i.e. concrete instantiation of the event. If these analyses were correct, the occurrence of the base verb's event would be a prerequisite for an adjectival passive sentence to be true. The results of Experiment 1 and 2 show that this is not the case. Second, the agent is less important for the interpretation of an adjectival passive sentence than expected for a regular event participant. The agent contained in an event particular is accessible via the event argument. It should thus be equally important for the interpretation of a sentence as the event argument itself. The results of Experiment 2 showed that the agent is less important for the interpretation of an adjectival passive sentence than the event itself. In view of these results, it seems plausible to assume that the semantics of an adjectival passive sentence does not contain an event particular and that concrete instantiation of the event and identification of its participants might just be pragmatic issues. This conclusion receives further support by the results of Experiment 2 where NoAG adjectival passives received descriptively even more TRUE judgments than true filler sentences which required the cancellation of a generalized implicature.

## 4    Formal Analysis and Conclusion

We now turn to the consequences of these results for the formal semantics of adjectival passives. As already noted, event particulars necessarily have event participants and they are instantiated. On the other hand, reference to an event kind does not need identification of its participants as these are generically bound and it does not require the actual occurrence of the event. It is thus plausible to assume that the semantics of adjectival passives involves event kinds rather than event particulars.

Let us briefly return to the problem of *schon immer* ('always') modification mentioned at the beginning of this paper. Under an event kind analysis, the property denoted by the participle in an adjectival passive sentence depends on a generic evidentiality which does not contain information either about a possible instantiation or about specific agent participants.[3] This provides a simple explanation for the acceptability of *schon immer*: the modification specifies that the event kind was not instantiated.[4]

In the remainder of the paper I will propose a formal analysis of adjectival passives that follows Maienborn's (2009) underspecification account but modifies it by adding reference to event kinds and by choosing the appropriate link between event kind and derived property.

In Maienborn's adjectival affix, repeated here in (20), the underspecified property Q an adjectival passive sentence ascribes to its subject referent is causally linked to an existentially bound event particular.

(20)  Adjectival $\varnothing$-affix: $\lambda P \, \lambda x \, \lambda s \, \exists e \, [s: Q(x) \, \& \, \text{result}(e,s) \, \& \, P(e)]$

(Maienborn 2009: 44)

To account for the reference to event kinds, a first idea might be to simply replace the event particular $P(e)$ in (20) by the respective event kind $\uparrow P$.[5] There are two reasons why such a solution would be too simplistic. First, it is technically impossible for a property particular to directly result from an

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[3] In sentences such as Kratzer's (2000) *The blood vessel was obstructed* the fact that the event kind does not identify event participants leads to the possibility of referring either to an agentive or to a stative *obstructing* kind.

[4] Under this view, the question why adjectival passives are in fact often interpreted as referring to a concrete event instance has to be answered pragmatically. The explanation amounts to saying that event kinds pragmatically implicate their concrete instantiation under certain conditions (e.g. in post state contexts). The exact spellout of this pragmatically implicated instantiation will be the matter of another paper.

[5] This is Link's (1995: 376) notation for an "up-arrow" operation converting predicates into kind-denoting terms; "for instance if TIGER is a one-place predicate denoting the set of tigers $\uparrow$TIGER is a singular term that denotes the kind Tiger." For a similar operator see, e.g., Chierchia 1998.

event kind.[6] Second, as already noted in the introduction, typical properties of causal relations such as temporal precedence of cause and effect are not shared by all adjectival passives. In fact, one of the most important properties of causal relations is their denseness, i.e. their tendency to form causal chains. Typical causal sentences, such as (21a) can be, potentially infinitively, expanded to more fine grained causal chains like (21b).

(21) a.  Smoking causes an increase of blood pressure.
     b.  Smoking causes an increase of adrenalin level, this causes an increase of blood pressure.

Adjectival passives do not function this way. In (22) the relation between the event kind *Mowing the grass* in (22a) and the derived property in (22b) cannot be paraphrased by a causal sentence such as (22c) as this would imply the possibility of expansion to a more fine grained causal chain. The deviance of (22d) shows that such an expansion is impossible: There simply is no intermediate cause X which could be inserted.

(22) a.  Mowing the grass
     b.  The grass is mown.
     c.  Mowing the grass causes the grass to be mown.
     d.  ???Mowing the grass causes X, this causes the grass to be mown.

This lack of denseness in adjectival passive sentences leads to an explanatory gap which should not be present in causal relations: Causes fully determine their effects and effects are fully predictable on the basis of their causes. In adjectival passives, however, the property denoted by the participle is not fully determined by its eventive base. This was already demonstrated by (14), in which the property denoted by the participle *geöffnet* ('opened') cannot be identified with the lexically given result state 'open'. The same holds for (4), repeated here as (23), in which the property is not only the result state of *hiding*, which would be 'to be out of sight'. Rather, it is something like 'to be inherently present'. Similarly, in (24a) *eingereicht* ('submitted') has an additional meaning component, namely 'to be of high value' (compared to a contextually salient alternative, e.g. an article which is still in preparation). In (24b) the same participle denotes the property of being of low value.

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[6] Gehrke (to appear) chooses to solve this problem by an analysis not only referring to event kinds but also to state kinds which are instantiated via a realization operation. The problem with this solution is that there are no independent, non-technical reasons for assuming state kinds in adjectival passives.

(23) Der Bildhauer meißelt aus dem Stein Figuren hervor, die nach seinem Verständnis dort schon immer verborgen waren.
'The sculptor carves shapes out of blocks of granit that he believes have always been[COP] hidden inside of them.'

(24) a. Der Artikel ist nicht in Vorbereitung, er ist eingereicht.
      'The article is not in preparation, it is submitted.'
   b. Der Artikel ist nicht akzeptiert, er ist eingereicht.
      'The article is not accepted, it is submitted.'

As (23) to (24) show, there is a surplus in the meaning of the participle of an adjectival passive which is not fully determined by its eventive base. In Maienborn's adjectival affix (20) above, this underdetermination is rendered by using a free variable Q for the property denoted by the participle in an adjectival passive sentence. There is an explanatory gap between Q and its underlying base, the event kind ↑P. Q is 'more' than (parts of the event structure of) its eventive base, therefore it is unpredictable from ↑P alone.

A similar explanatory gap is known in philosophy as the mind-body problem. There are several formulations of this problem which all rely on the intuition that the mental is somehow determined by the physical but that it cannot be reduced to it. On the one hand, physical events such as *firing of C-fibers* are more basic than mental states such as *pain feeling* in the sense that mental states depend on physical events but not vice versa. On the other hand mental properties are unpredictable or unknowable from information concerning their physical base-level phenomena (cf. Jackson's (1982) 'knowledge argument'). This explanatory gap led philosophers such as Jaegwon Kim to reject a reductive explanation of mental properties by neurophysiological processes and to opt for a non-temporal, non-dense dependency relation which they called "supervenience" (cf., e.g., Kim 1990). The common core of all definitions of supervenience can be captured by the slogan 'A supervenes on B if there is no A-difference without a B-difference (everything else being equal)'. Applied to the mind-body problem this means that a mental property supervenes on a set of neurophysiological processes in the sense that one cannot imagine differences in mental properties without neurophysiological differences (everything else being equal). The advantage of supervenience over other dependency relations (e.g. classical CAUSE) is that it only partially determines the supervenient property. It thereby leaves room for the subjective, non-reducible character of supervenient properties which cannot be deduced from their underlying base-level phenomena.

This dependency leaving room for underdetemination, for an irreducible 'surplus in meaning', is precisely what we need for the semantics of

adjectival passives. Borrowing a term from Engelberg (2005), we will call supervenience in the domain of the lexicon *Lexical Supervenience*. An informal definition is given under (25):

(25)  Lexical Supervenience
      For any state s and set of events $e^{7}$, $[\![ \text{LSV (s, e)} ]\!] = 1$  iff there can be no change in s without a change in e (everything else being equal).

In the case of adjectival passives the property denoted by the participle lexically supervenes on the event kind of the verbal base in the sense that if two adjectival passive sentences which are maximally similar, i.e. which share the same subject and the same context, refer to two different properties they also have to differ in their eventive base. On the other hand, lexical supervenience makes it possible to derive different properties from the same eventive base if the context differs too, cf. (24a) and (b). It thereby accounts for the subjective, pragmatic character of adjectival passives.

Applying the LSV-relation to Maienborn's adjectival affix (20) and replacing event particulars by event kinds finally yields our new version of the ∅-affix:

(26)  Adjectival ∅-affix: λP λx λs [s: Q(x) & LSV (s, ↑P)]

According to (26) the adjectival affix introduces an underspecified property Q which is ascribed to the subject referent x of the sentence. The assignment of a value to Q must be done by pragmatics with the only restriction that it lexically supervenes on the event kind derived from the verbal base. This means that Q depends on its eventive base ↑P, but that there is an explanatory gap between the two.[8] Lexical supervenience accounts for this specific gap in the meaning derivation of adjectival passives. It leaves room for the role pragmatics plays in the interpretation of adjectival passives and for their characteristic 'surplus in meaning'.

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[7] Supervenience is usually defined as holding between a property and a set of properties. As kinds can be roughly characterized as the set of all their instances (cf. Chierchia (1998)), this makes the above definition particularly suitable for the dependency relation between event kind and ascribed property in adjectival passives.

[8] Depending on the sort of base verb and the context of the sentence this gap may be smaller or bigger. If the meaning component which is supplied by the eventive base is informative enough in the given context pragmatics may choose to identify Q with it, but in other cases Q is a pragmatically derived complex property which contains a characteristic 'surplus in meaning' compared to its verbal base.

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