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On the meaning of German accusative external possessives

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This paper proposes an analysis of German accusative external possessives. It argues that these constructions are associated with the following meaning components: first, the physical attachment between the possessor and the possessee, and second, the entailment of a (potential) physical result which equally holds for the two participants. The paper proposes a compatibility constraint on verbs that can occur in these constructions and discusses the reasons why verb classes which do not occur in accusative external possessives fail this constraint. The analysis presented in the paper reveals correlations between the mereological properties of event participants and kinds of event culminations. Moreover, it discusses challenges and implications that accusative external possessives pose to the theory of thematic roles and existing approaches to relational nouns.

1 Introduction

In the body-part possessor ascension alternation (cf. Massam 1989; Levin 1993; Dowty 2001), a verb surfaces in two syntactic frames, the attributive possessive frame (1) and the accusative external possessive frame (2). In English, like in many other languages, whenever a verb can occur in the external possessive frame, it can also occur in the attributive one.

(1)   Attributive possessive frame:
        The cat scratched Paul's cheek.

(2)   Accusative external possessive frame:
        The cat scratched Paul on the cheek.

This is not the case in German. In German, only a subset of verbs occurring in accusative external possessives can also occur in the attributive ones. The other verbs occur in, what I call here, the prepositional attributive possessive frame instead. So in examples (3a) and (3b), the verb *kratzen* 'to scratch' alternates between external and attributive possessive frames, just like in the English example above. In parallel, verbs like *schlagen* 'to beat' alternate between the external possessive frame (4b) and the prepositional attributive possessive frame (4a) with an obligatory preposition.

(3)   a. Attributive possessive frame:
            Die Katze hat **seine   Wange** gekratzt.
            the cat   has his:POSS cheek   scratched
            'The cat scratched his cheek.'

        b. Accusative external possessive frame:
            Die Katze hat **ihn   an der Wange** gekratzt.
            the cat   has him:ACC on the cheek   scratched
            'The cat scratched him on the cheek.'

(4)   a. Prepositional attributive possessive frame:
            Der Täter   hat mit einer Glasflasche ***(auf) seinen Kopf** geschlagen.
            the offender has with a   glass bottle   on   his   head hit
            lit.: 'The offender hit *(on) his head with a glass bottle.'

        b. Accusative external possessive frame:
            Der Täter   hat **ihn** mit einer Glasflasche **auf den Kopf** geschlagen.
            the offender has him with a   glass bottle   on the head hit
            lit.: 'The offender hit him on the head with a glass bottle.'

Moreover, despite their apparent semantic closeness to the alternating verbs shown above (cf. (3)), verbs like *zerkratzen* 'to scratch all over, to lacerate' or *brechen* 'to break' cannot occur in the accusative external possessive frame (cf. (5) and (6)).

(5) a. Die Katze hat seine Wange zerkratzt.
     the cat   has his   cheek scratched all over
     'The cat scratched his cheek all over.'

  b. *Die Katze hat ihn an der Wange zerkratzt.
     The cat   has him on the cheek   scratched all over
     int.: 'The cat scratched him all over on the cheek.'

(6) a. Peter hat Pauls Arm gebrochen.
     Peter has Paul's arm broken
     'Peter broke Paul's arm.'

  b. *Peter hat Paul am   Arm gebrochen.
     Peter has Paul on the arm broken
     int.: 'Peter broke Paul on the arm.'

These patterns give rise to the following questions that will be addressed in this paper: What is the meaning of the external possessive frame, and how is it different from the meaning of the two attributive frames? What semantic properties of verbs determine their behavior in accusative external possessives? Answering these questions feeds the theoretical discussions about the organization of the mental lexicon, the composition of verbal meanings as well as the composition of the meanings of complex structures containing verbs. Moreover, the answers contribute to our knowledge about the correlations between mereological properties of event participants and event structure, about nominal relationality and type-shifting, and about encoding of possessive relationships.

To approach the questions outlined above, I assume an idiosyncratic root meaning specific to particular verbs and a meaning associated with argument-structural templates in which the verbs occur. The combination of these two meaning ingredients determines eventual surfacing patterns of verbs, which, for the sake of expository convenience, I henceforth will refer to as *frames* or *constructions*. While the particular formal analysis of accusative external possessives will not be worked out in this paper, it could be developed in several theoretical frameworks (cf. Müller & Wechsler 2014; Wechsler 2015; Beavers & Koontz-Garboden 2020), for instance, in the theoretical framework of the event semantics (cf. Dowty 1979; Rappaport Hovav & Levin 1998) or the constructional grammar (cf. Goldberg 1995).

This paper proposes that the accusative external possessive frame is associated with the following meaning components: (i) the possessor and possessee stand to each other in the relationship of physical attachment; (ii) the (potential) result state entailed by the construction is physical and must equally hold for two entities, the possessor and the possessee. The latter meaning component gives rise to the compatibility constraint (*the double entailment constraint*) on verbs to occur in the external possessive frame. The proposed meaning of the external possessives

and the compatibility constraint explain the behavior of a range of verb classes in accusative external possessives.[1]

The paper is structured as follows. The next section analyzes meaning components of accusative external possessive constructions and proposes a compatibility constraint on verbs to occur in this construction. Section 3 evaluates the explanatory force of the proposal and analyzes why non-alternating verb classes fail the constraint. It also considers meaning differences between the alternating verb classes and argues against the common claim that accusative external possessives encode affectedness. Section 4 discusses theoretical implications of the proposed analysis: 4.1 discusses challenges accusative external possessives pose to the theory of thematic roles; 4.2 deals with correlations between the mereological constitution of event participants and event structure; and 4.3 discusses the implications accusative external possessives have for the analysis of possessive relations and relational nouns. Finally, Section 5 summarizes the main points made in the paper.

2 The meaning of the accusative external possessive frame

The purpose of this section is to determine the meaning of accusative external possessives and formulate a constraint on when verbs are compatible with this frame. To do so, I juxtapose accusative external possessives with their attributive counterparts as minimal pairs. I show that

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[1] At this place, it is important to clarify that accusative external possessives are not the only kind of external possessives in German. External possessors can also occupy positions of dative or nominative arguments, as in examples (ia) and (ib) below. All three kinds of external possessives share one property: the possessor in these structures appears in the position external to the nominal phrase containing the possessee. This has consequences for the analysis of possessive relationships encoded by them as well as for the analysis of the referential behavior of the possessee. However, the meanings of the three structures are different, and so are the verbs that occur in them. Since this paper aims to determine the meaning of the accusative external possessives and the semantic properties of verbs occurring in these constructions, dative and nominative external possessives will not be considered here. For German, Dative external possessives have been discussed among others by von Polenz (1969), and by Wegener (1985) and Hole (2014; 2015) in connection to *free dative*. On the cross-linguistic scale, they have been considered among many others by Vergnaud & Zubizarreta (1992) (for French) and, from the typological perspective, by Haspelmath (1999). German nominative external possessives have not received much attention so far; these constructions have been mostly discussed for French, e.g., by Le Bruyn (2014) and Guéron (2017). Definiteness of body parts has been discussed in detail by Löbner (2011).

(i)   a. Dative external possessives:
        Die Katze hat ihm   die Wange zerkratzt.
        The cat   has him:DAT the cheek scratched all over
        lit.: 'The cat scratched the cheek all over to him.'

    b. Nominative external possessives:
        Er hob die Hand.
        he rose the hand
        lit.: 'He rose the hand.'

accusative external possessives are associated with three crucial meaning components. Firstly, they encode the relationship of physical attachment between the possessor and the possessee. Secondly, the (potential) result state contributed by the verb is physical. And lastly, this (potential) result state holds equally for the possessor and the possessee. The compatibility constraint I propose (cf. Ghomeshi & Massam 1994 for the term) is based on these last two components.

2.1 Physical attachment between the possessor and possessee

While, in some cases, both external and attributive possessives can be uttered to denote the same eventuality, the two constructions encode different kinds of possessive relationships. Unlike attributive possessives, which can presuppose various kinds of relationships depending on the semantics of the possessee, accusative external possessives always presuppose the relationship of physical attachment.

The evidence for this comes from the external possessives with non-body-part entities. These entities, usually elements of clothing or gear, can occupy the position of the possessee (cf. (7)). Yet, authors do not discuss differences between body parts and non-body parts occurring in external possessives. But it is precisely these differences that clearly show that the meaning of the possessive relationship in external possessives is physical attachment, while for attributive possessives, this is not so.

(7)   a.   Peter hat Paul   am Arm   gepackt.
              Peter has Paul:ACC at the arm grabbed
              'Peter grabbed Paul by the arm.'

        b.   Peter hat Paul   am Rucksack   gepackt.
              Peter has Paul:ACC at the backpack grabbed
              'Peter grabbed Paul by the backpack.'

Let us take a look at the following two examples.

(8)   a.   Peter hat Pauls Arm gepackt,
              Peter has Paul's arm grabbed
              (er lag vom Körper getrennt auf dem Boden).
              (it laid on the floor separated from the body).
              'Peter grabbed Paul's arm, (it was on the floor, separated from the body).'

        b.   Peter hat Pauls Rücksack gepackt, der   auf dem Boden gelegen hat.
              Peter has Paul's backpack grabbed, which on the floor laid   has
              'Peter grabbed Paul's backpack, which laid on the floor.'

Both attributive possessives in the sentences in (8) presuppose possessive relationships. In (8a), *Pauls Arm* presupposes a body-part relationship 'arm of', denoted by the relational noun *Arm*. The possessee in (8b) is a sortal (or non-relational) noun *Rucksack* 'backpack', which on its own does

not provide any information about the nature of the free possessive relationship between the backpack and its possessor Paul. The meaning of the relationship, in this case, has to be supplied by the context: it can be a backpack Paul possesses, a backpack Paul has gifted, a backpack Paul has sewn, etc. In any case, as both examples show, the relationship of physical attachment is not presupposed by either of the two attributive possessives.

Unlike attributive possessives, external possessives do presuppose physical attachment (e.g., (9) and (10)). In fact, they do not presuppose a body-part relationship. So the *backpack* in example (10a), despite not being a body part, is perfectly acceptable in the position of the possessee.

(9)   a. Peter hat Paul   am   Arm gepackt.
            Peter has Paul:ACC at the arm grabbed
            'Peter grabbed Paul by the arm.'

        b. #Peter hat Paul   am   Arm gepackt, er lag   vom   Körper getrennt
            Peter has Paul:ACC at the arm grabbed it laid from the body   separated
            auf dem Boden.
            on the floor
            int.: 'Peter grabbed Paul by the arm, it was on the floor, separated from the body.'

(10)   a. Peter hat Paul   am   Rucksack gepackt.
            Peter has Paul:ACC at the backpack grabbed
            'Peter grabbed Paul by the backpack.'

        b. #Peter hat Paul   am   Rucksack$_i$ gepackt. Er$_i$ lag auf dem Boden
            Peter has Paul:ACC at the backpack$_i$ grabbed he$_i$ laid on the floor
            int.: 'Peter grabbed Paul by the backpack. It was on the floor.'

We can conclude that, unlike body-part relations, physical attachment constitutes a part of the meaning of external possessives. Body-part possessees in these constructions are understood as physically attached to the possessor too, and thus are by default interpreted as natural body parts of the possessor. So the most reasonable interpretation of *Arm* in (9a) is the one on which it is a naturally attached body part of Paul and thus as an integral part of his body. This has implications for the analysis of relational and sortal nouns, which are discussed in more detail in Section 4.3.

Let us now turn to another meaning component usually attributed to accusative external possessives: physical contact.

2.2 External possessives entail (potential) physical impact on the undergoer

According to a standard view, verbs appearing in accusative external possessives must entail physical contact (cf. Levin 1993; Dowty 2001 for English). The purpose of this section is to

weaken this claim. As we will see below, external possessives allow verbs that do not entail physical contact as long as the (potential) result they entail is physical. For instance, the verb *verletzen* 'to injure', which does not entail physical contact (cf. (11)), but entails a physical impact on the undergoer, appears in accusative external possessives (cf. (12)). The action that leads to the physical impact remains unspecified.

(11) Bei sehr hohem Schalldruck   (etwa durch   eine Explosion…) können auch
      bei very high   sound pressure like   through an explosion   can   also
      Teile des Mittelohrs oder das Trommelfell verletzt werden.[2]
      parts the middle ear or   the eardrum   injured   become
      'Parts of the middle ear or the eardrum can also be injured (damaged) by very high sound pressure (e.g., by an explosion).'

(12) a. Peter verletzte Pauls   Arm.
          Peter injured   Paul's arm
          'Peter injured Paul's arm.'

      b. Peter verletzte Paul am   Arm.
          Peter injured   Paul on the arm
          'Peter injured Paul on the arm.'

Other German verbs that confirm the assumption of physical impact without physical contact requirement are *attackieren* 'to attack' and *zurichten* 'heavily damage or injure'. They do not entail physical contact, but the (potential) impact of the action they denote is physical. The requirement of (potential) physical impact allows us, therefore, to predict the behavior of these verbs in accusative external possessives.

The potentiality of physical impact is assumed to account for such verbs as *berühren* 'to touch' and *küssen* 'to kiss'. These verbs entail physical contact, but they are neutral towards physical impact on the undergoer, i.e., they neither entail nor exclude its physical impingement. Following Beavers (2011), I will treat these verbs as the ones entailing a potential change in the undergoer. We will come back to this topic in Section 3 of the paper.

As for *break*, which is commonly discussed in this connection (cf. Levin 1993; Dowty 2001), this verb entails a change in inherent physical properties of the undergoer, such that the undergoer can no longer perform its original function (Dowty 2001: 184). That is, the requirement of a (potential) physical impact is not enough to account for the behavior of this verb in the accusative external possessive frame.

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[2] https://www.gesundheitsinformation.de/kann-laerm-das-gehoer-schaedigen.html.

Further challenging verbs are those like *zerkratzen* 'to scratch all over, to lacerate'. While *kratzen* 'to scratch' and *zerkratzen* 'to scratch all over, to lacerate' both entail physical impact on the undergoer, only the former can occur in the external possessive frame (cf. (13)).

(13) a. Die Katze hat seine Wange gekratzt / zerkratzt.
          the cat   has his   cheek scratched / scratched all over
          'The cat scratched his cheek (all over).'

    b. Die Katze hat ihn an der Wange gekratzt / *zerkratzt.
          The cat   has him on the cheek scratched / scratched all over
          'The cat scratched him (*all over) on the cheek.'

The behavior of the verbs mentioned, and other challenging verbs will be accounted for in the following section.

2.3 The double entailment constraint

So far, we have considered two meaning components of accusative external possessives: the physical attachment of the possessee to the possessor and the (potential) physical impact entailed by the verb. However, as examples in (13) show, this is not enough to capture the complete picture. In this section, I argue that the central meaning component of accusative external possessives is what I call here *double entailment*. That is, the (potential) physical impact entailed by verbs in external possessives holds equally for both the possessor and the possessee (cf. (14)). The compatibility constraint on verbs that can occur in this construction can, therefore, be formulated accordingly: to appear in accusative external possessive constructions, verbs must have the double entailment property.

(14) **Double entailment**:
      A verb V has the double entailment property in the external possessive frame [X Ved Y PRP Z] where Z is attached to Y, iff V denotes an action that entails a (potential) physical impact that equally holds for Y and Z.

Let us consider an example first. For the already familiar cases repeated below, the same (potential) result requirement holds for both the possessor and the possessee. In (15a) with the verb *kratzen* 'to scratch', the entailed potential result, the scratch, is necessarily on both the hand and the person: (15a) entails both (15b) and (15c). In contrast, double entailment does not hold for attributive possessives: (15d) entails (15c), but it does not entail (15b) (for instance, in the case when Anna's hand is detached from Anna's body).

(15) a. Die Katze hat Anna an der Hand gekratzt.
          The cat   has Anna on the hand scratched
          'The cat scratched Anna on the hand.'

  b. Anna wurde gekratzt.
    Anna was scratched
    'Anna was scratched.'

  c. Annas Hand wurde gekratzt.
    Anna's hand was scratched
    'Anna's hand was scratched.'

  d. Die Katze hat Annas Hand gekratzt.
    The cat has Anna's hand scratched
    'The cat scratched Anna's hand.'

The same is true for the verbs alternating between the accusative external possessive frame and prepositional attributive possessive frame, like the verb *beißen* 'to bite' in (16). Also here, the potential result of a bite, for example, a bite mark, holds for both participants, the possessor and its body part.

(16) Der Hund hat den Mann ins Bein gebissen.
    the dog has the man in the leg bitten
    'The dog bit the man in the leg.'

The effects described are directly related to the interaction of two factors: thematic roles assigned to both undergoers (they appear to bear one and the same thematic role) and mereological relationships between them. Both factors will be discussed in more detail in Sections 4.1 and 4.2 of the paper.

   Evidence for what I propose as the meaning of the external possessive frame is twofold: the underlying existence of an affected possessee, and semantic restrictions on possessees occurring in external possessives. Both pieces of evidence are considered in more detail below.

   In accusative external possessives, prepositional phrases containing possessees can always be omitted without loss of grammaticality (cf. (17) and (18)). The omitted possessees are, however, always implied. That is, when a verb occurring in accusative external possessives appears in a transitive clause with an animate undergoer in accusative object position, there is a second implicit thematic participant, a body part or other attached entity, that undergoes the action in the same way as the participant expressed by the accusative object, its possessor. Therefore, the physical impact of this action holds for both the possessor and the possessee, even if the latter is not expressed overtly. That is, whenever a person is kissed, scratched, or bitten, there is always a body part of that person that is kissed, scratched, or bitten in one and the same event. Implicit possessees can be accounted for as dummy body parts whose existence is presupposed, along the lines of the analysis proposed by Postma (1997) for reflexive pronouns.

(17) Die Katze hat Anna (an der Hand) gekratzt.
      The cat   has Anna   on the hand   scratched
      'The cat scratched Anna (on the hand).'

(18) Der Hund hat den Mann (ins   Bein) gebissen.
      the dog   has the man   in the leg   bitten
      'The dog bit the man (in the leg).'

The second piece of evidence in support of the double entailment constraint on verbs in external possessives is the restrictions on attached possessees. The attached possessees must be such that the double entailment can hold. Consider the examples with verbs *packen* 'to grab' and *berühren* 'to touch' below. The possessee *Arm* 'arm' is acceptable in both (19a) and (19b), while *Rucksack* 'backpack' is acceptable in (19a) but not in (19b), and *Hut* 'hat' and *Fahrrad* 'bicycle' are not acceptable in either case. It is, for instance, possible to grab somebody by grabbing their backpack if it is attached to them, but it is impossible to touch somebody by touching their backpack. That is, the way the possessee is attached to the possessor must be such that the action expressed by the verb can have the same physical impact on both participants of this relationship, the possessor and the possessee. For the verb *packen* 'to grab' it would be control over the possessor and the attached possessee which would hold only if they are attached to each other firmly.

(19) a. Peter hat Paul am   Arm / Rucksack / #Hut / #Fahrrad gepackt.
          Peter has Paul at the arm / Backpack /   hat /   bicycle   grabbed
          'Peter grabbed Paul by the arm/backpack/#hat/#bicycle.'
      b. Peter hat Paul am   Arm / #Rucksack / #Hut / #Fahrrad berührt.
          Peter has Paul at the arm /   backpack /   hat /   bicycle   touched
          'Peter touched Paul by the arm/#backpack/#hat/#bicycle.'

In summary, in this section I have argued that whether a verb can occur in the external possessive construction depends on the satisfaction of the double entailment constraint. This is true equally for verbs that differ in other semantic properties that have been thought to be relevant for their acceptability in this construction.

3 The predictivity of the double entailment constraint and verbs in accusative external possessives

In the previous section, I argued that the acceptability of verbs in the external possessive construction depends on the satisfaction of the double entailment constraint. The goal of this section is to demonstrate how it allows us to account for the language data.

The account was tested on the set of verbs retrieved from Corpora Collection Leipzig.[3] The set included verbs denoting actions that can possibly or necessarily lead to a physical impact on the undergoer appearing in accusative object position. The full list of verbs in the set is provided in footnotes 7, 9, 11, 13, and 14 on pages 12–14.

Since the result state entailment is argued to be crucial for the verb's behavior in the accusative external possessives (cf. Massam 1989), the set has been made to include verbs that vary in the quantization of the result state they entail. This distinction goes back to the *affectedness hierarchy* proposed by Beavers (2011: 358–359). He distinguishes four levels of affectedness, which are ordered as follows:[4]

(20)   ***quantized change*** > ***non-quantized change*** > ***potential change*** > ***unspecified for change***
     Ex.: *break,*   Ex.: *widen, cool,*   Ex.: *hit, punch,*   Ex.: *see, laugh at,*
     shatter, devour   *cut, slice*   *rub*   *follow*

Verbs unspecified for change, on the right edge of the hierarchy, are not included into the data. Actions these verbs denote are either not related to physical contact or they cannot cause any immediate physical impact on the undergoer. Therefore, they do not occur in the external possessive frame. The quantized change is characterized by a specific goal state (e.g., the goal state associated with the verb *shatter* is that the undergoer disintegrates into multiple small pieces), while the non-quantized change only indicates a change to some (unspecified) extent (the result state for *widen*, for instance, is that the object undergoes widening to a non-zero extent). Verbs entailing potential change are the verbs for which a change in the undergoer might occur, but does not necessarily have to (e.g., *punching*, depending on the physical force applied, might cause some physical change in the undergoer or not).

I examined surfacing patterns of the selected verbs by studying their occurrences in the DWDS Reference Corpus and collecting judgments of ten native speakers on self-constructed examples.[5] The observed distributional behavior of the verbs allowed me to divide them into

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[3] Corpora Collection Leipzig (https://corpora.uni-leipzig.de/) cross-links statistical information about the use of a word (e.g., concurrences and frequency in the corpus) with information about its semantics (e.g., Dornseiff sets, synonyms, and antonyms). In this way, it provides an optimal tool for selecting verbs according to predefined semantic criteria, for instance, physical impact.

Dornseiff sets are sets of words organized along semantic criteria in 22 main groups and 970 domain groups that, in their turn, are subdivided into smaller semantic groups. This organization of the lexicon was developed further on the base of the dictionary by Dornseiff (2020) *Der deutsche Wortschatz nach Sachgruppen* (German vocabulary by topics).

[4] Beavers (2011) captures quantization of the entailed result state as *affectedness*. To avoid confusion with the term *affectedness* in its most general sense, which is usually used in the literature on external possessives, I will adopt the term *quantization* here.

[5] DWDS Reference Corpus: https://www.dwds.de/r.

five classes ('touch', 'hit', 'break', 'shred' and 'torture' verbs), most of which we have already encountered in previous sections.[6]

The first two classes listed below are the ones that occur in accusative external possessives:

I.   'touch' verbs: these verbs alternate between the accusative external possessive and attributive possessive frame. They entail either a potential or a non-quantized change in the undergoer.[7] An example of the latter case is repeated below.

    (21) a. Die Katze hat seine   Wange gekratzt.
              the cat   has his:POSS cheek   scratched
              'The cat scratched his cheek.'

          b. Die Katze hat ihn   an der Wange gekratzt.
              the cat   has him:ACC on the cheek   scratched
              'The cat scratched him on the cheek.'

II.   'hit' verbs: these verbs alternate between the accusative external possessive frame and the prepositional attributive possessive frame.[8,9] Just as 'touch' verbs, these verbs entail a potential or a non-quantized change in the undergoer (cf. (22) repeated from (4)).

    (22) a. Der Täter   hat mit   einer Glasflasche *(auf) seinen Kopf geschlagen.
              the offender has with a   glass bottle   on   his   head hit
              lit.: 'The offender hit *(on) his head with a glass bottle.'

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[6] Verbs belonging to each identified class, except for 'hit' verbs, are heterogeneous and, most probably, can be organized into subclasses with more detailed semantic characteristics than those in the paper. One specific difference that might lead to further classification of the verbs is, for instance, the case marking on the oblique possessees. It varies between the dative and the accusative case, as in the examples below. Since in German, the dative and the accusative marking encode the difference between the location and direction of an action, the noticed case variation in accusative external possessives is indicative of differences in the verbal meaning. However, since the classification of verbs is not pursued here, I leave this question for further research.

    (i)   a. Peter hat Marie **auf die**   **Wange** geküsst.
            Peter has Marie on the:ACC cheek   kissed
            'Peter kissed Marie on the cheek.'

         b. Peter hat Paul **an der**   **Wange** verletzt.
            Peter has Paul on the:DAT cheek   injured
            'Peter injured Paul on the cheek.'

[7] **'Touch' verbs:** *attackieren* 'to attack', *berühren* 'to touch', *halten* 'to hold', *küssen* 'to kiss', *kitzeln* 'to titillate', *kratzen* 'to scratch' *packen* 'to grab', *streifen* 'to touch lightly', *schwächen* 'to weaken', *tätowieren* 'to tatoo', *treffen* 'to hit (e.g., the goal)', *verletzen* 'to injure', *zurichten* 'heavily damage or injure'.

[8] These verbs also occur in Dative external possessives mentioned in Footnote 1 on page 4.

[9] **'Hit' verbs**: *beißen* 'to bite', *hauen* 'to hit', *schlagen* 'to hit', *schneiden* 'to cut', *stechen* 'to pinch, to prick', *stoßen* 'to push', *treten* 'to kick'.

b. Der Täter   hat ihn mit einer Glasflasche auf den Kopf geschlagen.
the offender has him with a   glass bottle on the head hit
lit.: 'The offender hit him on the head with the glass bottle.'

We are left with verbs that do not occur in accusative external possessives. They can be divided into three groups according to their surfacing patterns.

III.   'break' verbs: these verbs occur in the attributive possessive frame; they cannot occur in accusative external possessives (cf. (23) repeated from (6)).[10,11] Furthermore, on their physical readings, they take inanimates as their arguments exclusively. (Body parts count as inanimate.) They entail a quantized or non-quantized physical change in the undergoer.

(23) a. Peter hat Pauls Arm gebrochen.
        Peter has Paul's arm   broken
        'Peter broke Paul's arm.'

     b. *Peter hat Paul am   Arm gebrochen.
        Peter has Paul on the arm   broken
        int.: 'Peter broke Paul on the arm.'

IV.   'shred' verbs: the verb *zerkratzen* 'to scratch all over, to lacerate', briefly considered before, belongs to this group (cf. (24) repeated from (5)). Like 'break' verbs, these verbs occur in the attributive frame, but unlike 'break' verbs, they can take animate or inanimate arguments.[12,13] They entail a quantized change in the undergoer.

(24) a. Die Katze hat seine Wange zerkratzt.
        the cat   has his   cheek scratched all over
        'The cat scratched his cheek up.'

     b. *Die Katze hat ihn an der Wange zerkratzt.
        The cat   has him on the cheek   scratched all over
        int.: 'The cat scratched him all over on the cheek.'

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[10] These verbs also occur in Dative external possessives mentioned in Footnote 1 on page 4.

[11] **'Break' verbs**: *aufschlagen* 'crack open', *brechen* 'break', *beschädigen* 'to damage', *einschlagen* 'to smash', *ruinieren* 'to ruin'.

[12] These verbs also occur in Dative external possessives mentioned in Footnote 1 on page 4.

[13] **'Shred' verbs**: *durchbeißen* 'to bite through', *durchhauen* 'to beat through', *durchlöchern* 'to perforate', *durchnässen* 'soak completely/through', *durchreißen* 'to rip through', *durchschneiden* 'to cut through', *durchstechen* 'to pierce through', *waschen* 'to wash', *zerfetzen* 'to shred', *zerkauen* 'to chew into pieces', *zerkratzen* 'to scratch all over, to lacerate', *zerreißen* 'to tear apart', *zersägen* 'to saw up/into pieces', *zerstückeln* 'to break/cut into pieces', *zertreten* 'to tread down'.

V.   'torture' verbs: this group of verbs, not discussed in the paper so far, includes verbs that (on their non-psychological readings) entail a potential physical effect on the undergoer. However, like 'break' and 'shred' verbs, they do not occur in accusative external possessives. These verbs only take animate undergoers that occupy the accusative object position (cf. (25)).[14]

(25) a. Peter hat Paul (*am   Bein) gequält
            Peter has Paul (on the leg)   tortured
            'Peter tortured Paul (*on the leg).'

       b. *Peter hat Pauls Bein gequält.
            Peter has Paul's leg   tortured
            int: 'Peter tortured Paul's leg.'

Since the proposal outlined in the previous sections is built upon the evidence from 'touch' and 'hit' verbs, it is no wonder that it correctly predicts their surfacing in accusative external possessives. According to what has been said, both verb classes pass the double entailment constraint, i.e., the (potential) result state these verbs entail holds for both the possessor and possessee attached to each other. In what follows, I discuss the predictions for each of the three non-alternating verb classes, i.e., 'break', 'shred', and 'torture' verbs. We will return to 'touch' and 'hit' verbs at the end of this section.

3.1 'Break' verbs

As has been stated for English (cf. Massam 1989; Levin 1993; Dowty 2001), but is also true for German and many other European languages, 'break' verbs do not allow possessor raising, i.e., they do not occur in accusative external possessives (cf. (23)). Given the proposed account, the explanation for their behavior is straightforward.

On their physical readings (the only readings that might lead to any physical impact), 'break' verbs do not take animate complements.[15] Therefore, these verbs cannot fulfill the double entailment condition: the physical results they entail cannot hold for animate possessors.

3.2 'Torture' verbs

Much the same is true for 'torture' verbs. Just like 'break' verbs, they impose a restriction on the kind of arguments they take. These verbs subcategorize for animates exclusively, and the result state they entail can only hold for animates. Verbs like *kränken* 'to hurt' or *peinigen* 'to tantalize' on their physical readings (cf. (26a)) entail that the necessarily animate undergoer

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[14] **'Torture' verbs**: *foltern* 'to torture', *kränken* 'to hurt', *peinigen* 'to tantalize', *plagen* 'to plague', *quälen* 'to torment', *wachküssen* 'to kiss awake'.

[15] An example of a non-physical reading would be *Dieser Schmerz hat Peter gebrochen* 'This sorrow broke Peter'.

physically perceives some unspecified action and suffers from it; the verb *wachküssen* 'to kiss awake', behaving in the same way, entails a result state of being awake, which is only possible for animate undergoers. Consequently, verbs of this class can neither occur in the external possessive (cf. (26c)) nor in the attributive possessive frame (cf. (26b)) where the complement position is filled by an inanimate body part or another attached entity.

(26) a. Peter hat Paul gequält.
          Peter has Paul tortured
          'Peter tortured Paul.'

      b. *Peter hat Pauls Bein gequält.
          Peter has Paul's leg tortured
          int: 'Peter tortured Paul's leg.'

      c. *Peter hat Paul am Bein gequält
          Peter has Paul on the leg tortured
          int.: 'Peter tortured Paul on the leg.'

3.3 'Shred' verbs

The last and the most puzzling class of verbs not appearing in the accusative external possessive frame are 'shred' verbs. As shown in the examples repeated below, verbs of this class occur in the attributive possessive frame and also take animates as direct objects (cf. (27a) and (27b)). That is, the result state they entail can hold likewise for animate and inanimate entities. Nonetheless, they do not occur in accusative external possessives (cf. (27c)). In what follows, I argue that the reason for that is the kind of result state they entail: it is quantized and, therefore, it is not universally the same for two entities standing in the mereological relationship to each other, like the one presupposed by accusative external possessives. This makes 'shred' verbs fail the double entailment constraint and explains why they cannot occur in accusative external possessives.

(27) a. Die Katze hat seine Wange zerkratzt.
          the cat has his cheek scratched all over
          'The cat scratched his cheek all over.'

      b. Die Katze hat ihn zerkratzt.
          the cat has he:ACC scratched all over
          'The cat scratched him all over.'

      c. *Die Katze hat ihn an der Wange zerkratzt.
          The cat has him:ACC on the cheek scratched all over
          int.: 'The cat scratched him all over on the cheek.'

There are two striking characteristics of 'shred' verbs: first, many of them are marked by prefixes *zer-* 'apart, completely' or *durch-* 'through'; and, second, many of them have a non-prefixed

counterpart compatible with the external possessive frame, e.g., *zerkratzen* 'to scratch all over, to lacerate' vs. *kratzen* 'to scratch'.

German prefixes *zer-* and *durch-* are related to the result state entailed by the verb. The prefix *zer-* 'apart, be in pieces' adds to the meanings of the verbs with which it combines that the thematic argument of an event described by the verb is divided or separated into parts, seriously damaged or annihilated. *Zer-* thereby specifies that the events expressed by verbs have culminated (Stiebels & Wunderlich 1994; Stiebels 1996).[16] (These effects are visible in the English translations of the *zer-* verbs provided in footnote 13 on page 13.) Likewise, when the prefix *durch-* 'through' combines with verbs, it specifies the result and entails a culmination (e.g., *beißen* 'to bite' vs. *durchbeißen* 'to bite through').

Unlike verbs that occur in accusative external possessives, *durch-* and *zer-* verbs, as well as other verbs of this class, entail a quantized result (Hay et al. 1999; Beavers 2011), also known as a *definite state* (cf. Dowty 1979). Such a result state is quantized with respect to some physical property of the undergoer of the action (e.g., volume, surface, thickness, etc.). Consequently, it does not hold simultaneously for two entities being in a relationship of physical attachment with each other (which, in most instances of accusative external possessives, is a part-whole relationship).[17] In contrast, verbs that entail a non-quantized result state, like some of the verbs in 'touch' and 'hit' classes (e.g., *kratzen* 'scratch'), can appear in accusative external possessives.

Let us consider as an example the pair of verbs *kratzen* 'to scratch' and *zerkratzen* 'to scratch all over, to lacerate', the first of which appears in external possessives, while the second does not. The potential result state entailed by the alternating verb *kratzen* is the particular kind of damage to the undergoer's material integrity (at least one scratch). This result can be taken in two ways, as damage to the part and as damage to the whole: the damage to the part is the damage to the whole. It is in this sense that double entailment should be understood.

The verb *zerkratzen* 'to scratch all over, to lacerate' entails a different kind of result. Not only does it entail the presence of scratches, but it also entails that they are distributed over the surface of the undergoer, specifically, that the undergoer is covered by scratches. To say that the body part is fully covered with scratches is a different claim from the one that the body as a whole is fully covered with scratches. The two claims are logically independent: not only can the hand be fully covered with scratches without this being true for the body as a whole, but it is also possible for the body to be conceived as fully covered, while yet one would not necessarily want to say this about the hand. While one can imagine scenarios on which the result state of being scratched all over is true for both, the possessor and its body part (e.g., the person is scratched all over and the person's hand too), this does not hold universally, that is, it is not a part of the verb

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[16] I thank the anonymous reviewer for pointing out this body of literature.

[17] The connection between the quantization of the result state and the nominal mereology is discussed in Section 4.2.

meaning. Similar logic applies to all other members of the 'shred' verb class, such as *durchbeißen* 'to bite through', *zerstückeln* 'to break/cut into pieces', *waschen* 'to wash' and others.

The explanation for the behavior of 'shred' verbs in accusative external possessives proposed here is also supported by the evidence from resultative constructions. As we have seen, 'touch' and 'hit' verbs, which do not entail a quantized physical change in the undergoer, occur in accusative external possessives (cf. (28a) with a 'touch' verb *lecken* 'to lick'). While their attributive counterparts can be enriched by a specific result state, as in (28b), this is not possible in case of the external possessives (28c), owing to the incompatibility of quantized results with the double entailment.

(28)   a.   Mein Hund hat mich an der Hand geleckt.
             My   dog   has me   on the hand licked
             'My dog licked me:ACC on the Hand.'

        b.   Mein Hund hat meine Hand nass geleckt.
             My   dog   has my   hand wet   licked
             lit.: 'My dog licked my Hand wet.'

        c.   *Mein Hund hat mich   an der Hand nass geleckt.
             My   dog   has me:ACC   on the hand wet   licked
             int.: 'My dog licked me on the Hand wet.'

3.4 'Touch' and 'hit' verbs and what else they tell us about the meaning of accusative external possessives

As we have seen, 'touch' and 'hit' verbs can occur in accusative external possessives. However, the two verb classes differ in their behavior in attributive possessives. In this section, I discuss these differences and argue that, against the common claim that the use of external possessives is associated with the expression of affectedness on its most general understanding (cf. Chappell & McGregor 1996, Heine 1997, Wierzbicka 1988, Payne & Barshi 1999, Podlesskaya & Rakhilina 1999), these constructions do not encode it.

The term *affectedness* used in connection with external possessives is usually understood very broadly and is not limited to the kinds of physical impact on the undergoer. It captures the difference between sentences (29a) and (29b) as alternative descriptions of the same scenario as follows. While the physical impingement of both the possessor and the possessee is the same in both cases, the possessor's surfacing in the more prominent position of the accusative object emphasizes its affectedness by the event expressed in the sentence. The use of attributive possessives instead evokes an inference of the distant perception of the event by pure virtue of the availability of the alternative encoding with external possessives connected to the expression of the affectedness (cf. Lehmann 2021).

(29) a. Peter touched Paul's arm.
      b. Peter touched Paul on the arm.

While most native speakers of German share the above intuitions about differences between accusative external and attributive possessives, it is not entirely clear whether the information about the possessor's affectedness is directly encoded in the external possessive frame or derived by inference. In what follows, I will argue for the latter.

In the discussion of the double entailment carried out in the previous sections, two alternating verbal classes, 'hit' and 'touch', were considered in opposition to the other three classes which do not occur in the accusative external possessive frame. However, as we have seen in Section 1, verb classes 'hit' and 'touch' behave differently when it comes to the formation of the attributive possessive frame. Unlike 'touch' verbs, inanimate undergoers of 'hit' verbs are encoded not as accusative objects, but as obliques (cf. (30a) and (30b)). With other words, only animates can occupy the accusative object position of 'hit' verbs.

(30) a. Mareike hat seine Schulter berührt.
          Mareike has his   shoulder touched
          'Mareike touched his shoulder.'

      b. Mareike hat *(auf) seine Schulter geschlagen.
          Mareike has on   his   shoulder hit
          lit.: 'Mareike hit on his shoulder.'

Verbs in the 'touch' verb class are so heterogeneous that it is hard to make any generalizations about them besides that all of them, as discussed previously, entail a potential or non-quantized physical impact on their animate or inanimate undergoer. The class of 'hit' verbs is, in contrast, well-defined. Verbs in this class have been studied for a variety of languages and found to have three basic meaning components: physical contact, movement, and force (cf. Levin 1993; Gao & Cheng 2003; Goldschmidt et al. 2015). Indeed, in German these verbs take oblique complements in accusative case encoding goals (as opposed to 'touch' verbs mostly appearing with obliques in dative expressing location).[18] Due to the mentioned peculiarity in their surfacing patterns with inanimate undergoers (also observed in Dutch and exemplified once again in (31)), these verbs

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[18] As the examples below show, In German locative prepositional phrases, accusative case marking corresponds to the expression of a goal, (ia), and dative marking to the expression of a location, (ib).

(i) a. Ich lege das Buch auf **den**   Tisch.
         I   lay   the book on   the:ACC   table
         'I put the book on the table.'

     b. Das Buch liegt auf **dem**   Tisch.
         the book lays   on   the:DAT   table
         'The book lays on the table.'

have been discussed in the context of paradigmatic differential object marking (cf. Fleischhauer 2018 for German and de Swart 2014; de Swart & de Hoop 2018 for Dutch).

(31)   a. Der Hund hat den   Mann gebissen.
          the dog has the:ACC man   bitten
          'The dog bit the man.'

      b. *Der Hund hat das   Brot   gebissen.
          the dog has the:ACC bread bitten
          int.: 'The dog bit the bread.'

      c. Der Hund hat **in** das   Brot   gebissen.
          the dog has in the:ACC bread bitten
          lit.: 'The dog bit in the bread.'

Based on the animacy restrictions exhibited by 'hit' verbs, they have been accounted for in terms of *sentience* (de Swart 2014; cf. Dowty 1991 for the term) or *experiential affectedness* (Fleischhauer 2018; cf. Lundquist & Ramchand 2012: 229 for the term). According to these accounts, 'hit' verbs entail experiential affectedness of the undergoers appearing in the accusative object position. Therefore, this position can only filled by animates (inanimates are not sentient and, thus, cannot be affected experientially). That is, the accusative external possessives with 'hit' verbs expresses affectedness.

Yet in German, 'touch' verbs do not impose sentience restrictions on their undergoer arguments: not only do they take likewise animates or inanimates as accusative objects, but most of them also occur in external possessives, with inanimates standing in part-whole relationships to each other (cf. (32) and (33)). Consequently, we can state that in German, affectedness meaning, as understood by the last mentioned authors, is not directly associated with the external possessive frame.

(32)   Gott sei Dank hatte ich die Fliegerbombe mit der Schaufel an der Seite berührt
       thanks God   had I   the aerial bomb with the shovel on the side touched
       und nicht am   Zünder.[19]
       and   not   on the detonator
       'Thank God, I touched the aerial bomb with the shovel on the side and not on the detonator.'

(33)   Peter hält   die Pflanze am   Stiel.
       Peter holds the plant   by the   stalk
       'Peter holds the plant by the stalk.'

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[19] https://www.augsburger-allgemeine.de/noerdlingen/Alarm-Bombenfund-in-Rain-id24682221.html.

Nonetheless, intuitively not only for 'hit' verbs but also for 'touch' verbs, animate possessors in external possessives still seem to be more affected than in their attributive counterparts (cf. (29)). There are several tentative non-competing explanations for this, which require further research not pursued here.

Firstly, affectedness inferences might be drawn from differences in the information structure. In particular, the appearance of the possessor in the more prominent object position may lead to the inference of its higher importance in the event denoted by the sentence. Secondly, canonical objects, as opposed to the deeper embedded elements like attributive possessors, have a natural affinity towards affectedness. That is, from all the participants, the ones encoded by accusative objects are most likely to be affected (cf. Dowty 1991; Beavers 2010).

Furthermore, the following observations might also be relevant to the matter. In cases with an animate possessor, when both external and attributive possessives can be formed, the former seems to be preferred over the latter. This fact might reflect generalizations captured in several prominence hierarchies in all of which animates are ranked higher than inanimates and, thus, are expected to occur in more prominent positions in the sentence (cf. empathy hierarchy by DeLancey (1981), personal hierarchy by Siewierska (2008) and animacy hierarchy by Comrie (1989) among others). In addition, attributive possessives tend to occur in particular text genres that lack emotional coloring, such as medical handbooks, legal protocols, or descriptions of paintings. As for inanimate possessors, external possessives with such possessors are somewhat rare, even if grammatically acceptable. For inanimate entities standing in a part-whole relationship with each other, the choice the speaker is facing seems to be between the attributive frame and the frame in which the whole occupies the accusative object position without further specification of the subpart (e.g., *He holds the stalk of the plant* vs. *He holds the plant*). This is possibly related to the fact that the specification of the subpart (or the secondary undergoer) has more relevance in the discourse when it comes to animates.

In sum, the observations mentioned above might explain the inferences about the possessor's affectedness associated with the use of the external possessive frame. However, as shown by the lack of animacy restrictions on participants in the accusative object position with 'touch' verbs, the external possessive frame does not entail the possessor's experiential affectedness.

4 Discussion

In this section, I situate the findings presented in this article in the context of the established linguistic theory. I discuss the implications for the theory of thematic roles, the interaction of verb meaning with nominal mereology and the theory of nominal relationality.

4.1 Thematic roles

One of the basic assumptions about thematic roles is uniqueness. According to the uniqueness principle, one event can have only one thematic role of a particular kind (Carlson 1984). For

instance, in one and the same event of eating, there will be one and the same eater and the same food to be eaten. Events described by external possessives are different in that there are two argument phrases with the same thematic role.

While there are semantic differences between accusative external possessives and attributive possessives (cf. Section 2), there are cases when both structures can be used to denote one and the same event. So, in the pair of examples repeated below, whenever (34b) is true, (34a) is also true. That is, the thematic roles of the possessor and the possessee are semantically equivalent.

(34) a. Die Katze hat seine   Wange gekratzt.
          the cat   has his:POSS cheek scratched
          'The cat scratched his cheek.'

      b. Die Katze hat ihn   an der Wange gekratzt.
          the cat   has him:ACC on the cheek   scratched
          'The cat scratched him on the cheek.'

According to Carlson (1984), the constraint on thematic uniqueness arises from the natural properties of eventualities; thematic uniqueness is not a linguistic property of verbs. Accusative external possessives with 'touch' verbs are an exception. The existence of verbs violating uniqueness has been pointed out by Krifka (1998). He briefly discusses two verbs of this kind: *see* and *touch*. Krifka proposes to capture uniqueness as a general principle that can be overridden by more specific rules, for instance, by the rule below formulated for the verb *touch* (cf. (35)). Krifka points out that this kind of rule serves as a conceptual basis for possessor raising.

(35) "… as soon as a material part x of an object y was touched, then y itself was touched."
      (Krifka 1998: 209)

Indeed, as we have seen, accusative external possessives reveal a whole class of verbs that denote events in which the part and the whole play the same thematic role. However, to formulate a more general rule that would apply to all of them does not seem possible. One reason for that is that the relationships of physical attachment between possessors and possessees are not uniform, they cannot be uniformly defined for all verbs in this class. For instance, the relationships suitable for touching and grabbing are not the same: one can grab somebody by the backpack, but is not possible to touch somebody on the backpack. Eventualities involve entities that come with their mereological properties. If, due to these properties, the part and the whole are involved in the event in the same way, they can be assigned equal thematic roles.

Unlike those described by 'touch' verbs, events described by 'hit' verbs do not assign the same thematic roles to the possessor and possessee. As discussed in Section 3.4, they exhibit differential object marking: their animate undergoers surface as accusative objects, while inanimate ones surface as obliques. Although they undergo the same physical action and the entailed potential physical change holds for both of them, the thematic roles assigned to them are different. Besides the potential physical result, the thematic role assigned to the animate

possessor includes sentience, while the one assigned to the part lacks it. In other words, 'hit' verbs do not violate the uniqueness principle.

According to another common assumption, no argument is assigned more than one thematic role (Bresnan 1982; Carlson & Tanenhaus 1988). Also this is challenged by accusative external possessives. As we have just seen, along with the possessor, the possessee plays the role of an undergoer. However, it also seems to have the role of location, direction, or manner (depending on the verb and the analysis). So in the already familiar example with 'touch' verb below, questions targeting the possessee in sentence (36b) are questions about location or manner (less common) (cf. (36a)). The same is true for 'hit' verbs: the possessee in external possessives appears to be the theme and the location, direction or manner at the same time (cf. (37)).

(36) a. **Wo**   / **wie** hat der Polizist   Paul gepackt?
        Where / how has the policeman Paul grabbed
        'Where / how has the policeman grabbed Paul?'

      b. Der Polizist   hat Paul **am   Arm** gepackt.
        the policeman has Paul at the arm   grabbed
        'The policeman grabbed Paul by the arm.'

(37) a. **Wohin**   hat der Hund den Mann gebissen?
        where:DIR has the dog   the man   bit
        'Where did the dog bit the man?'

      b. Der Hund hat den Mann **ins   Bein** gebissen.
        the dog   has the man   in the leg   bitten
        'The dog bit the man in the leg.'

4.2 Verb meaning and nominal mereology

Aspectual properties of predicates correlate with the meaning of their nominal arguments (cf. Garey 1957; Verkuyl 1972; Platzack 1979). It is well established that the (a)telicity of eventive predicates interacts with the mereological composition of their undergoers. So atelic eventive predicates, like *drink* or *push*, yield atelic readings due to the scalar characteristic of the non-quantized change they entail in combination with the quantizedness of the undergoer: while the predicate in (38a) is atelic, the one in (38b) is telic. The culmination of an event, like the one denoted by (38b), is partly induced by the physical finiteness of the undergoer (the event reaches its logical culmination when there is no more beer left) (cf. Krifka 1989; 1992; 1998; Beavers 2011).

(38) a. Peter drank beer.
      b. Peter drank a beer/ a glass of beer.

Quantized and non-quantized result states are kinds of event culminations that, for the verbs discussed in this paper, are characterized by a physical change in the undergoer. Verbs like *kratzen* 'to scratch' and *zerkratzen* 'to scratch all over, to lacerate' discussed previously are good examples for this distinction that, as we have seen, determines the verb behavior in accusative external possessives. In German, English, and Spanish, verbs entailing quantized change cannot occur in external possessives because a quantized result is determined in relation to some physical property of the undergoer and, therefore, cannot hold for a whole and a part at the same time (cf. Section 3.3). Thus, the mereological constitution of the undergoer correlates not only with the culmination of the event denoted by the predicate but also with the kind of culmination, i.e, with the quantization of the entailed result state.

It is interesting in this connection how the mereological structure of the undergoer is conceived. In accusative external possessives, the possessor is affected through the possessee. That is, the action denoted by the verb is carried out on the possessee and, as a consequence of the physical attachment, thereby also on the possessor. The possessor and the attached possessee are, therefore, conceptually considered as two constituents of a single totality. However, unlike animates, which are typically perceived as wholes whose body parts are their natural components, animates with attached elements of clothing or gear are generally not conceptualized as integral wholes. That is, accusative external possessives allow for the creation of, so to speak, new, ad hoc wholes that do not correspond to any established mereological concept (cf. *accidental integrated wholes* by Moltmann (1997)). The common denominator between the two conceptually very different kinds of part-whole relationships (natural and ad hoc ones) encoded by accusative external possessives, is the physical attachment at the event time that allows the (potential) physical result to be transferred (or to *spread*, cf. Dowty 2001) from the possessee to the possessor.

4.3 Possessive relationships

There are two commonly distinguished kinds of nouns: relational and sortal (cf. Löbner 2011). While sortal nouns, like *table* or *backpack*, denote entities, relational nouns, like *father* or *arm*, denote entities and relationships in which they stand to another entity, their possessor. Despite this semantic distinction between the two kinds of nouns, both of them can appear either accompanied by a possessor (cf. (39a) and (40a)) or without it, on their own (cf. (39b) and (40b)). There is a not yet settled discussion of how to analyze formally equal but semantically different attributive possessives with relational and sortal nouns (cf. (39a) and (40a)) (cf. Hellan 1980, Partee 1983/97, Jensen & Vikner 1994; Barker 1995; Vikner & Jensen 2002; Partee & Borschev 2003). Specifically, there is no consensus about whether possessors occurring with both kinds of nouns should be considered their arguments or modifiers. Nonetheless, there is a general agreement that in cases like (39b), where relational nouns appear without an NP-internal possessor, their meaning is shifted from its original relational function to the sortal function.

(39) a. The policeman twisted Peter's arm.
      b. The dog found an arm in the woods.

(40) a. Peter's backpack is on the floor.
      b. I need to buy a backpack.

Although in accusative external possessives, relational nouns appear without NP-internal possessors, their meaning does not seem to shift. Not only can relational nouns be interpreted as such, but their sortal interpretations appear to be disfavored.

As discussed in Section 2.1, accusative external possessives presuppose physical attachment. They allow non-relational nouns, like *backpack*, in the possessee position. However, relational possessees, like nouns for body parts, are still interpreted as such. So, in example (41) repeated below, *der Arm* 'the arm' not accompanied by an NP-internal possessor is interpreted as a body part of Paul and, along with this, as an arm attached to Paul's body. That is, it stands in two relationships to a single referent (viz., the possessor). In addition, the body-part relationship can be made explicit by an optional NP-internal possessor, as in example (42). In this case, both relationships, the body-part relation and the physical attachment relation, are directly encoded in the sentence.

(41) Der Polizist   hat Paul am   Arm gepackt.
      the policeman has Paul at the arm grabbed
      'The policeman grabbed Paul by the arm.'

(42) Der Polizist   hat Paul an **seinem** Arm gepackt.
      the policeman has Paul at his   arm grabbed
      'The policeman grabbed Paul by his arm.'

Similar in this sense are German dative external possessives (cf. (43) repeated below). Hole (2014) argues that nominal phrases containing possessees include an implicit anaphor picking up the possessor antecedent appearing in the position of the dative argument. In this regard, possessees resemble associative definites (also known as *binding definites* or *inferables*) (cf. Clark 1977; Prince 1981; Löbner 1998 among others). However, unlike instances of associative anaphora, like the one given in (44), in dative, but also in accusative external possessives, the assumed implicit anaphora must be bound clause-internally. That is, the possessor must occur in the same clause as the possessee.

(43) Die Katze hat ihm   die Wange zerkratzt.
      The cat   has him:DAT the cheek   scratched all over
      lit.: 'The cat scratched the cheek all over to him.'

(44)   Sophie stepped into the room$_i$. The window$_i$ was wide open.

While dative and accusative external possessives are similar in that possessees occurring in these constructions do not have to bear an overt NP-internal possessor marking, they also show some crucial differences, so that the analysis developed by Hole (2014) for dative external possessives is not applicable to the accusative ones without further ado. In dative external possessives, the possessee appears in the accusative object position and cannot be omitted without lost of grammaticality. According to Hole (2014), free datives, not licensed by the verb, always must bind a clause-internal anaphor, which, like in our case, can be implicit. This bound anaphor is always contained in the nominal phrase encoding the possessee.

Applying Hole's (2014) analysis to accusative external possessives discussed here, we can state that the anaphor contained in the nominal phrase encoding possessee is likewise always bound by the possessor. However, the latter does not have to bind per se: as mentioned in Section 2.3, the prepositional phrase encoding the possessee in accusative external possessives can always be omitted. That is, unlike dative possessors, accusative possessors do not have to bind, but the possessees in these constructions, when they are overtly expressed, must be bound clause-internally.

The presence of a zero-anaphor would explain the interpretability of the possessive relationship (physical attachment) for all kinds of possessees occurring in accusative external possessives, including sortal non-body-parts. In addition to that, further piece of evidence suggests that sortal interpretations of relational nouns appearing in accusative external possessives are generally dispreferred. Consider the example (45) below. If, according to the standard assumption, a shift from relational to sortal meaning occurred whenever a relational noun appears without an NP-internal possessor DP, we would expect the dependent clause to be felicitous. This is, however, not the case. The relational interpretation of *Arm* collides with the sortal interpretation required for the dependent clause to be felicitous.

(45)   Der Polizist   hat Paul am   Arm gepackt,
         the policeman has Paul at the arm grabbed
         (# den Paul an seinen Halloween-Kostüm genäht hat, um die Kinder zu erschrecken).
         (that Paul attached to his Halloween costume in order to scare the children)
         'The policeman grabbed Paul by the arm (#that Paul attached to his Halloween
         costume to scare the children).'

Similarly, English speakers confronted with the parallel example (46) have pointed out that, to make the sentence acceptable, the possessee phrase must include adjectives *fake* or *false*. These adjectives necessarily shift the meaning of the body-part noun from relational to sortal. Without them, *the arm* would receive a relational interpretation which, again, would collide with the sortal interpretation required for the felicity of the dependent clause.

(46) The policeman grabbed Paul by the #(false/fake) arm that he had attached to his Halloween costume.

Consequently, we can state that relational possessees accompanied by contracted definite articles in accusative external possessives do not shift from relational meanings to sortal. This, however, does not mean that relational nouns cannot shift at all. As shown by example (47) below, such a shift is possible when a full, or non-contracted, definite article is used (compare (47) with (45)). Unlike their contracted counterparts, which in German, mark dependent definite noun phrases characterized by the reduced referential potential in discourse (cf. Schwarz 2009, 2014; Krifka 2021), regular definite noun phrases can introduce discourse referents that not only can be picked up more easily in the subsequent discourse but can apparently also be reevaluated regarding their relationality. So *Arm* in (47) can receive a sortal interpretation.

(47) Der Polizist   hat Paul **an dem** Arm gepackt,
      the policeman has Paul at the   arm grabbed
      (den Paul an seinen Halloween-Kostüm genäht hat, um die Kinder zu erschrecken).
      (that Paul attached to his Halloween costume in order to scare the children)
      'The policeman grabbed Paul by the arm (that Paul attached to his Halloween costume to scare the children).'

In a nutshell, accusative external possessives show that type-shifting is not a necessary condition for a relational noun to appear without an overt NP-internal possessor. Furthermore, accusative external possessives offer an insight into the meaning of body-part relationships. They show that these relations are conceptual bonds between two entities as participants in a given eventuality e, which go beyond a mere physical relationship which holds between them independently of e.

5 Summary

This paper assumes that German accusative external possessive constructions impose as part of their meaning a compatibility constraint on the verbs that can occur in these constructions. The paper proposes that this meaning has the following ingredients: first, the relationship between the possessor and possessee must entail physical attachment; second, the (potential) result state entailed by the verb must be physical and hold equally for the possessor and the possessee (in the sense of double entailment). To occur in accusative external possessives, verbs must be compatible with the double entailment. The paper also argues that affectedness (on its broad understanding), which has sometimes been identified as the decisive admissibility factor for the accusative external possessive construction, does not constitute a necessary meaningful part of the construction.

The proposed meaning of accusative external possessives and the compatibility constraint explain the behavior of the five verb classes we have considered in relation to the accusative

external possessive construction. Two of them ('hit' and 'touch' verbs) allow for the double entailment and, therefore, can occur in the construction. The other three verb classes ('break', 'torture', and 'shred' verbs) are incompatible with double entailment. 'Break' and 'torture' verbs cannot occur in the construction due to their subcategorization restrictions. The (potential) result states these verbs entail can hold either for animates ('torture' verbs) or else for inanimates ('break' verbs), but never for both. These verbs, therefore, fail the double entailment constraint. The 'shred' verbs fail double entailment as well. In their case, the reason for the failure is that the result states they entail are quantized and, therefore, cannot hold for two entities standing in a part-whole relationship with each other.

External possessives are interesting from several points of view. For one, the evidence that their complex meaning cannot be contained in the lexical entry of the verb supports the accounts on which surfacing patterns of verbs are determined by the combinations of an idiosyncratic root meaning and a meaning associated with argument-structural templates in which they occur. Furthermore, accusative external possessives show the importance of the mereological constitution of undergoers in event structures. On the one hand, the part-whole relationship between the possessor and the possessee in accusative external possessives leads to the violation of the principle of uniqueness of thematic roles. On the other, the undergoer's mereology correlates with the kind of event culmination (quantized vs. non-quantized change). The verbs that entail quantized change are incompatible with the double entailment constraint because of the part-whole relationship that holds between the possessor and the possessee. Moreover, accusative external possessives provide us with yet another context where relational nouns can appear without an overt NP-internal possessor and yet be understood as relational. The fact that the possessive relationships denoted by them are interpreted along with the physical attachment speaks against the often-made assumption that when relational nouns appear without an explicit internal argument, they must get a sortal interpretation.

Abbreviations

ACC: accusative, DAT: dative, NP: nominal phrase, PRP: preposition, PST: past, PP: prepositional phrase, V: verb.

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Competing interests

The author has no competing interests to declare.

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