

Anticausatives in transitive guise*

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Abstract: This article discusses verbs of change that allow for a formally transitive construal which, nevertheless, has anticausative semantics. Verbs forming such 'transitive anticausatives' (e.g., *The water raised its temperature.*) also form canonical anticausatives (cf. *The temperature of the water rose.*). Such verbs differ from verbs that only form canonical anticausatives (cf. *The water warmed.*) in that they do not lexicalize a fixed scale along which they measure change so that the DP merged in the internal argument position of these verbs (a DP denoting a property concept like *the temperature*) can determine the actual scale of change. When these verbs form canonical anticausatives, the entity undergoing change along this scale is realized as the possessor of this internal argument DP. When these verbs form transitive anticausatives, the entity undergoing the change is realized in the verb's canonical external argument position, where it is, however, not assigned any external argument role. Instead, as in the canonical anticausative variant, it is interpreted as the possessor of the internal argument DP. This possessive relation is overtly reflected in English and other languages where the subject of the transitive anticausative construal binds a possessive pronoun in the internal argument DP.

After an illustration of the phenomenon in typologically different languages, the article lays out the above semantic properties of the transitive anticausative construal and the verbs occurring in it. It then subsumes transitive anticausatives under the theory of the causative alternation in Alexiadou et al. (2006, 2015), Schäfer (2008). Particular attention is, thereby, given to the morphological marking that sets apart, in many languages, the lexical causative and the anticausative variant of (a subset of) alternating verbs (cf. English *raise/rise*). Transitive anticausatives show a theoretically challenging but informative behavior here. Even though the transitive anticausative construal expresses anticausative semantics, its verb necessarily features the morphological marking that is canonically associated with its lexical causative use. This suggests that the morphological difference often found between pairs of lexical causative and anticausative verbs is only indirectly related to causative and anticausative semantics, but it is ultimately determined by more abstract, syntactic properties.

1. Introduction: Morphological marking in the causative alternation

In many languages, verbs undergoing the causative-anticausative alternation fall into two broad morphological classes (see Tubino-Blanco 2020 for a recent overview). For example, German, French, and Greek have *marked anticausative verbs* (1a', 2a', 3a'), which are obligatorily set aside from their corresponding lexical causative variants in (1a, 2a, 3a) by an extra

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morphological device, and they have *unmarked anticausative verbs* (1b', 2b', 3b'), which are obligatorily identical to their corresponding lexical causative variants in (1b, 2b, 3b). While German and French, like many Indo-European languages, use a formally reflexive pronoun or clitic (SE) as an anticausative marker, Greek uses a non-active verbal affix (NACT). These languages also have a small(er) set of verbs that can optionally realize their anticausative variant with or without anticausative morphology.

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|--------|--|-----|--|
| (1) a. | Maria öffnete die Tür.
Mary opened the door
'Mary opened the door.' | a'. | Die Tür öffnete sich .
the door opened SE
'The door opened.' |
| b. | Peter zerbrach die Vase.
Peter broke the vase
'Peter broke the vase.' | b'. | Die Vase zerbrach.
the vase broke
'The vase broke.' |
| (2) a. | Pierre ouvre la porte.
Peter opens the door
'Peter opens the door.' | a'. | La porte s' ouvre.
the door SE opens
'The door opens.' |
| b. | Ana brûle la maison.
Ana burns the house
'Ana burns the house.' | b'. | La maison brûle.
the house burns
'The house burns.' |
| (3) a. | O Janis ekapse ti supa.
the John burnt.ACT the soup
'John burnt the soup.' | a'. | I supa kaike .
the soup burnt.NACT
'The soup burnt.' |
| b. | O Janis adiase ti sakula.
the John emptied.ACT the bag
'John emptied the bag.' | b'. | I sakula adiase.
the bag emptied.ACT
'The bag emptied.' |

Besides these descriptive facts, no consensus exists in the literature on the linguistic motivation and theoretical implementation of anticausative morphology. However, two overall aspects of the phenomenon seem rather uncontroversial: First, to all we know there is no way to predict on lexical-semantic grounds whether a particular anticausative verb in a particular language comes with or without morphological marking. Instead, this seems to be an idiosyncratic, i.e., lexical property that must be learned and, thus, be listed for each verb undergoing the alternation.¹ Cross-linguistic variation also suggests this. For example, the German counterparts of the Greek verbs in (3a') and (3b') fall in exactly the opposite classes, and the French counterparts of the German verb in (1b') are marked (*se briser*) or optionally marked (*(se) casser*). Second, even though the synchronic distribution of anticausative morphology within a language is idiosyncratic, the fact that (a subset of) anticausative verbs appear, in language after language, marked with similar morphological devices suggests that the phenomenon itself reflects some grammatical property of anticausative verb formation. The question is what is this property?

The lexical causative variant of a verb undergoing the causative alternation introduces an external argument (an agent, causer, or instrument) and an internal argument (theme), and most authors agree that both marked and unmarked anticausatives denote one-place predicates of change that lack any external argument entailments (for a different view, see Koontz-Garboden 2009; cf. fn. 32). Many authors thus suggested that anticausative morphology is related in some

¹ But see Jacobsen (1985), Haspelmath (1993), Haspelmath et al. (2014) and Heidinger (2015) for cross-linguistic conceptual or use-conditional tendencies and Junker (1987), Labelle (1992) and Martin (2023) for the observation that French anticausative verbs strongly tend to appear with anticausative morphology if they come with a prepositional prefix (e.g., *a-*, *de-*, *en-*).

way to this difference in adicity (e.g., Grimshaw 1982, Reinhart 2002, a.m.o.). A subsequent question concerning the overall organization of grammar is whether this morphology reflects the semantic or the syntactic side of this difference in adicity, i.e., whether it reflects anticausative semantics (the absence of any external argument entailment) or anticausative syntax (the absence of a DP in the canonical external argument position). This, in turn, raises the question of whether there is a way to decide between the two options on empirical grounds.

In this article, I present a new argument that anticausative morphology is only indirectly related to an anticausative verb's semantics (as denoting a one-place predicate of change, as opposed to the semantics of its lexical causative variant, which denotes a two-place predicate of caused change), but reflects more abstract syntactic properties (cf. Embick 1997, 2004 for such a proposal). The argument is based on a subset of verbs of change that can be realized in a non-canonical syntactic construal that I refer to as 'transitive anticausative' (TrAC). An English example of this construal is the following:

(4) The Mediterranean Sea has raised its temperature by 1.4 degrees since 1982.

The term 'transitive anticausative' reflects that this construal expresses anticausative semantics (i.e., it involves a one-place predicate of change lacking any external argument entailments) within a formally transitive syntax. Crucially, anticausative morphology must not appear in this construal even with verbs that are obligatorily marked with anticausative morphology in their canonical anticausative construal. This shows that the presence of anticausative morphology is ultimately determined by syntactic properties of the verb phrase, which correlate only indirectly and imperfectly with the lexical semantics of the verb.

Transitive anticausatives are also found in languages that set aside the causative variant of the causative alternation from the anticausative variant with an extra verbal affix (typically glossed as CAUSE). Since transitive anticausatives appear in such languages with CAUSE-morphology but have anticausative semantics, this shows that this morphology is equally dissociated from semantics and rather reflects syntactic properties of the verbal phrase (cf. Wood & Marantz 2017 for a related argument based on Japanese adversity causatives).

The paper is structured as follows. In section 2, I illustrate the morpho-syntactic properties of transitive anticausatives (TrACs) in various, also typologically distinct, languages, and I lay out why they should inform theories of the causative alternation, in particular regarding the role of morphological marking found in this alternation. In section 3, I examine the argument structure of TrACs and the lexical-semantic properties of the verbs forming TrACs. In section 4., I develop an analysis of TrACs within the theory of the causative alternation in Alexiadou et al. (2006, 2015), Schäfer (2008). This theory puts a particular focus on the difference between morphologically marked and unmarked anticausatives and proposes that marked anticausatives involve an expletive Voice projection (as opposed to a thematic Voice projection). I propose that the verbal decomposition of TrACs involves the same syntactic formatives as marked anticausatives found in languages like German and French above, in particular, expletive Voice projecting a non-thematic specifier. This formative allows to reconcile the transitive morpho-syntax of TrACs with their anticausative semantics. In section 5, I discuss the broader theoretical implications of TrACs concerning the organization of grammar. Section 6 concludes.

2. Transitive anticausatives (TrACs)

Consider the German, French, and Greek example sets in (5)-(7). They are formed based on empirical observations on German in Schumacher (1986) (see also Löbner 1979). The examples are headed by the lexical causative variant of verbs undergoing the causative alternation. They involve a causer subject in the nominative and a theme object in the

accusative. The b-examples involve the corresponding canonical anticausative variants of the causative verbs used in the a-sentences. The accusative theme of the a-sentence appears as the sole nominative argument in the b-sentences. The German anticausative verb in (5b) necessarily appears with the reflexive pronoun *sich* (SE). The French example in (6b) features two alternative verbs, one necessarily forming an unmarked anticausative and the other necessarily marked with the reflexive clitic *se* (SE). Note that SE-marked anticausatives in French select the auxiliary *être* (be), while unmarked anticausatives select *avoir* (have). The anticausative verb in the Greek example in (7b) can optionally appear with or without the anticausative affix (NACT). Finally, the c-examples feature what I call the transitive anticausative variants of the verbs used in the a/b-sentences, in short TrACs.²

- (5) a. Die steigende Temperatur vergrößerte [das Volumen [des Gases]].
 the rising temperature.NOM enlarged the volume.ACC of.the gas
 'The rising temperature enlarged the volume of the gas.'
- b. Mit steigender Temperatur vergrößerte **sich** [das Volumen [des Gases]].
 with rising temperature enlarged **SE** the volume.NOM of.the gas
 'With the temperature rising, the volume of the gas enlarged.'
- c. Mit steigender Temperatur vergrößerte [das Gas] [sein Volumen].
 with rising temperature enlarged the gas.NOM its volume.ACC
 'With the temperature rising, the gas enlarged its volume.'
- (6) a. Le vent a changé / a modifié [la forme [des nuages]].
 the wind.NOM has changed/has modified the shape.ACC of.the clouds
 'The wind has changed /altered the form of the clouds.'
- b. [La forme [des nuages]] a changé / **s'est** modifiée.
 the shape.NOM of.the clouds has changed / **SE is** modified
 'The form of the clouds has changed/altered.'
- c. [Les nuages] ont changé / ont modifié [leur forme].
 the clouds.NOM have changed / have modified their shape.ACC
 'The clouds changed/altered their shape.'
- (7) a. I igrasia afksani [tin agogimotita [polon epifanion]].
 the wetness.NOM increases.ACT the conductivity.ACC many.GEN surfaces.GEN
 'The wetness increases the conductivity of many surfaces.'
- b. [I agogimotita [polon epifanion]] afksani /afksanete
 the conductivity.NOM many.GEN surfaces.GEN increases.ACT/increase.NACT
 otan ine igres.
 when they are.wet
 'The conductivity of many surfaces increases when they are wet.'
- c. [Poles epifanias] afksanun [tin agogimotita tu] otan ine igres.
 many surfaces.NOM increase.ACT the conductivity.ACC their when they are.wet
 'Many surfaces increase their conductivity when they are wet.'

The term 'transitive anticausative' (TrAC) reflects two properties of the verbs in the c-examples:

² If not indicated otherwise, all German data in this paper are based on the author's judgment which was reconfirmed by additional speakers. English data were verified by Yining Nie and Ben Sluckin (p.c.). French data are due to Fabienne Martin (p.c.), Greek data are due to Artemis Alexiadou, Elena Anagnostopoulou and Despina Oikonomou (p.c.). In section 2.1., I will also provide examples of TrACs in Hebrew, Turkish and Japanese. Besides this, I have verified the existence of TrACs in Italian (p.c. Andrea Miglietta) and Spanish (p.c. Antonio Fábregas). I am not in the position to make any broader typological or even universal claims about the availability of TrACs.

On the one hand, the verbs in the c-sentences are *syntactically transitive*. They come with two syntactic DP-dependents, a nominative DP triggering verbal agreement and an accusative DP. They necessarily appear in the same morphological shape as their canonical lexical causative (i.e., transitive) uses in the a-examples. In particular, anticausative morphology must not appear in the c-examples even if the same verb must (or optionally can, as in the Greek example) appear with anticausative morphology in the b-examples. Finally, the verbs in the c-examples necessarily select the auxiliary *have* even if the canonical anticausative use of the verb in the b-examples selects the auxiliary *be* (cf. 6b, c). All this suggests that the nominative DP in these c-examples (or a covert copy of this DP) is located in the canonical external argument position, which I label Spec, VoiceP (Kratzer 1996).

On the other hand, even though the verbs in the c-examples are formally transitive, they are *semantically intransitive* in that they denote one-place events of change without any external argument entailments (agent or causer). That is, as observed in Löbner (1979) and Schumacher (1986), the verbs in the c-examples do not correspond semantically to their lexical causative variants used in the a-examples. In particular, the nominative DP in the c-examples does not denote an agent or a causer nor does it have any other thematic relation to the verb (this claim will be substantiated with tests in section 3.1). Instead, the c-examples correspond semantically to the b-examples involving clearly anticausative verbs with only one internal argument. (Throughout this paper, I say that TrACs as in the c-examples, like their canonical anticausative counterparts in the b-examples, express 'anticausative semantics', meaning therewith that both denote inchoative events of change that lack any external argument entailments and, thereby, stand in opposition to the semantics of their lexical causative counterparts in the a-example, which come with exactly such external argument entailments.)

These two properties (syntactic transitivity vs. semantic anticausativity) seem to contradict each other. The central observation that allows this contradiction to be resolved is that the canonical anticausative verbs in the above b-examples feature a complex DP_{NOM} expressing a possessive relation. Besides being the internal argument of the verb, DP_{NOM} is also the *possessee* of a genitive *possessor* DP, as depicted in (8a). In the corresponding c-sentences, this possessive structure is dissociated, as depicted in (8b): Here, the possessor is realized as a DP_{NOM}, and the possessee, which is again the internal argument of the verb, is realized as DP_{ACC}. Further, DP_{NOM} obligatorily binds a possessive pronoun inside of DP_{ACC}.³ Binding is indicated in (8b) with superscripts. In the literature on possession, a structure like (8a) is said to realize internal possession (the possessor DP is a syntactic dependent of the possessee DP), and a structure like (8b) is said to realize external possession (the possessor DP is a syntactic dependent of the verb) (e.g., Deal 2017 and references there).⁴

³ The possessive pronoun agrees with DP_{NOM} in φ -features. It cannot be replaced by a disjoint DP and replacing it with a definite determiner typically leads to a lexical causative interpretation of the verb. In (5c), for example, replacing the possessive pronoun with a definite determiner would obviate a possessive relation between DP_{NOM} and DP_{ACC} and, as a result, the sentence can only convey the interpretation 'The gas caused the volume of some implicit entity to enlarge'. However, some noun-verb combinations more or less allow replacing the possessive pronoun with a definite determiner, e.g., in the German example in (i). Still, DP_{NOM} in (i) is obligatorily interpreted as the possessor of DP_{ACC} under the relevant anticausative interpretation (cf. fn. 38 for possible analyses).

(i) Die Wolken änderten ¹?(?)die Form / ²?die Farbe / die Richtung.
the clouds.NOM changed the shape.ACC / the color.ACC / the direction.ACC
'The clouds changed the shape/the color/the direction.'

I have not explored the circumstances enabling TrACs like (i), but my intuition about German is that the phenomenon is limited to the verb (*ver-ändern* (to change) (cf. fn. 17 for some potentially relevant discussion).

⁴ Instances of external possession can differ cross-linguistically in whether the possessor is doubled by a possessive pronoun or not (cf. fn. 3 for this variation within one language). External possession could, in principle, be derived via binding or via possessor raising. The presence of an overt possessive pronoun is typically taken as an argument in favor of binding (see Deal 2017). See section 4.2. for further arguments against possessor raising in TrACs.

- (8) a. [TP ... [_{VP} verb [POSSESSEE_{NOM} [POSSESSOR_{GEN}]]]]
 b. [TP ... [_{VoiceP} [POSSESSOR_{NOM}]ⁱ Voice [_{VP} verb [[PRONOUN_{POSS}]ⁱ POSSESSEE_{ACC}]]]]

The structure in (8b) will allow resolving the contradiction that the term transitive anticausative seems to express as follows. In TrACs, the DP_{NOM} is located in the canonical external argument position Spec, VoiceP but does not receive any external argument θ -role from Voice because, as I will argue, Voice in (8b) is semantically inert (expletive). Instead, DP_{NOM} is interpreted as the possessor of the internal DP_{ACC} as it obligatorily binds the (typically overt, cf. fn. 3, fn. 6, fn. 38) possessive pronoun within DP_{ACC}. Accordingly, sentences instantiating (8a) and (8b) (the above b-examples and c-examples) do not differ truth-conditionally. They only differ in that the sentence topic in (8a) is the possessee DP, while the sentence topic in (8b) is the possessor DP. This is not a lexical-semantic difference but follows from the differences in syntactic partitioning. While the possessor is embedded inside of the nominative possessee in (8a), it is itself the nominative DP in (8a), and nominative DPs are predestined as sentence topics. (See Deal 2017 for reports that the shift from internal to external possession goes along with information structural effects such as topicality or discourse saliency.)

The proposal in (8b) is, at this point, a hypothesis about the syntax and the semantics of the above c-examples, whose verbs I call, accordingly, transitive anticausatives (TrACs). In the following sections, I will substantiate this hypothesis empirically and theoretically and I will work out the relevance of TrACs for the theory of the causative alternation in particular and for the organization of grammar in general. The overall direction should be clear at this point. (8a) allows anticausative morphology while (8b) disallows it. If (8a) and (8b) are semantically equivalent, the presence of anticausative morphology cannot ultimately be predicted by the verb's lexical semantics, in particular not by the lack of an external argument in the verb's θ -grid. Similarly, since DP_{NOM} in (8b) is not assigned an external argument θ -role but anticausative morphology is excluded, the lack of anticausative morphology cannot be related to the presence of an external argument in the verb's θ -grid. However, syntactically, (8b) involves a Voice head projecting a specifier just like Voice does in lexical causative verbs, and the latter necessarily lack anticausative morphology. Thus, the presence vs. absence of anticausative morphology depends on whether the syntactic structure involves a VoiceP whose specifier is filled by a DP_{NOM} or not (but see fn. 36 for a technical update concerning passives). The way this DP_{NOM} in Spec, VoiceP is interpreted, as carrying the verb's external argument θ -role in lexical causatives or as the possessor of DP_{ACC} in TrACs, does not affect the blocking of anticausative morphology. The morphological behavior of TrACs then supports a hallmark of Distributed Morphology (Halle & Marantz 1993, 1994, Alexiadou et al. to appear) and related theories according to which morphology actually reflects or realizes aspects of the syntactic structure and syntactic structure provides the input to the semantic computation.

2.1 Further examples of TrACs

Before turning to a more detailed investigation of TrACs, I will enhance the empirical picture with additional examples in the languages discussed above and in additional, also typologically different, languages. This will reconfirm that TrACs show a morpho-syntactically transitive behavior. These additional examples will also help to establish that TrACs can be formed only with a subset of verbs undergoing the causative alternation. Contrasting verbs that form TrACs with those that do not will provide a first empirical argument that DP_{NOM} in TrACs receives a fundamentally different interpretation than a DP_{NOM} in lexical causatives; only the latter receives an external argument θ -role.

In (9a-c), we see three further German sentences involving TrACs. (They are (shortened) examples taken from the internet). The verbs in (9a-c) undergo the causative alternation and their canonical anticausative uses are obligatorily marked with the SE-reflexive pronoun *sich*

(*sich verdoppeln* (to double); *sich verkleinern* (to reduce); *sich steigern* (to increase)). The sentences in (9a-c) obligatorily lack these anticausative markers and involve a DP_{NOM} and a DP_{ACC}. Further, DP_{ACC} is modified with a possessive pronoun which is obligatorily bound by DP_{NOM}. Thereby, DP_{NOM} is interpreted as the possessor of DP_{ACC}. Besides this possessor role, DP_{NOM} does not receive any additional θ -role; it is not understood as a causer that triggers the change undergone by the possessed DP_{ACC}. This is clear in (9a) where the actual causer of the event is mentioned in the adverbial phrase '*dank dieses Futters*' (*thanks to this food*). If we wanted to form a canonical causative version of (9a), the DP inside this adverbial phrase would be realized as the external argument (*This food doubled the dogs' life expectancy.*). A causative interpretation can, of course, be forced upon the string in (9a), for example by adding further material (cf. '*With the help of this food, the dogs {successfully doubled/managed to double} their life expectancy*'). Conceptually, however, such an interpretation is conceived as deviant as it attributes scientific skills to dogs that do not fit our world knowledge (I call this as a 'fairy tale interpretation' because, in a fairy tale, one might encounter dogs endowed with human or even magical abilities). On the other hand, no conceptual deviance at all goes along with the TrAC in (9a), and this is so because DP_{NOM} in (9a) does not come with any agent or causer entailments. The same holds for (9b) and (9c). Neither are the ice caps in (9b) understood as causing their surface to become smaller nor are the breaths in (9c) understood as causing their frequency to become higher.

- (9) a. Dank dieses Futters verdoppelten die Hunde ihre Lebenserwartung.
 thanks this food doubled the dogs.NOM their life-expectancy.ACC
 'Thanks to this food, the dogs doubled their life expectancy.'
- b. Schon bei einer geringen Erwärmung der Meere verkleinern die Eiskappen
 already at a slight warming of.the.oceans reduce the icecaps.NOM
 an den Polen ihre Fläche.
 at the poles their surface.ACC
 'Already with a slight warming of the oceans, the ice caps at the poles shrink their surface.'
- c. Die Atemzüge steigerten ihre Frequenz auf das zwanzigfache pro Minute.
 the breaths.NOM increased their frequency.ACC at the twenty-fold per minute
 'The breaths increased their frequency by a factor of twenty per minute.'

(10a,b) feature two further French examples involving TrACs. The verb in (10a) would form an unmarked anticausative, the one in (10b) a SE-marked anticausative ((10b) is a shortened example from the internet). In the TrACs in (10a, b), SE must not appear.

- (10)a. Le gaz augmente sa température.
 the gas.NOM increases its temperature.ACC
 'The gas increased its temperature.'
- b. Le lac inférieur élève son niveau par l'effet d'eau plus abondante
 the lake.NOM lower raises its level.ACC by the effect of water more abundant
 qu'il reçoit du lac supérieur.
 that it receives from.the lake upper
 'The lower lake raises its level by the effect of more abundant water that it receives from the upper lake.'

(11a, b) provide two further Greek examples of TrACs. While the verb in (11a) forms its canonical anticausative use with active morphology, the verb in (11b) forms it with non-active morphology (NACT). In (11a, b), active morphology (ACT) must be used.

- (11)a. Ta sinefa. allaksan to sxima tus.
 the clouds.NOM changed.ACT the shape.ACC theirs
 'The clouds changed their shape.'
- b. I atmospha. miose tin thermocrasia tis.
 the atmosphere.NOM dropped.ACT the temperature.ACC its
 'The atmosphere reduced its temperature.'

In (12), we see a Hebrew example set (Odelia Ahdout, p.c.). Hebrew verbs undergoing the causative alternation often realize their causative and their anticausative variant in different verbal templates (e.g., Doron 2003, Kastner 2019, 2020). For example, the lexical causative verb in (12a) appears in the active (ACT) template, and its anticausative variant in (12b) obligatorily appears in the middle (MID) template (following Doron's 2003 classification of templates as Voice-markers). The verb in the corresponding TrAC-example in (12c) obligatorily appears in the active template just as its canonical lexical causative variant in (12a).

- (12)a. [ha-ruax] jint-a 'et [ha-tsura [fel ha-'anani-im]].
 the-wind.NOM changed.ACT-3SG.F ACC the-shape of the-cloud-PL.M
 'The wind altered the shape of the clouds.'
- b. [ha-tsura [fel ha-'anani-im]] hijtant-a.
 the-shape.NOM of the-cloud-PL.M changed.MID-3SG.F
 'The shape of the clouds altered.'
- c. [ha-'anan-im] jin-u 'et [tsurat-am].
 the-clouds.NOM-PL.M changed.ACT-PL ACC shape-THEIR.M
 'The clouds altered their shape.'

Next, I turn to causativization languages, called like this (cf. Haspelmath 1993) because they predominantly feature an additional morphological device on the lexical causative variant of alternating verbs.⁵ The first language of this type is Turkish (e.g., Key 2012, 2013). (13a, b) illustrates that the lexical causative variant of the Turkish verb meaning 'change' is marked with an extra affix on the verbal stem, which is typically glossed as CAUSE, while the anticausative variant lacks this morpheme. The corresponding TrAC in (13c) comes with the verbal affix. Possession is expressed in Turkish via an agreement morpheme on the possessed noun which, I assume, is triggered by a covert subject-bound possessive pronoun (pro) inside of DP_{ACC} (Kornfilt 1997, 2022). (The data in (13a-c) are due to Jaklin Kornfilt, p.c.).

- (13)a. Rüzgar bulut-lar-ın şekl-in-i deđiş-tir-di.
 wind.NOM cloud-PL-GEN shape-3.AGR-ACC change-CAUSE-PAST
 'The wind changed the form of the clouds.'
- b. Bulut-lar-ın şekl-i deđiş-ti.
 cloud-PL-GEN shape-3.AGR.NOM change-PAST
 'The shape of the clouds changed.'
- c. Bulut-lar şekil-lerin-i deđiş-tir-di.
 cloud-PL.NOM shape-3.PL.AGR-ACC change-CAUSE-PAST
 'The clouds changed their shape.'

⁵ Both causativization languages discussed here, Turkish and Japanese, show much morphological variation within their verbs undergoing the causative alternation. While many of them mark the causative variant as illustrated in the main text, others mark the anticausative variant with a verbal affix similar to Greek, some show morphological marking on both versions (called 'equipollent' pairs) and some form 'labile' pairs where both variants remain unmarked (see Haspelmath 1993 for this terminology).

As in the languages discussed above, the immediate interpretation of (13c) is truth-conditionally equivalent to the interpretation of (13b). (Of course, (13c) can, in principle, also receive a fairy tale reading where the clouds are anthropomorphized and manipulate their own form.)

A second language where many verbs undergoing the causative alternation mark their lexical causative variant with an extra CAUSE-morpheme is Japanese (e.g., Miyagawa 1998, Harley 2008). The examples in (14a, b) illustrate this for the verb meaning 'decrease'. In (14c) we see the same verb used in a TrAC ((14a-c) are due to Daiki Asami, p.c.). As in Turkish, the TrAC uses the same affix as the lexical causative variant in (14a). As in the other languages, Japanese TrACs do not receive a causative interpretation but express the same meaning as their canonical anticausative counterparts. Consequently, the presence of the CAUSE-morpheme in (14c) does not coincide with the presence of a causer argument. Japanese TrACs have already been discussed under the term 'transitive unaccusative' in Hasegawa (2004) (who cites Kageyama 2002 and Sugioka 2002). I refer the reader to this work for further examples.⁶

- (14)a. Ooame-ga yasai-no situ-o ot-osi-ta.
 heavy.rain-NOM vegetable-GEN quality-ACC decrease-CAUS-PAST
 'The heavy rain decreased the quality of the vegetables.'
- b. Yasai-no situ-ga oti-ta.
 Vegetable-GEN quality-NOM decrease-PAST
 'Vegetables' quality decreased.'
- c. Yasai-ga situ-o ot-osi-ta.
 vegetable-NOM quality-ACC decrease-CAUS-PAST
 'The vegetables decreased their quality.'

Finally, I turn to English examples of TrACs, which are mostly taken from the internet (some shortened). While the causative alternation is normally not morphologically reflected in English, English has a few verbs marking the causative alternation via Ablaut on the verbal stem. Fortunately, one of these verbs forms TrACs (*rise/raise*). As (15i) shows, the TrAC features the version of the stem with the fronted diphthong, which is also used in the lexical causative variant of the verb (this example is constructed, p.c. Yining Nie).

- (15)a. If water *changed its temperature* easily, we would constantly be too hot or too cold.
 b. Since it generally *increases its frequency* with age, glaucoma needs to be screened ...
 c. Only in the past one month the lake has *expanded its surface* area by more than 200 square kilometers.
 d. By the early sixteenth century, family had *widened its meaning* to include all the other people living in a household.
 e. The word "love" is thrown around and has *diminished its* value in some regards.
 f. I don't think there'll be a pill where people are going to *double their lifespan*.
 g. The Australian Dollar *slowed down its growth*.
 h. During the observation period the *glacier reduced its mass* by 17.95 m water equivalents.
 i. The gaseous planet *raised (*rose) its surface temperature*.

3. The semantic properties of (verbs forming) TrACs

This section investigates the argument structure of TrACs and the central lexical-semantic properties of verbs forming them. (16) gives, in English, a set of verbal concepts that I found forming TrACs in the various languages I looked at in section 2.

⁶ In Japanese, no overt possessive pronoun appears on the DP_{ACC} of TrACs (cf. 14c). I assume that, as in Turkish discussed above, a covert subject-bound pronoun is present inside DP_{ACC} (see also fn. 38).

- (16) accelerate, alter, change, decrease, diminish, double, drop, enlarge, expand, halve, increase, modify, multiply, narrow, r(a)ise, reduce, stabilize, slow down, widen

This set is rather small (though I do not claim it to be exhaustive). In reverse, this means that most verbs undergoing the causative alternation do not form TrACs. The examples in (17) involve textbook instances of alternating verbs. When these verbs are put into a transitive syntax where DP_{NOM} binds a possessive pronoun inside of DP_{ACC} , DP_{NOM} is necessarily interpreted as the agent or causer of the event (on top of being interpreted as the possessor of DP_{ACC}). If the DP_{NOM} is human, this is perfectly acceptable (17a). But (17a) means something very different than its anticausative variant in (17a'). If DP_{NOM} is non-human and also lacks suitable causer properties as in (17b, c, d), the transitive sentences are not acceptable (#). They might become acceptable in fairy-tale contexts, but then, again, they are not truth-conditionally equivalent to their anticausative variants (17b', c', d'). As said above and elaborated in more detail in the subsequent subsection, this is very different from TrACs and their canonical anticausative counterparts, which are paraphrases of each other.

- (17)a. John opened his shoelace. a'. John's shoelace opened.
 b. #The house burnt its roof. b'. The roof of the house burnt.
 c. #The gate opened its left wing. c'. The left wing of the gate opened.
 d. #The cake melted its glaze. d'. The glaze of the cake melted.

That speakers distinguish two sets of verbs undergoing the causative alternation, a small set that forms TrACs, and the majority of others that do not, is a first indication that DP_{NOM} in TrACs is not interpreted as a canonical external argument (causer or agent of the verbal event). I will substantiate this now by further investigating the argument structure properties of TrACs.

3.1. TrACs lack external argument entailments

In this section, I will show with four tests that DP_{NOM} in TrACs is not a semantic dependent of the verb. First, I establish that it does not receive any external argument role (*agent* or *causer*). Related to this, I show that TrACs express the same truth-conditional meaning as sentences headed by their corresponding canonical anticausative variant. The truth of the former entails the truth of the latter and the other way around. I conclude that DP_{NOM} in TrACs is interpreted as the possessor of DP_{ACC} but does not come with any additional thematic entailments at all. Just like canonical anticausatives, the verb in TrACs only assigns a theme role (cf. fn. 14) to its internal argument DP.

3.1.1. Passive formation

Passivization is typically characterized as absorbing the verb's external argument θ -role, which can then be optionally re-introduced in a *by*-phrase. According to the proposal reflected in the structure in (8b), DP_{NOM} in TrACs is located in the canonical external argument position (Spec, VoiceP), but it is not assigned any external argument θ -role (agent or causer). Instead, it receives a possessor role due to its obligatory binding relation with the possessive pronoun inside DP_{ACC} . Under this perspective, TrACs should not passivize because the verb (or the Voice head) in TrACs does not provide any external θ -role that could be absorbed and re-introduced in a *by*-phrase.⁷

⁷ The absence of passives of TrACs follows within lexicalist theories of passives and the syntactic theory of the English passive in Bruening (2013) (and its adaptations to other languages in Schäfer 2017 or Legate et al. 2020), which represent the implicit external argument only semantically. It does not follow in theories that assume that i) the implicit external argument of short passives is merged in the canonical external argument position as a covert nominal element (e.g. pro or PRO or a phiP) and/or ii) that the DP in passive *by*-phrases is merged in the canonical

This prediction is confirmed. (18a) features a German TrAC. This string is first transformed into a short passive without a *by*-phrase in (18b). (18b) is fully acceptable and entails an implicit external argument causing the increase of the volume of some entity, the latter denoted by the possessive pronoun. However, the implicit external argument in short passives cannot be interpreted as covalued with the possessive pronoun for principled reasons (cf. Schäfer et al. 2021). The passive test becomes telling when we add the DP_{NOM} of (18a) in a *by*-phrase as in (18c). Now the possessive pronoun inside of DP_{NOM} can be co-valued with the DP inside the *by*-phrase (see Bruening 2014; cf. Pesetsky 1995, Angelopoulos et al. 2020). (This co-valuation can be enforced by adding the adjectival intensifier *eigen* (own)). However, (18c) is conceptually deviant, only acceptable in a fairy tale scenario where the gas can act on its own properties. (18c) is, thus, interpreted very differently than (18a).⁸ I conclude that TrACs cannot be transformed into long passives, and this follows if the verb in TrACs does not provide an external argument θ -role that could be absorbed and re-introduced in a *by*-phrase.

- (18) a. Mit steigender Temperatur vergrößerte das Gas_i sein_i Volumen.
 with rising temperature enlarged the gas.NOM its volume.ACC
 'With the temperature rising, the gas increased its volume.'
- b. Mit steigender Temperatur wurde sein Volumen vergrößert.
 with rising temperature was its volume.NOM increased
 'With the temperature rising, its volume was increased.'
- c. #Mit steigender Temperatur wurde von dem Gas_i sein_i (eigenes) Volumen
 with rising temperature was by the gas its own volume.NOM
 vergrößert.
 increased
 '#With the temperature rising, its volume was increased by the gas.'

3.1.2. Causer PPs

Across languages, anticausatives can combine with PPs introducing non-human causers or causing events (Kallulli 2006, 2007; Alexiadou et al. 2006, 2015; Schäfer 2012c). This is illustrated for German in (19a). The DPs in these PPs are called causers because they make good causer subjects in lexical and periphrastic causatives (19b, c). TrACs license such causer-PPs just as well as their corresponding canonical anticausatives (20a, b).

- (19) a. Die Tür öffnete sich durch eine Windböe.
 the door opened SE through a gust-of-wind
 'The door opened from a gust-of-wind.'
- b. Eine Windböe öffnete die Tür.
 a gust-of-wind opened the door
 'A gust-of-wind opened the door.'
- c. Eine Windböe verursachte, dass die Tür sich öffnete.
 a gust-of-wind brought-about that the door SE opened
 'A gust-of-wind caused that the door opened.'

external argument position (e.g., Collins 2005, Landau 2010, Roberts 2019, Angelopoulos et al. 2020). If overt DPs can appear in the canonical external argument position without receiving a verbal θ -role (as I propose for DP_{NOM} in structure (8b)), the same should be possible for covert nominal elements and the DP in a *by*-phrase. Thus, TrACs should be transformable into short passives (if the referent of the possessor is contextually salient) or long passives, where the possessor is overtly realized in the *by*-phrase, contrary to fact.

⁸ The same holds for passives of examples of TrACs where the possessive pronoun can be replaced by a definite determiner (cf. fn. 3).

- (20) a. Das Aussehen der Erde änderte sich (durch den Klimawandel).
 the appearance of.the earth change SE through the climate.change
 b. Die Erde änderte ihr Aussehen (durch den Klimawandel).
 the earth changed her appearance through the climate-change
 'The appearance of the Earth changed from/due to climate change.'

This test further confirms that TrACs behave semantically like their canonical anticausative counterparts in that they denote one-place predicates of change. To such one-place predicates, a causer can be added via a prepositional adjunct. If the DP_{NOM} in TrACs would, itself, carry an external argument role (agent or causer), the addition of a causer PP should lead to unacceptability because an event of change cannot have more than one argument with an external argument role. This is shown in (21a, b), where the verbs are lexical causatives as they come with clear agent and causer subjects, and where adding a causer in a PP is not possible.⁹

- (21) a. Die Frau öffnete die Tür (*durch eine Windböe).
 the woman opened the door through a gust-of-wind
 'The woman opened the door (from a gust-of-wind).'
 b. Das Ozonloch änderte das Aussehen der Erde (*durch den Klimawandel).
 the ozone.hole change the appearance of.the earth through the climate-change
 'The ozone hole changed the appearance of the Earth from/due to climate change.'

3.1.3. Paraphrases and entailments

If a verb is undergoing the causative alternation, the meaning of its lexical causative variant can be paraphrased with a periphrastic causative verb embedding its anticausative variant. I illustrate this again in German. Thus, (22b) and (22c) are truth-conditionally equivalent paraphrases of (22a). (22b) uses the periphrastic causative verb *lassen* (let) which embeds a non-finite verbal constituent headed by the anticausative variant of the verb in (22a), and (22c) uses the causative verb *bewirken* (effectuate, bring about) which embeds a finite complement clause headed by this anticausative variant.

- (22) a. Der Forscher/Die steigende Temperatur vergrößerte das Volumen des Gases.
 the scientist/ the rising temperature increased the volume of.the gas
 'The scientist/the rising temperature increased the volume of the gas.'
 b. Der Forscher/Die steigende Temperatur ließ
 the scientist/ the rising temperature let
 das Volumen des Gases sich vergrößern.¹⁰
 the volume.ACC of.the gas SE increase
 'The scientist/the rising temperature let the volume of the gas increase.'

⁹ Lexical causative verbs can combine with what looks like causer-PPs, but there are clear restrictions (Schäfer 2008:99) that do not hold in TrACs such as (20b). If the subject is a human agent, the causer-PP introduces a causative event that must be under the agent's control (similar to an instrumental PP) as in (ia). If the subject is a non-human causer, the PP-causer must be in a part/whole relation with the subject as in (ib) and the preposition 'with' is equally possible, if not better.

- (i) a. Peter hat das Kartenhaus (durch heftiges Pusten/#durch den Sturm) zerstört.
 John has the house.of.cards through hard puffing/ through the storm destroyed
 'John destroyed the house of cards by blowing hard/by the storm.'
 b. Das Meer hat die Sandburg durch/mit seinen Wellen zerstört.
 the sea has the sand-castle through/with its waves destroyed
 'The sea destroyed the sand castle with its waves.'

¹⁰ Since German lacks SE-passives, the presence of the SE-morpheme with a verb like *vergrößern* (increase) ensures that an anticausative event is embedded below the causative verb.

- c. Der Forscher/Die steigende Temperatur bewirkte
 the scientist/ the rising temperature brought-about
 dass das Volumen des Gases sich vergrößerte.
 that the volume.NOM of.the gas SE increased
 'The scientist/the rising temperature caused that the volume of the gas increased.'

TrACs like (23a), while formally transitive, are not paraphrased by a periphrastic causative verb embedding the canonical anticausative version of the verb used in the TrAC (23b, c). In fact, (23b, c) violate our world knowledge and are, thus, judged as deviant; only a fairy tale context can rescue them.

- (23)a. [Das Gas] vergrößerte [sein Volumen].
 the.NOM Gas increased its.ACC volume
 'The gas increased its volume.'
 b. #Das Gas ließ sein Volumen sich vergrößern.
 the gas let its volume SE increase
 '#The gas let its volume increase.'
 c. #Das Gas bewirkte, dass sich sein Volumen vergrößerte.
 the gas brought-about that SE its volume increased
 '#The gas brought about that its volume increased.'

On the other hand, TrACs and their canonical anticausative variants are truth-conditionally equivalent paraphrases of each other. (As said in section 2, such sentence pairs differ only in their topic-comment partition.) This is verified by the observation that it is impossible to assert one of the two and negate the other at the same time. The coordinated examples in (24a, b) are contradictory. If DP_{NOM} in TrACs received an external argument θ -role from the verb, (24a) should not be contradictory (cf. Schäfer & Vivanco 2016).

- (24)a. Das Gas hat sein Volumen nicht vergrößert,
 the gas has its volume not increased
 #aber das Volumen des Gases hat sich trotzdem vergrößert.
 but the volume of.the gas has SE anyway increased
 'The gas did not increase its volume, #but the volume of the gas increased anyway.'
 b. Das Volumen des Gases hat sich nicht vergrößert,
 the volume of.the gas has SE not increased
 #aber das Gas hat sein Volumen trotzdem vergrößert.
 but the gas has its volume anyway increased
 'The volume of the gas did not increase, #but the gas increased its volume anyway.'

At least some Germanic and Romance languages allow a further interesting paraphrase of TrACs. This paraphrase matches with TrACs even in topic-comment structure because it also realizes the possessor as DP_{NOM} . The theme, on the other hand, is not realized as a DP_{ACC} but it is introduced in a PP in the verbal phrase (cf. Levin 1993: 77f., Zwarts 2018 for English). I call this the 'PP-variant' of TrACs and their canonical anticausative variants. I put the three variants next to each other for English: (25a) provides the canonical anticausative variant, (25b) the corresponding TrAC, and (25c) the corresponding PP-variant (data due to Yining Nie, p.c.). (26a, b) provide the German and French PP-variants of the French TrAC-example in (6c).¹¹

¹¹ Other Romance languages allowing the PP-variant are Italian (p.c. Andrea Miglietta) and Spanish (p.c. Antonio Fábregas). I have not investigated the availability of the PP-variant in other language families. It is mentioned in Levin (1993:72ff.) for English under the term 'Possessor-Attribute Factoring Alternation'.

- (25) a. *The surface temperature of the gaseous planet rose* over the course of 2 million years.
 b. *The gaseous planet raised its surface temperature* over the course of 2 million years.
 c. *The gaseous planet rose in (its) surface temperature* over the course of 2 million years.
- (26) a. [Die Wolken] veränderten sich [in ihrer /in der Form].
 the.NOM clouds changed SE in their.DAT / in the.DAT shape
 b. [Les nuages] ont changé [de forme].
 the clouds have changed of form
 'The clouds changed in (their) form.'

Since the PP-variant will be used as a point of comparison later, I add three observations about it. First, as can be seen by the anticausative stem morphology in the English example (25c) and the presence of the anticausative marker SE in the German example (26a), PP-variants of TrACs are formally anticausative. (The French verb in (26b) forms an unmarked canonical anticausative; as such it selects auxiliary *have* in French). This means that DP_{NOM} is merged as an internal argument in the PP-variant. This is further confirmed by the fact that the PP-variant also allows for a lexical causative construal (cf. *The wind changed the clouds in their form.*) Second, the PP-variant expresses the same truth-conditional meaning as its corresponding TrAC and its corresponding canonical anticausative variant, i.e., the sentences in (25a-c) entail each other (cf. Zwarts 2018 for the semantic equivalence of canonical anticausatives and their corresponding PP-variants). Third, while DP_{ACC} in TrACs comes with a possessive pronoun (or a definite determiner, see fn. 3), the corresponding noun inside the PP of the PP-variant appears as a bare noun in French (cf. (26b); cf. English (25c) where a definite as well as a bare DP is possible).¹²

Finally, French provides one further paraphrase for TrACs, the so-called 'presentational relative construction' (Lambrecht 2002) in (27a, b). The main clause predicate in (27a, b) is *avoir* (have) in its use as a lexical verb of possession, and the possessum is modified by a relative clause headed by the canonical anticausative variant of the transitive verb used in the corresponding TrAC. This paraphrase, thus, makes explicit the possessive semantics that I assume to underly TrACs, i.e., they explicitly reflect my claim that DP_{NOM} in TrACs is interpreted as the possessor of DP_{ACC}.

- (27) a. Les nuages ont leur forme qui change.
 the clouds have their form that changes
 'The form of the clouds changes.'
 b. Le gaz a son volume qui se modifie.
 the gas has a volume that SE modify
 'The volume of the gas changes.'

3.1.4. Sentential negation and interim conclusions

Sentences headed by lexical causative verbs are ambiguous under sentential negation. Either the coming about of a change is negated, or the causal role of the agent/causer-subject in this change is negated (e.g., Schäfer & Vivanco 2016, Wood & Marantz 2017). The latter reading is the one accessed by the well-formed continuation in (28a), where the finite auxiliary carries

¹² The French example uses a different preposition than the Germanic examples. In fact, French could use the preposition *dans* (in), but then the noun inside the *dans*-PP would either need a possessive pronoun or a definite determiner as in German. In French *de*-PPs, the noun must be bare. The English *in*-PP seems to allow possessive pronouns as well as bare nouns. The use of bare nouns reminds of incorporation. In fact, Martin (2005) investigates French *de*-phrases in the nominal and verbal domain and argues that the bare nouns in *de*-phrases denote properties that get semantically incorporated into the verb. I leave this domain of variation for future research.

stress (indicated by capital letters) to support *verum focus*.¹³ Sentences headed by anticausative verbs lack this latter reading as anticausatives do not introduce an external argument whose participation in the event could be negated; therefore, the continuation in (28b) is contradictory. This holds equally for morphologically marked and unmarked anticausatives (Schäfer & Vivanco 2016), as can also be seen by the fact that the German example in (28b) behaves like its English translation. TrACs, even though they feature a DP_{NOM} and a DP_{ACC} like lexical causative verbs, are not ambiguous under sentential negation but behave like their canonical anticausative counterparts (28c). This behavior of TrACs cannot be related to the binding relation between DP_{NOM} and the possessive pronoun inside DP_{ACC} because the relevant reading remains under such circumstances with lexical causative verbs (28d).

- (28) a. Hans/Das Feuer hat die Temperatur des Wassers nicht verändert,
 John/the fire has the temperatur of.the water not changed
 aber seine Temperatur HAT sich verändert.
 but its temperature has SE changed
 'John/the fire did not change the temperature of the water, but its temperature DID change.'
- b. Die Temperatur des Wassers hat sich nicht verändert,
 the temperature of.the water has SE not changed
 #aber seine Temperatur HAT sich verändert.
 but its temperature has SE changed
 'The temperature of the water did not change, #but its temperature DID change.'
- c. Das Wasser hat seine Temperatur nicht verändert,
 the water has its temperature not changed
 #aber seine Temperatur HAT sich verändert.
 but its temperature has SE changed
 'The water did not change its temperature, #but its temperature did change.'
- d. Hans hat seine Vase nicht zerbrochen, aber seine Vase IST zerbrochen.
 John has his vase not broken, but his vase is broken
 'John did not break his vase, but his vase DID break.'

To conclude, the tests in this section showed that DP_{NOM} in TrACs does not receive an external argument θ -role. TrACs, as their name implies, are semantically anticausative. Furthermore, since TrACs and their canonical anticausative variant are truth-conditionally equivalent, I conclude that DP_{NOM} in TrACs is merely interpreted as the possessor of DP_{ACC} and does not receive any θ -role from the verb at all. To explicate this conclusion, consider once more the two clauses correlated in (24a, b). Assume that DP_{NOM} in the first clause of (24a), the TrAC-version, receives a θ -role from the verb. Intuitively, this should be what is traditionally called the theme- or undergoer-role, since the option of a causer- or agent-role has just been excluded, and since, as a matter of fact, this DP_{NOM} denotes the entity whose change of state is expressed in the overall clause. However, aside from the fact that a verb's theme/undergoer role is otherwise never realized as an external argument, this hypothesis raises the question of how this role would be realized in the second clause of (24a), the canonical anticausative variant. Since θ -roles go along with entailments, and since the two clauses in (24a, b) entail each other, one would have to assume an implicit theme/undergoer in the second clause of (24a). However, neither intuitively nor based on any empirical evidence I am aware of, does the second, canonical anticausative clause involve an implicit argument. Furthermore, the possessor of the internal argument DP in this second clause is definite and, thus, should be disjoint from any implicit argument, while in the TrAC-counterpart, the possessor of the internal argument DP is

¹³ The relevant reading is enforced by putting further stress on DP_{NOM} and the negation in the first clause.

a possessive pronoun bound by DP_{NOM}. Thus, I conclude that the internal argument DP headed by the noun ‘volume’ in both clauses in (24a, b) is a semantic argument of the verb (what is traditionally called the theme or undergoer), but that DP_{NOM} in TrACs is not a semantic argument of the verb but of this noun.¹⁴ I turn to the lexical-semantic properties of such nouns and the verbs forming TrACs next.

3.2. The lexical-semantic properties of (verbs forming) TrACs

In this section, I discuss two necessary conditions that a verb must fulfill to form TrACs. A first property shared by all verbs in the TrACs from various languages in section 2 is that they also allow for a canonical anticausative construal. The same holds for all English verbs in the list in (16). I will reinforce this observation at the end of this section. Before, I will lay out a second, lexical-semantic precondition on the formation of TrACs: to form a TrAC, the verb must leave lexically underspecified the scale along which it measures change. In this case, a DP denoting a so-called ‘property concept’ (cf. Dixon 1982; or an event-denoting DP; see below) can be merged in the verb’s internal argument position to determine the actual scale. If the verb’s internal argument DP does not (further) characterize the scale along which change is measured but denotes an entity undergoing change, a DP merged in the verb’s external argument position will necessarily be interpreted as the agent or causer of the event even if it binds the possessor slot of the internal argument DP (cf. the examples in (17a-d) above).

The central set of verbs undergoing the causative alternation are verbs of change of state. Most change-of-state verbs express that an entity changes over the time of the event in some scalar property or attribute that it has (though see fn. 16 and 17). More technically, the meaning of these verbs has been analyzed as denoting a measure-of-change function, a function that measures "the difference between the degree to which an object possesses some scalar property at the beginning and end of an event" (Kennedy 2012:108, building on Kennedy and Levin 2008; see also Hay et al 1999, Levin & Rappaport Hovav 2010; Rappaport Hovav 2014). Based on this difference, the verb asserts that the scalar property becomes either more or less pronounced during the event.

The value of the measure function is determined by the lexical content of the verb. The relevant scales in the domain of the causative alternation are 'property scales', which are lexicalized by change-of-state verbs (e.g., *to warm, to deepen, to widen, ...*)¹⁵ and 'path scales' which are lexicalized by verbs of inherently directed motion (e.g., *r(a)ise, drop, ...*). A property scale is defined as i) a set of degrees (points or intervals indicating measurement values) that are ordered along ii) a particular dimension (*temperature, height, cost, speed, weight, ...*) according to iii) an ordering relation (*increasing or decreasing*) (e.g., Kennedy 1999, Kennedy

¹⁴ In the system of Ramchand (2008), nouns like *volume* in (24a, b) invite an analysis as ‘rhemes’, object DPs (or PPs) which further modify the verbal event by explicating the ‘event path’ (see also Zwarts 2018). An example with a canonical rhematic DP_{ACC} is given in (i). A reason for distinguishing DP_{ACC} in TrACs and its counterpart in the corresponding canonical anticausative and lexical causative structures from mere rhemes is that, unlike canonical rhemes of eventive verbs, they are not optional (ii), thus, they do not just modify the verbal event but are selected arguments of the verb (cf. the next subsection).

- (i) Andrew ran (the marathon/100 miles).
- (ii) a. Andrew increased *(the volume of the gas).
- b. The gas increased *(its volume).

A central aspect of the system developed in Ramchand (2008) is the possibility of DPs to accumulate θ -relations by undergoing movement from a lower to a higher θ -position. For example, the subject in (i) is analyzed as both, undergoer/theme and agent of the event. Ramchand (2008:53) mentions that her system opens the possibility that an internal argument DP realizes both the rheme and the undergoer/theme role, but lacking empirical evidence she leaves this matter unresolved. Since the ban of object drop as in (ii) is well-known from themes of verbs of change (e.g., Levin 1999), one could hypothesize that the internal argument DP of verbs forming TrACs instantiates such a combined undergoer/theme-rheme.

¹⁵ Many change-of-state verbs are derived from adjectives which already lexicalize the scale (e.g., Bartsch & Vennemann 1972/5, Kennedy 2001, Kennedy & McNally 2005, Beavers 2008).

& McNally 2005). A locational path can equally be characterized as a scale made up of the increasingly or decreasingly ordered set of points measuring the dimension 'spatial location' of an entity (a figure) relative to a reference object (a ground) (e.g., Dowty 1991, Krifka 1998, Zwarts 2005, Svenonius 2008, Levin & Rappaport Hovav 2008, Rappaport Hovav 2014, Beavers & Koontz-Garboden 2017, Zwarts 2018).

To exemplify, the verbs *to warm* and *to cool* lexicalize scales with the same degrees on the same dimension (degrees of temperature) but differ in that these degrees are ordered increasingly for *to warm* and decreasingly for *to cool*. Leaving aside many details (see Kennedy & Levin 2008, cf. also Deo et al. 2013), (29a) is true if the degree of temperature of the water is numerically higher at the end of the event than at the beginning of the event and (29b) is true if it is numerically lower. The verb *to rise* in (29c) lexicalizes a scale of points located on a vertical axis and ordered with increasing distance from a reference object (by default the ground surface). (29c) is true if the location of the balloon on this path scale is numerically higher at the end of the event than at the beginning.

- (29)a. The water warmed.
- b. The water cooled.
- c. The balloon rose.

The scale lexicalized in a verb of change denotes a property or attribute of the entity undergoing the change. This entity is realized as the internal theme argument of the verbs in (29a-c). As Bartsch and Vennemann (1972:172; cf. Kennedy 1999: Chapter 2, fn. 5) point out, a property scale "is inherently a nominal concept" (e.g., *the temperature, height, size, cost, speed, ...*). The verbs *to warm* and *to cool* (like their underlying adjectives), thus, lexicalize the nominal scale *temperature* without mentioning it explicitly. With the denominal verb *discolor* in (30), the nominal property along which change is measured is even visible in the composition of the stem, and the entity that changes along this property is the internal argument. (30) is true if the color of the screen is different at the end of the event than at the beginning.¹⁶

- (30) The screen discolored.

However, as observed in the literature (e.g., Löbner 1979, Schumacher 1986, Fleischhauer & Gamerschlag 2014, Rappaport Hovav 2014, Zwarts 2018), there are verbs of change denoting underspecified measure functions in that they do not lexicalize a fixed scale, i.e., they do not measure change along one and the same scale in all of their uses. Rather, the actual scale is fixed contextually. It turns out that verbs forming TrACs, i.e., those that fit in the list of verbal concepts in (16), are, in one way or the other, of this type (though verbs not forming TrACs can be of this type, too, as discussed towards the end of this section). To show this, I build on the following assumptions: First, with Rappaport Hovav & Levin (2010) and Rappaport Hovav (2014:261), I assume that "lexicalized meaning components are those that are specified and entailed in all uses of the verb regardless of context". Second, I assume with much literature (e.g., Tenny 1994, Goldberg 1995, Levin & Rappaport Hovav 1995, Rappaport Hovav 2014: 276) that "an event description can only have one measure or scale". Third, I take measure phrases (cf. *5 meters, 10 minutes, 10°C*, etc.) to reflect the scale along which change is measured (spatial length, temporal length, temperature, etc.). Measure phrases name the degrees that are ordered on a particular scale. It follows that if the verbs in (16) do not lexicalize a definite scale, they should be compatible with different types of measure phrases in different contexts, where the contexts specify the actual scale along which these verbs measure change. To illustrate this,

¹⁶ As Fleischhauer & Gamerschlag (2014:33) point out "color space is structured ... but colors are not linearly ordered and consequently do not form a scale". *to discolor* is thus a non-scalar verb of change of state.

I divide the verbs in (16) into the intuitive subclasses in (31a-g) and discuss instances of each class in turn.

- (31) a. double, increase, multiply b. decrease, diminish, halve, reduce
 c. alter, change, modify, stabilize d. drop, r(a)ise
 e. enlarge, expand f. narrow, widen
 g. accelerate, slow down

If these verbs denote measure-of-change functions but do not lexicalize a definite scale of change, the actual scale along which change is measured must be fixed contextually; otherwise, the change-of-state description is not interpretable. A straightforward way to provide such a scale is for these verbs to take as their internal argument a definite noun phrase denoting the actual property along which change is measured, a property concept noun phrases such as *the temperature*, *the price*, *the pressure*, etc. This is exemplified in (32)-(34) for one verb from (31a), (31b) and (31c), respectively. The entity undergoing the change is realized as the possessor inside the property concept noun phrase. Further, these examples license different measure phrases that name the type of degrees measured, thereby indicating different scales.

- (32) a. The temperature (of the soup) increased (by 5°C/#by \$1).
 b. The value (of gold) increased (to \$1,98 per ounce/#to 5°C).
 c. The pressure (of the gas) increased (by 50 Pascal/#by 5°C).
- (33) a. The temperature (of the soup) halved (to 20°C/#to \$1).
 b. The price (of the gadget) halved (to \$24/#to 5°C).
 c. The pressure (of the gas) halved (to 20 Pascal/#to 5°C).
- (34) a. The temperature (of the soup) changed (from 5°C to 10°C/#to 20 Pascal).
 b. The price (of gold) changed (from \$1.67 to \$1,85 per ounce/#to 5°C)
 c. The color (of the screen) changed (from yellow to green/#to \$5).

As shown, the verbs in (32-34) can combine with various property concept nouns and the choice correlates with the type of measure phrase that can be used. Consequently, these verbs can measure change along different scales. While the property noun determines the actual measurement scale, the verbs themselves still lexicalize the remaining aspects of the measure-of-change function. *Increase* asserts that the degree measured along the scale introduced by the property noun is higher at the end of the event than at the beginning of the event, *change* only asserts that the value of the property denoted by the noun is different at the end of the event than at the beginning.^{17/18} Finally, while the verbs in (32)-(34) are construed intransitively, their internal argument is understood as the attribute or property of some nominal entity. This entity (in brackets in the above examples) can be explicitly expressed as a possessor DP inside the property concept noun phrase, or, if contextually salient, it can remain implicit, but it is an obligatory semantic argument of the property concept noun.

Since the verbs in (32a-c) denote measure functions but do not lexicalize a scale along which change is measured, they can become difficult to interpret in the absence of a property

¹⁷ Consequently, *change* allows for non-scalar dimensions of change such as *color*, *taste*, *appearance*, *shape* (Fleischhauer & Gamerschlag 2014). The same holds for *stabilize* in (31c) which asserts the decline of change with respect to some scalar or non-scalar property.

¹⁸ The verb *change* used in (34a-c) has a second, irrelevant sense, characterized in the OED as ‘to substitute one thing for another; to replace/exchange one thing with another’ (e.g., *change clothes*). As Löbner (1979) observes, German uses two different verbs for these two senses, (*ver-*)*ändern* (‘make/become different’) and *wechseln* (‘replace, exchange’). Only the first sense is relevant for our discussion.

concept noun, at least if no property can be accommodated via contextual clues. This is illustrated in (35a) for *increase* where the effect is strong. The verb *change* is different, as the acceptability of (35b) shows. Nevertheless, that *change* does not lexically specify any scale can be seen in another way, namely that under its relevant sense (cf. fn. 18), *change* forces a reinterpretation of the internal argument in (35b). For example, *the soup* does not have its literal meaning but is reinterpreted so as to denote a contextually retrieved property of the object (e.g., the taste of the soup). At the semantic level, the sentence only entails that the DP in the internal argument position changes with respect to some of its attributes, but leaves the nature of this attribute fully underspecified.¹⁹ Note finally that adding a measure phrase as in (35a', b') leaves these examples unacceptable in the absence of a property concept noun (many thanks to Giorgos Spathas (p.c.) for pointing this out). This suggests that these verbs are not just ambiguous (as the measure phrases should resolve the ambiguity) but leave their scale of change underspecified and the actual scale or property can only be provided by an internal argument, i.e., these verbs select for a scale or property.

- (35) a. ??The soup/The gas/Gold increased.
 b. The screen/The soup/Gold changed.
 a'. ??The soup/The gas/Gold increased by 5\$.
 b'. ??The screen/The soup/Gold changed by 5\$.

If the verbs *drop* and *r(a)ise* in (31d) combine with an entity undergoing change as their internal argument as in (36a), they measure change along a spatial path defined by the points on the vertical axis above the ground (e.g., Rappaport Hovav 2014; Zwarts 2018). However, this spatial aspect of interpretation is not lexically fixed as it can be replaced by "paths" along other scales (cf. Zwarts 2018) that are introduced by a property concept noun in the internal argument position in (36b, c). That these examples no longer measure a spatial path is shown by the measure phrases available in these examples.

- (36) a. The balloon rose from 5 meters to 10 meters over the ground/#to 5°C.
 b. The temperature (of the soup) rose to 10 °C/#to 10 meters.
 c. The price (of gold) rose to \$1,980 per ounce/#to 10 meters.

To capture this behavior, one could either hypothesize that *r(a)ise* and *drop* are ambiguous between a verb of change lexicalizing a spatial path scale (36a) and a verb of change that does not lexicalize any scale (36b, c), or that these verbs do not lexicalize any scale, but are associated with a default scale 'path above ground' that is supplied in the absence of a property noun (cf. 36a). Without deciding between these options, I conclude that *r(a)ise* and *drop* allow their scale of change to be contextually determined.

Enlarge in (31e), like its underlying adjective *large*, measures *size*. However, entities can be *large* in different ways. Kennedy (1999:19) discusses *large* as an example of 'indeterminacy' found with many scalar adjectives; he treats those adjectives as ambiguous in that they can lexically associate with different scales. For example, the set of 'large cities' can be ordered according to different aspects of largeness, such as surface area, population, or the size of the bureaucracy. Consequently, the measure-of-change function *enlarge* can measure an increase in largeness along different scales and these scales can be made explicit with a property noun

¹⁹ The reason why (35a) is more marked than (35b) could be that *change* is much more permissive than *increase* in the range of dimensions it is compatible with: while *change* can express a change with respect to basically any property (corresponding to a scale or not; cf. fn. 17), *increase* requires a scale with ordered degrees, which might make the reinterpretation of the entity-denoting DP more constrained.

in the internal argument position, as indicated by the measure phrases available in the following examples:²⁰

- (37) a. The population (of the city) enlarged/expanded by 500 persons over the last year.
b. The area (of the city) enlarged/expanded to 20 km².
c. The size of the bureaucracy (of the city) enlarged/expanded to 5 administrative employees per 10 inhabitants.

When the verbs in (31f), *widen* and *narrow*, combine with an entity-denoting noun phrase as their internal argument, they measure change in the *linear extent* between two points on a spatial path as in (38a). However, these verbs can be used to measure extent with respect to other properties, as in (38b), where time stretches are measured, or in (38c) where the verb is used metaphorically to measure the extent of an abstract property. The examples of TrACs that I found with these verbs involved such metaphorical uses (cf. (38d) repeated from (15d)). As with the verbs discussed earlier, these alternative properties along which change is measured in (38b-d) are determined by the verb's internal argument and they are reflected by the measure phrases that can be used.

- (38) a. The gap widened (to 5 m/#to 24 hours).
b. We also widened the time of the closures (to 5 hours/#to 5 m).
c. Our options will widen (to include innovative technologies/#to 10 cm).
d. By the early sixteenth century, family had widened its meaning (to include all the other people living in a household/#to 10 cm).

Finally, the verbs in (32g) measure increase or decrease in speed. In the default case, speed sets into relation the distance covered by an entity during an event or subevent of movement along a spatial path to the run-time of the event or subevent (e.g., miles per hour) (39a). However, distance can be measured along all types of scales as the difference value between the degree an object has a scalar property at the beginning and the end of an event, and, in turn, the speed of all kinds of scalar change can be computed. This means that the property speed is itself underspecified (distance on some scale/time), though it comes with a default (spatial distance/time). To overwrite this default (or, if an ambiguity analysis of these verbs is chosen, under their alternative interpretation), the verbs in (32d) take a noun phrase as their internal argument that denotes an event of change different than movement on a path. The complex measure functions denoted by these verbs take early and late subevents of this event, divide them by their run times, and assert that these ratios increase or decrease during the overall run-time of the event. In this sense, then, the verbs in (32g) do not lexicalize all aspects of the scale along which they measure change either.

- (39) a. (The movement of) the car slowed down (to 20mph/#to 5°C per minute).
b. The growth (of the plant) slowed down (to less than 1 cm per month).
c. The warming (of the gaseous planet) slowed down (from 3°C to 1°C per decade).

To conclude, there are two types of verbs denoting a measure-of-change function, those like *warm* in (40a) that inherently lexicalize a fixed scale (temperature) along which they

²⁰ With these verbs (as with the adjective *large*), measure phrases seem to be acceptable also if the internal argument denotes an entity (cf. i). That the verb and an entity denoting theme together are able to restrict the range of possible measures enough to allow for measure phrases suggests that these verbs are not underspecified but ambiguous. Relevant for the discussion in the main text is that the scale can be made explicit as in (37a-c).

(i) The city enlarged by 500 persons/to 20 km²/to 5 administrative employees per 10 inhabitants.

measure change and those like *increase* in (40b) that do not (fully) lexicalize such a scale but semantically select for such a scale. In the latter case, the actual scale of change can be determined by a DP in the internal argument position. (Below, I concentrate on *increase* as a representative of the verbs in (31a-d) leaving an analysis of how exactly the verbs in (31e-g) compose semantically with a property concept noun (e.g., *the size*) or an event description (e.g., *the growth*) in their internal argument position for future research.)

- (40)a. The soup warmed.
 b. The temperature of the soup increased.

These two types of verbs of change are sometimes called 'extensional' and 'intensional' verbs (Montague 1974, Löbner 1979, 1981, 2020; Fleischhauer & Gamerschlag 2014, Deo et al. 2013, Zwarts 2018, a.o.). Verbs like *warm* combine with an internal argument of type $\langle e \rangle$ (e.g., *the soup* in (40a)), which has a constant extension over the course of the verbal event. Verbs like *increase* combine with a different type of internal argument called property concept noun in the present paper (called 'functional noun' by Löbner, 'individual concept' by Montague or 'quality noun' by Francez & Koontz Garboden 2017). Such a noun does not have a constant extension over time; rather, its extension can change over the time course of an event. In scale-based approaches, it denotes a function from individuals and times to degrees, as exemplified in (41a) for the noun *temperature*.²¹ In (41b), this noun has combined with a DP of type $\langle e \rangle$ (syntactically its genitive possessor or prepositional possessor) via functional application, resulting in a function from times to degrees. The meaning of (41b) is intensional as the degree of temperature of the soup that it provides (its extension) can be different at different points of time. The meaning of *increase* is given in (41c), where $END(e)$ and $BEG(e)$ are functions from events to points of time (the time at the end and the beginning of the event, respectively; cf. Hay et al. 1999). It denotes an increase relation $>$ that applies to a function δ from times to degrees. Combining (41c) with (41b) derives the meaning of the verbal phrase of sentence (40b) in (41d). (41d) asserts that the output of the measure function $TEMP$ provides a higher numerical degree at the end (of the event) than at the beginning.

- (41)a. $TEMP$ is a function from ordinary individuals and times to temperature degrees
 b. $\llbracket \text{the temperature of the soup} \rrbracket = \lambda t. TEMP(t, \text{the-soup})$
 c. $\llbracket \text{increased} \rrbracket = \lambda \delta \lambda e. \delta(END(e)) > \delta(BEG(e))$
 d. $\llbracket \text{the temperature of the soup increased} \rrbracket =$
 $TEMP(END(e), \text{the-soup}) > TEMP(BEG(e), \text{the-soup})$

Note that (41d) characterizes the meaning of (40b), but it equally characterizes the meaning of (40a). The sentences differ only in that the *temperature* scale is explicitly named by the internal argument DP in (40b) while it is hidden in (40a) in the meaning of the verb *to warm*. As Bartsch and Vennemann (1972:172) point out, the fact that the verb *to warm* inherently lexicalizes the nominal scale *temperature* allows the syntactic structure of *to warm* to be simpler than its underlying semantic representation: The surface syntax in (40a) treats the DP *the soup* as the direct (first-degree) argument of the verb, even though this DP is a second-degree argument in the verb's semantic structure. In (40b), on the other hand, the syntax-semantics mapping is fully transparent, but to the price that the syntax is more laborious. Since the scale of change is overtly realized as a dependent of the verb, the entity undergoing the change must now be treated as a second-degree argument not only in semantics but also in syntax.

²¹ Or, in the case of non-scalar dimensions, a function from individuals and times to values without inherent ordering (cf. fn. 17). Francez & Koontz-Garboden (2017) argue for a different characterization of property nouns as qualities, a sort of mass entity in the sense of Link (1983).

As discussed in section 3.1.3., anticausative sentences as in (42a) can, in principle, be paraphrased in two ways. In the PP-variant in (42b), the property concept noun is introduced in a prepositional phrase and the entity semantically selected by this noun (the holder of the attribute denoted by the property concept noun) is construed as the internal argument of the verb (cf. Löbner 1979, Levin 1993: 77f, Rappaport Hovav 2014, cf. Zwarts 2018 for an analysis of (42b)). TrACs provide the second paraphrase; in (42c), the property concept noun appears as the internal argument of the verb and selects for a possessive pronoun (cf. fn. 38). This possessive pronoun, thus, combines with the denotation of the property concept noun in (41a) via functional application. Furthermore, TrACs feature a DP_{NOM} which obligatorily binds this possessive pronoun. Thereby, we indirectly arrive at the meaning in (41b) and, in combination with the verb (in 41c), at the meaning in (41d). Thus, TrACs receive the same meaning as their canonical anticausative counterparts.²²

- (42) a. The temperature (of the soup) increased. (canonical anticausative)
 b. The soup increased in (its) temperature. (PP-variant)
 c. The soup increased its temperature. (TrAC)

To conclude, the central semantic property that allows a verb of change to form TrACs is that it does not lexically fix (all aspects of) the scale along which it measures change. The actual scale of change can then be specified by adding a property concept noun syntactically. A property concept noun, in turn, denotes the attribute of some entity. This entity can remain implicit if it is contextually salient (cf. (42a), when the *of*-PP is left out). But otherwise, the syntax must provide space for two DPs, one headed by the property concept noun, and one headed by the entity selected by this property concept noun. We have seen that these two DPs can be syntactically arranged in three different ways, in the canonical anticausative construal,²³

²² As an anonymous reviewer finds (42c) odd in German, let me point out that the acceptability of TrACs can vary pending on contextual factors as well as the lexical choice for the two DPs. In general, adding an adjunct providing the cause for the verbal change as in (i) can make the disambiguation towards an interpretation as a TrAC (instead of a lexical causative construal) smoother.

- (i) Dadurch erhöhte die Suppe ihre Temperatur.
 this.through increased the soup its temperature
 ‘As a result of this, the soup increased its temperature.’

(ii) shows an interesting contrast triggered by the choice of the internal argument DP_{ACC}. Several speakers confirmed my intuition that only ‘value’ denotes an inherent attribute of a building, while ‘price’ denotes a property that is imposed onto the building by a human agent, thus, almost a kind of alienably possessed property.

- (ii) Das Gebäude erhöhte seinen Wert/#seinen Preis.
 the building increased its value/ its price
 ‘The building increased its value/its price.’

Finally, if DP_{NOM} is human, the agentive construal of the transitive string is very prominent. Thus, (iii) can hardly express that the child got fever. This agent bias (or agent preference) is well-known from comprehension studies: we preferentially interpret role-ambiguous DPs as agents if they are human (Bickel et al. 2015, Sauppe et al. 2023).

- (iii) Das Kind erhöhte seine Temperatur.
 the child increased its temperature
 ‘The child increased its temperature.’

²³ As an anonymous reviewer correctly points out, the canonical anticausative construal can realize the two DPs not only in an explicit possessive structure but also in a compound:

- i) Die Temperatur des Wasser/Die Wassertemperatur erhöhte sich.
 The temperature of.the water /the water-temperature increased SE
 ‘The temperature of the water/The water temperature increased.’

in the PP-variant, and as a TrAC. In fact, TrACs subsume the canonical anticausative construal in that, in both, the property noun is merged as the internal argument of the verb and obligatorily hosts an internal possessor. TrACs add to this syntax a DP_{NOM} in the external argument position of the verb that obligatorily binds the possessor inside of the internal argument.

Since all three variants are truth-conditionally equivalent, I concluded in section 3.1. that DP_{NOM} in TrACs, while realized in the verb's external argument position, does not carry any external argument θ -role but it is merely interpreted as the possessor of the internal argument. We are now in a better position to characterize this possessive relation: it is the relation between an attribute (a noun denoting an intensional function along the lines of (41a)) and its holder (an individual of type $\langle e \rangle$) (or an event entering the computation of the attribute *speed* and its holder in (39a-c)). The attribute-holder relation is an instance of inalienable possession, and it is well known that inalienable possession is often treated in special ways by grammar compared to alienable possession (e.g., Myler 2016, Barker 2019 and references there). TrACs show that the attribute-holder relation plays an even more privileged role in grammar compared to other instances of inalienable possession (e.g., part-whole relation, body-part relation, or kinship relation). Only a canonical anticausative sentence like (43a), where the complex DP_{NOM} expresses a relation between an attribute and its holder, can be transformed into a TrAC (43b). With any other type of inalienable possession, this is not possible. Thus, for example, (44a), which involves a complex DP_{NOM} expressing a relation between a part (a noun denoting an extensional function from entities to entities) and a whole does not form a TrAC. (44b) can only receive a causative fairy-tale interpretation, i.e., the DP_{NOM} is necessarily understood as carrying an external argument θ -role (in addition to being interpreted as the possessor of the internal argument DP). I am not in the position to give any real explanation as to why this difference holds. But it must lie in the semantics of the head of the internal argument DP in (43a, b) as denoting (or further specifying in (39a-c)) a function from individuals and times to degrees as opposed to the semantics of the head of the internal argument DP in (44a, b) as denoting a function from individuals to individuals. In the latter case, the internal argument DP itself (*the roof*) is the entity undergoing the change expressed by the verb, while in the former case, the possessor (*the soup*) of the internal argument DP is the entity undergoing the change characterized by the verb together with its internal argument property concept noun (*the temperature*). And for some reason, only if the verb's internal argument does not denote an entity but a property, the transitive construal allows for an interpretation as a TrAC, i.e., the DP

in the external argument position can be interpreted as the mere possessor of the internal argument without taking on any external argument entailments.^{24/25}

²⁴ In an earlier version of this paper, I assumed that only verbs of change that do not (fully) specify a scale can readily combine with a property concept noun as their internal argument. In reaction, a reviewer pointed out the English example ‘The temperature warmed.’ (where the scale lexicalized by the verb is pleonastically repeated by the object DP) and seems to suggest that the phenomenon is productive. The German counterpart of this example sounds very odd (see also Fleischhauer & Gamerschlag 2017:fn. 11), and the same was reported to me by my French and Greek informants. While most other examples of this type are equally odd in German, I found that verbs lexicalizing the dimension ‘speed’ (*beschleunigen* (speed up), *verlangsamen* (slow down)) do relatively well combine with the property concept noun *Geschwindigkeit* (‘speed’) as their internal argument. It seems then that individual verbs allow for this kind of over-specification of their lexicalized scale of measurement, but I must leave the exact semantic mechanism of this phenomenon for future research. What is interesting is that the phenomenon also shows up in TrACs such that the examples in (ia, b) are paraphrases of each other. (ic), which is a further paraphrase of (ia, b), is interesting as it shows that the subject of TrACs does not have to be an entity but it can be the noun phrase that further specifies the property denoted by the internal argument.

- (i) a. Das Karotten verlangsamten ihr Wachstum.
 the carrots slowed-down their growth
 b. ?Die Karotten verlangsamten die Geschwindigkeit ihres Wachstums.
 the carrots slowed-down the speed of their growth
 c. Das Wachstum der Karotten verlangsamte seine Geschwindigkeit.
 the growth of the carrots slowed down its speed
 ‘The carrots slowed down their growth.’

²⁵ There are some English examples involving verbs undergoing the causative alternation that look like TrACs, but where DP_{NOM} stands in a part-whole or body-part relation with DP_{ACC}. A first example is (i).

- i) John broke his leg/his arm/his neck.

However, Levin (1993:102f.) characterizes *John* in such examples as an unintentional agent and German can confirm this view. Compare (iia, b). (iia) involves the canonical anticausative use of *brechen* (break), where a possessor is realized inside of the body-part theme. Different from English (p.c. Andrew McIntyre), ‘*Peter's heart broke*’ is a possible metaphor in German. In (iib), we see the transitive counterparts of (iia). Differently from *Arm* (arm) and *Bein* (leg), the object *Herz* (heart) in (iib) cannot be understood as being possessed by the subject *Peter*. One can make sense of this difference in (iib) if the subject is necessarily interpreted as an (unintentional) agent and if the metaphoric event of heart-breaking must be caused by an agent disjoint from the possessor of the heart for conceptual reasons.

- ii) a. Peters Arm /Fuss /Herz brach.
 Peter.GEN arm.NOM/foot.NOM/ heart.NOM broke
 ‘Peter's arm/foot/heart broke.’
 b. Der Peter_i brach (sich)_i sein(en)_i {Arm/Fuss/#Herz}.
 the.NOM Peter broke himself.DAT his.ACC arm /foot/neck/heart
 ‘Peter broke his leg/arm/foot/neck/*heart.’

A second set of examples is given in (iii):

- (iii) a. John broke an arm (Wood & Marantz 2017)
 b. The ship tore one of its sails. (Hole 2006)
 c. The car burst a tire. (ibid.)

These are also not TrACs. Note first that the internal argument must be indefinite in these English examples while it is definite in TrACs. Further, in languages with a morphological dative case like German, the nominative DPs in (iii a-c) would necessarily have to appear in the dative, whether human or non-human, and the internal argument would appear in the nominative. The NOM-ACC-pattern would trigger a lexical causative interpretation (conceptually deviant in German for the counterparts of (iib, c). Next, in the case of the human nominative DP in (iii a) (and its dative counterpart in German), there is affectedness implied (e.g., Hole 2006). This can be seen, for example, by the fact that such sentences are unacceptable in contexts where the human DP is no longer alive. Both properties point to the presence of an applicative head combining with an anticausative structure. This suggests that English, though it lost its morphological dative, still allows for some lexicalized instances of such an

(43) a. The temperature of the soup rose. b. The soup raised its temperature.

(44) a. The roof of the building burnt. b. #The building burnt its roof.

With this background, I can return to the second precondition on the formation of TrACs mentioned at the beginning of this subsection. There, I stated that all examples of TrACs identified so far are formed with verbs that also allow for a canonical anticausative use. This raises the hypothesis that a verb can form TrACs only if it also forms a canonical anticausative. Conversely, this would mean that a verb of change that only has a lexical causative use cannot form TrACs. In testing this hypothesis, we need to make sure, however, that any verb in question fulfills the other precondition on the formation of TrACs just discussed that it does not lexicalize any fixed scale of change.

While verbs that fulfill the latter two properties are rare, the German verb *drücken* under its resultative interpretation 'push-down/press-down' fits this characterization (Löbner 1979). In this use, featured in (45a), the verb can combine with various property concept nouns (price, temperature, volume, ...) and it asserts that the degree measured for some entity along the scale denoted by the noun is lower at the end of the event than at the beginning.²⁶ In (45a), the verb is construed a transitive, lexical causative verb. The internal argument position is filled by a property concept DP and the entity undergoing change is realized as the internal possessor of the property concept DP. Further, the measure phrase relates to the price scale (cent per kilo) as predicted by the property concept noun *Preis* (price). Thus, this verb shows the characteristics of a verb of change that does not lexicalize a fixed scale of change. (This verb also allows for a transitive PP-variant, not exemplified here). Turning to (45b), we see that this verb does not allow for a canonical anticausative use (whether with or without SE-marking). (45c), finally, shows that, as predicted by the hypothesis above, this verb also does not form the corresponding TrAC – the sentence can only have the conceptually odd interpretation that the potatoes caused their own price to become lower.

- (45) a. Die gute Ernte/ Der Großhändler drückte den Preis der Kartoffeln um 20c/kg.
the good harvest/the wholesaler depressed the price the.GEN potatoes by 20c/kg
'The good harvest/the wholesaler pressed down the price of potatoes by 20c/kg.'
- b. *Der Preis der Kartoffeln drückte (sich) um 20c/kg.
the price of.the potatoes pushed SE by 20c/kg
'*The price of potatoes pushed down by 20c/kg.'
- c. #Die Kartoffeln drückten ihren Preis um 20c/kg.
the potatoes pushed their price by 20c/kg
'#Potatoes pushed their price by 20c/kg.'

applicative head. Since this head no longer assigns inherent dative case, the canonical dependent case pattern (NOM-ACC) of English applies. For the examples featuring non-human DPs (nominative in (iiib, c), but necessarily dative in German), Hole (2006) equally develops an analysis involving a functional head similar in its logic to an applicative.

²⁶ In its extensional use, i.e., when it combines with an entity-denoting expression as its internal argument as in (ia, b), the verb is necessarily interpreted as an atelic, mono-eventive manner verb (cf. English *push, press*). As such, it no longer takes causer subjects and any kind of measure phrase is impossible as indicated by the underspecified measure phrase *um 10%* (by 10%).

- (i) a. Der Großhändler drückte die Kartoffeln (*um 10%).
the wholesaler pressed the potatoes by 10%
'The wholesaler pushed the potatoes (*by 10%).'
- b. *Die gute Ernte drückte die Kartoffeln (um 10 %).
the good harvest pressed the potatoes by 10%
'*The good harvest pressed the potatoes (by 10%).'

(46) provides a set of French examples that also support the above hypothesis. The verb *majorer* (to increase, magnify) can combine with various property concept nouns as its internal argument, for example *prix* (price) in (46a). (This verb also allows for a transitive PP-variant, not exemplified here). However, an external argument is obligatory as the verb lacks an anticausative variant (46b, c); (46c) only has a passive interpretation involving an implicit agent. Finally, the verb cannot form TrACs as the deviance of (46d) shows.

- (46) a. Les marchands ont majoré le prix de certaines pommes de terre.
 the merchants have bigger.ed the price of some apples of earth
 'The merchants marked up the price of some (types of) potatoes'
- b. *Le prix de certaines pommes de terre a majoré.
 the price of some apples of earth has bigger.ed
 'The price of some potatoes rose.'
- c. ?Le prix de certaines pommes de terre s'est majoré (only passive)
 the price of some apples of earth SE is bigger.ed
 'The price of some potatoes was marked up.'
- d. #Certaines pommes de terre ont majoré leur prix.
 some apples of earth have bigger.ed their price
 '#Some potatoes increased their price.'

In the absence of any counterexamples, I conclude that the availability of a canonical anticausative variant is a precondition for a verb to form TrACs.²⁷ (See section 4.3. for the question (tentatively answered negatively) whether a lexical causative variant is equally a precondition). This provides further, indirect evidence for the conclusion reached in section 3.1. that DP_{NOM} in TrACs does not carry any external argument θ -role.

4. The (morpho-)syntactic analysis of TrACs

In this section, I propose an analysis of the morpho-syntax and argument structure of TrACs. It is based on the theory of the causative alternation and (anti-)causative morphology developed in Schäfer (2008) and Alexiadou et al. (2015), the most relevant aspects of which are laid out in the following subsection.

4.1 The causative alternation and the active/passive alternation

Schäfer (2008) and Alexiadou et al. (2015) develop a theory of the causative alternation within the framework of Distributed Morphology (Halle & Marantz 1994), where word meaning is built in syntax by combining an a-categorial root with various layers of functional heads (e.g., Marantz 1997, 2007, Embick & Noyer 2007). The core of their analysis is illustrated with the English sentence pair in (47a) and (48a). The syntactic decomposition of the verbal domain of these sentences is given in (47b) and (48b), and the semantics computed from these structures are given in (47c) and (48c).

²⁷ To reconfirm this point, if the non-alternating verb *drücken* in the German examples in (45a-c) is replaced by an alternating verb close in meaning such as *verringern* (decrease), then the anticausative example in (45b) becomes available (with the reflexive pronoun *sich*), and, in turn, (45c) becomes a fully acceptable TrAC. Similarly for French, if the non-alternating verb *majorer* in (46a-d) is replaced by an alternating verb close in meaning such as *augmenter* (increase), an anticausative construal for the string in (46c) becomes available and, in turn, (46d) becomes a fully acceptable TrAC. I thank an anonymous reviewer for urging me to make explicit that the meanings aimed for in (45c) and (46d) can, in fact, be expressed by TrACs once an alternating verb is used.

- (47)a. John opened the door.
 b. [[John] Voice [$v_{\langle e \rangle}$ [$v_{\langle s \rangle}$ $\sqrt{\text{OPEN}}$ [the door]]]]
 c. $\lambda e \exists s. [\text{AGENT}(e, \text{John}) \ \& \ \text{CAUSE}(e, s) \ \& \ \text{OPEN}(s) \ \& \ \text{THEME}(s, \text{door})]$
 d. $[[\text{Voice}] = \lambda x \lambda e. (\text{AGENT}(x, e)) \ \text{or} \ \lambda x \lambda e. (\text{CAUSER}(x, e))]$
- (48)a. The door opened.
 b. [$v_{\langle e \rangle}$ [$v_{\langle s \rangle}$ $\sqrt{\text{OPEN}}$ [the door]]]
 c. $\lambda e \exists s. [\text{CAUSE}(e, s) \ \& \ \text{OPEN}(s) \ \& \ \text{THEME}(s, \text{door})]$

Central to this analysis is that lexical causative and anticausative verbs have the same vP-structure and, thereby, the same event structure complexity (cf. von Stechow 1996, Pylkkänen 2008, Martin & Schäfer 2014). Their vPs denote a complex event involving an event e and a state s predicated of the internal argument DP and the semantic relation between the event and the state is one of causation (Kratzer 2005).^{28/29} Whether the state is projected by the root itself or, as in the structures in (47b/48b), by a stative verbal head that is modified by the root, is under discussion (cf. Harley 2014). I assume the latter for expository reasons. While lexical causatives and anticausatives have the same event structure, they differ in that the former entail an external argument (agent or causer) while the latter do not. Following Kratzer (1996), an external argument variable is introduced by a Voice-head with the semantics in (47d) which is merged on top of the vP in (47b) and combines semantically with this vP via a rule of event identification. A DP merged in Spec, VoiceP saturates the variable introduced by Voice and, thereby, is assigned the thematic role of the agent (or causer) of the event introduced in the vP. To conclude, the analysis in (47) and (48) treats the causative alternation as a Voice alternation.

Depending on the language, Voice can come in different versions. This allows, for instance, the implementation of the Greek active/passive alternation, as seen in (49a, b). Greek has medio-passives, which are set aside from their active counterparts with the help of a 'non-active' (NACT) verbal affix.³⁰

- (49)a. I daskala katigori-Ø-se ti Maria.
 the teacher.NOM accused-ACT-3.sg the Mary.ACC
 'The teacher accused Mary.'
 b. I Maria katigori-th-ike (apo ti daskala).
 the Mary.NOM accused-NACT-3.sg by the teacher
 'Mary was accused (by the teacher).'

The active verb in (49a) involves $\text{Voice}_{\text{ACTIVE}}$, which fulfills two functions. Semantically, it introduces an external argument variable (50a). Syntactically, it selects for a DP in its specifier (50b). This DP saturates the variable and, thereby, receives its θ -role. The two functions are indicated by the feature set $\{\text{AGENT}, \text{D}\}$ on $\text{Voice}_{\text{ACTIVE}}$, the first introducing the agent (or causer)

²⁸ See Alexiadou et al. (2006, 2015), Schäfer (2012c) for arguments that anticausatives denote causative events and Martin (2020) for further elaboration of this proposal. Alexiadou et al. (2015) do not assume that the higher v-head is typed semantically as causative but that it denotes a simple event e . They follow Marantz (2007) in the idea that the causative relation between the event e and the state s is added at the CI-interface due to the syntactic adjacency of these heads (for related ideas, see Higginbotham 2000, Cuervo 2003, 2015, Ramchand 2008).

²⁹ For what follows it is only important that the eventive v-head in causatives and anticausatives is *syntactically* the same such that it can combine with thematic Voice in causatives and with expletive Voice in marked anticausatives (see on this below). Wood & Marantz (2017) develop a related theory that assumes that lexical causatives and anticausatives involve the same eventive v-head from a syntactic perspective, which however, is subject to allosemy: it is translated at the CI-interface into a CAUSE-event in causatives and into a BECOME-event in anticausatives.

³⁰ For passives which do not qualify as medio-passives (cf. Alexiadou & Doron 2012), for example periphrastic passives in English, French or German, I assume a different analysis (see Bruening 2013; cf. fn. 36).

are both marked with the same NACT-affix, the former lack an implicit external argument (Alexiadou et al. 2015).³¹ And even though German or French marked anticausatives are formed with the same reflexive morpheme (SE) as canonical reflexive verbs, the former are not semantically reflexive as they lack any external argument entailments (Schäfer & Vivanco 2016). More generally, these authors conclude that marked and unmarked anticausatives do not differ in grammatical meaning.³² To conclude, compared with unmarked anticausatives, marked anticausatives involve additional morpho-syntax that is otherwise associated with external argument entailments, but they do not involve any additional semantic component, in particular no external argument entailments. Marked anticausatives, thus, show a morpho-syntax/semantics mismatch. To resolve this empirical mismatch, the concept of 'expletive Voice' was proposed, a variant of canonical Voice that lacks any truth-conditional semantic impact (Schäfer 2008, Alexiadou et al. 2015; see also Wood 2014, 2015; Myler 2016; Wood & Marantz 2017; Kastner 2020). Theory-internally, the existence of expletive Voice is predicted by the conception of Voice above as involving a semantic and a syntactic feature or a subset of these features. According to this, each of the two Voice heads in (50b) and (51b), repeated in (53a, b), may have an expletive counterpart that lacks the thematic feature and, thus, does not introduce an external argument variable. The two expletive Voice heads differ in that one, like active Voice, has a D-feature (53c), while the other, like medio-passive Voice, lacks the D-feature (53d).

- | | |
|-------------------------------------|-----------------------------|
| (53)a. active Voice: | Voice _{AGENT, D} |
| b. medio-passive Voice: | Voice _{AGENT, ∅} |
| c. "active" expletive Voice: | Voice _{∅, D} |
| d. "medio-passive" expletive Voice: | Voice _{∅, ∅} |

(53c, d) lack a thematic feature, a shortcut for not introducing an external argument variable. Thus, these heads do not make any semantic contribution. Following Wood (2014, 2015), Alexiadou et al. (2015) assume that such expletive Voice heads denote the identity function over predicates of events as in (54), where P stands for an event predicate.

$$(54) \quad \llbracket \text{Voice}_{\text{expletive}} \rrbracket = \lambda P \lambda e. P(e)$$

Since (53d) lacks a D-feature, it does not project a specifier. This head is used in Greek to form marked anticausatives. The spell-out rule in (52) applies to this "medio-passive" expletive Voice head just as it applies to the medio-passive Voice head in (51b/53b). (53c) is used in Romance and Germanic marked anticausatives. Since (53c) has a D-feature, a nominal expression must merge. However, since Voice is expletive, it does not provide any external argument variable that this DP could saturate. If an ordinary DP (say *Mary* or *this person*) were merged, it would not receive any θ -role, and, consequently, it would fall victim to the Theta Criterion (Chomsky 1981). Only a DP that does not need a θ -role, and, thus, is not subject to the Theta Criterion, could survive in the specifier of expletive Voice. Schäfer (2008) and Alexiadou et al. (2015) call such a DP an "argument expletive": A DP that can formally merge in a potential argument position such as Spec, VoiceP but that lacks any meaning. Further, they

³¹ The most decisive test for this semantic difference between passives and (marked or unmarked) anticausatives is the 'by-itself' test (see Alexiadou et al. 2015, Schäfer & Vivanco 2016, and references there).

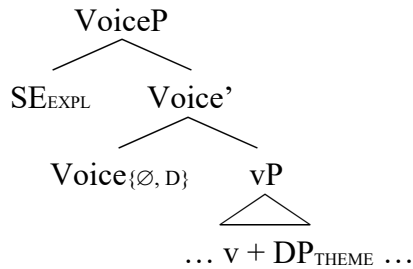
³² These authors discuss various claims to the contrary made in the literature (e.g., in Labelle 1992 for French, Folli 2001 for Italian, Koontz-Garboden 2009 for Spanish and Lundquist et al. 2016 for Norwegian anticausatives), and argue that the effects identified in this literature do not point to any truth-conditional meaning difference that could consistently be associated with the presence vs. absence of anticausative morphology. Schäfer & Vivanco (2016: fn. 18) as well as Martin & Schäfer (2014) and Martin et al. (ms.) suggest, however, that the presence of anticausative morphology can trigger pragmatic meaning effects in particular contexts.

argue that SE-reflexives (pronouns or clitics) qualify as argument expletives if they lack a local antecedent that would provide them with semantic content via binding. Following Wood (2014, 2015), expletive SE also denotes the identity function over predicates of events (cf. 55).

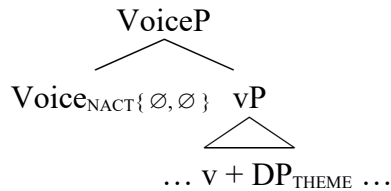
$$(55) \quad \llbracket \text{SE}_{\text{expletive}} \rrbracket = \lambda P \lambda e. P(e)$$

(56a, b) provide the structures of marked anticausatives in Germanic or Romance languages and in Greek. (57a-c) provide their semantic derivation. The meaning of (56a) and (56b) is identical as it is determined already in the vP that they share (cf. 57a). Adding expletive Voice in both, (56a) and (56b), does not change this meaning (cf. 57b) and adding the argument expletive SE in (56a) does not change this meaning either (cf. 57c). Thus, marked anticausatives have the same meaning as unmarked anticausatives which lack expletive Voice and only involve a vP (cf. 48a-c). Expletive Voice does, however, have morpho-syntactic effects known from canonical medio-passive and transitive structures. In (56b), the spell-out rule in (52) applies, and in (56a), the argument expletive in Spec, VoiceP makes the verb formally transitive.

(56) a. Romance/Germanic:



b. Greek:



- (57) a. $\llbracket \text{vP} \rrbracket = \lambda e. \exists s [\text{CAUSE}(e, s) \ \& \ \text{STATE}(s) \ \& \ \text{THEME}(s, \text{DP})]$
 b. $\llbracket \text{Voice}' \rrbracket = (\lambda P \lambda e. P(e)) (\lambda e. \exists s [\text{CAUSE}(e, s) \ \& \ \text{STATE}(s) \ \& \ \text{THEME}(s, \text{DP})])$
 $= \lambda e. \exists s [\text{CAUSE}(e, s) \ \& \ \text{STATE}(s) \ \& \ \text{THEME}(s, \text{DP})]$
 c. $\llbracket \text{VoiceP} \rrbracket = (\lambda P \lambda e. P(e)) (\lambda e. \exists s [\text{CAUSE}(e, s) \ \& \ \text{STATE}(s) \ \& \ \text{THEME}(s, \text{DP})])$
 $= \lambda e. \exists s [\text{CAUSE}(e, s) \ \& \ \text{STATE}(s) \ \& \ \text{THEME}(s, \text{DP})]$

The above structures raise several questions concerning case and agreement as well as the dual role of SE-reflexives as anaphors and as argument expletives. For reasons of space, I must refer the reader to Schäfer (2008) or Alexiadou et al. (2015) for a discussion of these aspects. Before turning to the analysis of TrACs, I will, however, lay out what I assume to determine the distribution of the various Voice heads above, i.e., whether a verb undergoes the causative alternation and whether it forms a marked or an unmarked anticausative.

Inherently agentive causative verbs (e.g., English *murder*) are generally assumed to lack an anticausative variant for a principled, conceptual-semantic reason. In turn, it is often implicitly assumed that verbs of change that are not inherently agentive should freely alternate (Haspelmath 1993, Levin & Rappaport Hovav 1995, Piñón 2001, Reinhart 2002, Reinhart & Sioni 2005). However, there are exceptions, in that some verbs of change that are not inherently agentive lack an anticausative variant (e.g., English *kill*, *destroy*, *poison*, ...; cf. Härtl 2003, Rappaport Hovav 2014) and some unaccusative verbs of change of state/location lack a lexical causative variant (e.g., English *arrive*, *disappear*). Furthermore, languages do not behave fully consistently here. For example, the present-day German verb meaning *delay* (*sich verspäten*) lacks a lexical causative use for most speakers, the verbs meaning *destroy* form anticausatives in Greek and French (Alexiadou et al. 2006, 2015; Martin 2023), and Japanese allows lexical causative uses of verbs like *arrive* and *disappear* (Volpe 2007). To cover this variation, I assume that some verbs of change are labeled to obligatorily combine with a Voice head introducing an external argument variable (e.g., English *destroy*), while other verbs are

prohibited to do so (e.g., English *arrive*). The feature system proposed to this end below leaves it open whether this is due to idiosyncratic, diachronic, or lexical-semantic factors.

As pointed out in the introduction, the synchronic behavior of individual anticausative verbs as appearing with or without anticausative morphology does not seem to be predictable on lexical-semantic grounds. Thus, it has to be learned and coded as an idiosyncratic, i.e., lexical property. Under the theoretical perspective developed above, the relevant information must be that alternating verbs forming marked anticausatives are subject to the idiosyncratic instruction that they must appear in the context of Voice, at least expletive Voice (i.e., this instruction is fulfilled whether Voice makes a semantic contribution or not). If an alternating verb can, but does not have, to appear in the context of Voice then such a verb should appear in the context of Voice only if Voice makes a semantic contribution. Such a verb should avoid expletive Voice for reasons of economy: Since expletive Voice makes no semantic contribution, and since nothing formally enforces the presence of a Voice head, it is cheaper to leave this head out. Thus, such a verb should form an unmarked anticausative.

The above reasoning then predicts four morpho-syntactically different types of verbs of change, and, for the sake of illustration and preciseness, I will code their behavior within a feature system of the type proposed in Ramchand (2008). Thus, in (58a-d), the roots underlying these four types of verbs are associated with idiosyncratic labels that express that they necessarily or optionally appear in the context of particular functional heads in their verbal spine. While these representations leave open many questions (e.g., fn. 33), they are intended to convey that this type of lexical information must be provided in some way to the grammar.

All four root types are characterized as necessarily appearing in the context of v_s and v_e , i.e., we are talking about change of state/location uses of roots. (58a) represents roots/verbs like English *kill*, *destroy*, or *clean*.³³ They must combine with thematic Voice introducing an agent or causer role (I use the shorthand $\text{Voice}_{\{\text{Theta}\}}$) and, thus, entail an external argument participant. A root as in (58b) must combine with Voice, at least expletive Voice, i.e., this root does not care about the semantic contribution of Voice ($\text{Voice}_{\{\text{Theta}/\text{Expl}\}}$). Since expletive Voice is connected with a phonological exponent, a root of type (58b) forms marked anticausatives.³⁴ (58c) represents roots that form unmarked anticausatives. Such a root optionally combines with Voice (as indicated by the parentheses); if Voice has semantic content, an external argument is entailed. If Voice is left out, no external argument is entailed. The latter meaning could also be derived by adding expletive Voice and, formally, the feature specification in (58c) allows the addition of expletive Voice. But since expletive Voice makes no semantic contribution and nothing enforces the presence of expletive Voice, general considerations of economy will prohibit the use of expletive Voice in the context of roots of type (58c).³⁵ However, I will argue below that there can be circumstances (i.e., TrACs) where such economy considerations no longer apply. (58d), finally, represents roots that are incompatible with external arguments and only have an unaccusative use (e.g., *arrive*). The representation in (58d) predicts the absence of anticausative morphology on such pure unaccusative verbs that lack a lexical causative variant. I will update this feature specification in section 5.

³³ I ignore that a verb like *destroy* is, at least from a diachronic perspective, morphologically complex, involving the root $\sqrt{\text{stroy}}$ and the prefix *de-*. The same holds for other prefixed verbs below.

³⁴ I assume that a functional projection can be stated (i.e., learned) only if it shows an effect at least at one interface, i.e., if it makes a meaning contribution or a phonological contribution (or both). The alternative that expletive Voice can be phonologically visible or silent (due to root-conditioned allomorphy) is developed in Wood (2014, 2015) and Wood & Marantz (2017) (cf. fn. 39).

³⁵ Verbs that form their anticausative optionally with or without extra morphology, such as French (*se*) *casser* mentioned in Section 1 or the Greek verb in (7b), have two lexical entries along the lines in (58b) and (58c). Thereby, the use of the extra morphology is not filtered out as being less economical. Many thanks to an anonymous reviewer for bringing up this point.

- (58) a. \sqrt{A} [$v_s, v_e, \text{Voice}_{\{\text{Theta}\}}$] (only lexical causative)
 b. \sqrt{B} [$v_s, v_e, \text{Voice}_{\{\text{Theta}/\text{Expl}\}}$] (alternates; marked anticausative)
 c. \sqrt{C} [$v_s, v_e, (\text{Voice}_{\{\text{Theta}/\text{Expl}\}})$] (alternates; unmarked anticausative)
 d. \sqrt{D} [v_s, v_e] (pure unaccusative; unmarked)

(58b, c) do not differentiate between the two versions of expletive Voice in (53c) ($\text{Voice}_{\{\emptyset, D\}}$) and (53d) ($\text{Voice}_{\{\emptyset, \emptyset\}}$). This raises the question what determines the choice between the two? A reasonable answer to why Greek chooses the "medio-passive" variant in (53d) is that Greek lacks a suitable argument expletive that could check the D-feature of (53c) without harm (Greek lacks SE-reflexives and, like English, only has heavy reflexive pronouns. Since heavy reflexives involve intensifiers (e.g., English *self*), they do not qualify as argument expletives). However, I will argue later that Greek and English can use (53c) in particular circumstances (i.e., TrACs). There is no synchronic answer as to why languages like German or French use (53c) but not (53d); the idea that these languages lack a spell-out rule as in (52) only shifts the question. Finally, what about the verbal morphology found with (a subset of) lexical causatives in languages like Turkish and Japanese? I assume that such languages have the mirror-image version of the Greek spell-out rule in (52). In these languages, Voice receives an exponent if its specifier is filled by a DP.³⁶ This rule must be further restricted by root-conditioned allomorphy, as the ultimate exponent of Voice in lexical causatives shows quite some variation in Japanese.

4.2 TrACs

With this background, I turn to the analysis of TrACs. Consider the sentences in (59a, b). (59a) involves a SE-marked anticausative verb whose internal argument DP_{NOM} (denoting a property concept) hosts a genitive possessor DP. (59b) provides the corresponding TrAC, where the possessor appears as DP_{NOM} and the internal argument DP (denoting the property concept) has accusative case. The feature specification in (59c) characterizes the formal behavior of the verbal root involved.

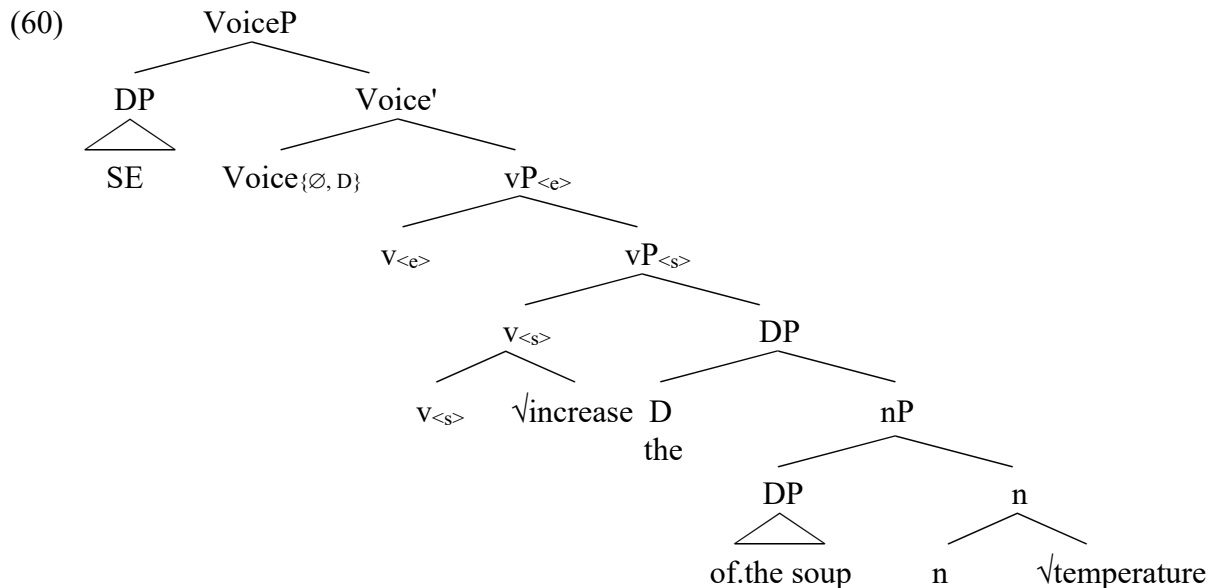
- (59) a. weil sich die Temperatur der Suppe erhöhte.
 as SE the temperature.NOM of.the soup increased
 'as the temperature of the soup increased.'
 b. weil die Suppe ihre Temperatur erhöhte.
 as the soup.NOM her temperature.ACC increased
 'as the soup increased its temperature.'
 c. \sqrt{B} [$v_{\langle s \rangle}, v_{\langle e \rangle}, \text{Voice}_{\{\text{Theta}/\text{Expl}\}}$] (alternates; marked anticausative)

The tree structures of (59a, b) are given in (60) and (61) with English glosses. I assume that nominal roots adjoin to a nominalizer *n* and that verbal roots adjoin to the lowest verbalizer *v*. The trees ignore that the verb in (59a, b) is morphologically complex involving a prefix. I introduce the internal argument as the complement of the lowest *v*-head; this is only for expository reasons (see Embick 2004b, Ramchand 2008 or Alexiadou & Schäfer 2011 for alternatives). Furthermore, I abstractly treat all types of possessors identically, thereby ignoring the difference between pre- and post-nominal possessors, genitive and prepositional possessors as well as full DP-possessors and possessive pronouns. For my proposal, it is only relevant that all possessive structures express the same semantic relation between an attribute and its holder.

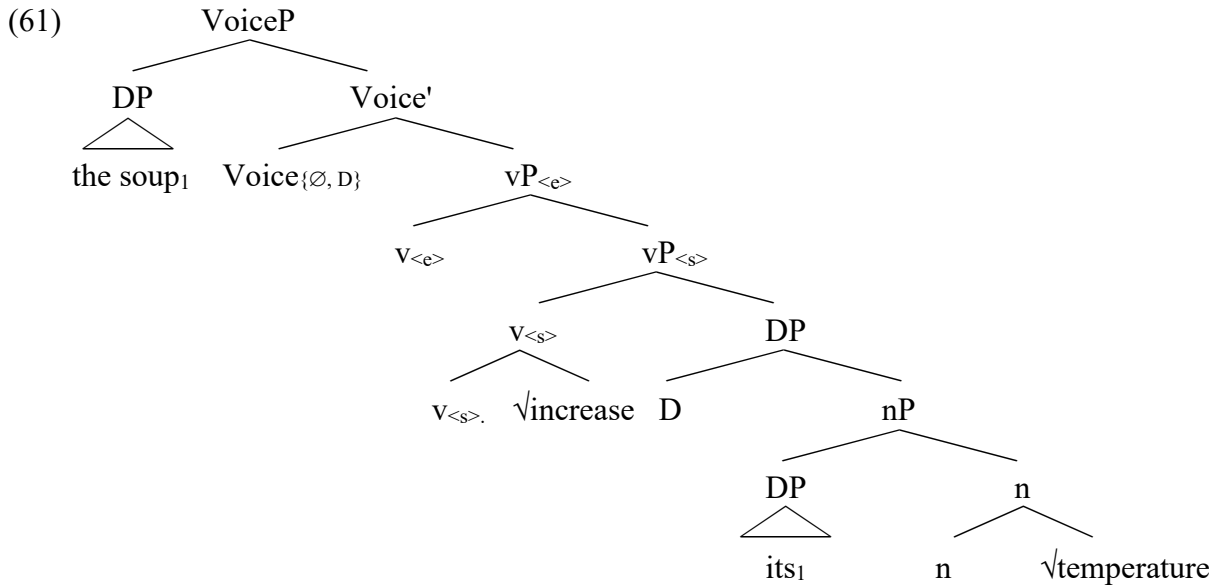
³⁶ In fact, the rule should be made sensitive to the presence of a D-feature on Voice because the causative morphology survives under passivization, where the external argument is only semantically present and not merged as a nominal expression in Spec, VoiceP . I assume that passives in these languages are not established at the level of VoiceP as in Greek but involve a PASS-projection selecting VoiceP as proposed in the theory of passives in Bruening (2013). Voice in such passives is active Voice in that it carries a D-feature, but this Voice head does not project a specifier because its D-feature is checked by the PASS-head above it.

Since this is an instance of inalienable possession, I treat the possessor as an argument of the N-head of the possessum (Myler 2016, Barker 2019).

Consider then the structure of (59a) in (60). The verb's internal argument is the (idealized) complex DP *the temperature of the soup*. The vP combines with expletive $\text{Voice}_{\{\emptyset, D\}}$ due to the idiosyncratic properties of the verbal root (cf. (58b/59c)). To check the D-feature on Voice, a nominal element must merge in Spec, VoiceP. Formally, any kind of DP could be merged there. However, the Theta Criterion restricts the options strongly. Since no θ -role is provided by Voice, only a nominal element that does not need a θ -role can be merged. SE, by assumption an argument expletive, fits this characterization. Due to SE lacking inherent phi-features (cf. Schäfer 2008), the internal argument DP triggers agreement on T and receives nominative.



Next, consider the structure of the TrAC in (59b) in (61). This structure is basically identical to the one of the SE-marked anticausative above in that it involves the very same version of $\text{Voice}_{\text{Expl}}$ selecting for a DP in its specifier. In this formal sense, both (60) and (61) involve, thus, transitive anticausatives. Two differences hold, however: First, the possessor of the internal argument is realized as a possessive pronoun in (61). This, itself, does not yet constitute a real difference as this is possible in a canonical anticausative if the possessor is contextually salient (cf. *'What about the soup? Its temperature increased.'*). Second, the full possessor DP is merged in Spec, VoiceP, where it c-commands and binds the possessive pronoun inside the internal argument DP in (61).



As the structure in (60), (61) involves the active version of expletive Voice ($\text{Voice}_{\{\emptyset, D\}}$). The D-feature triggers Merge of the DP_{NOM} *the soup* in Spec, VoiceP , but since Voice does not assign any θ -role, why does this DP not fall victim to the Theta Criterion (Chomsky 1981)?

The Theta Criterion requires each DP to be assigned a θ -role. Semantically, this means that the DP must be interpreted as the argument of some predicate. This requirement (which I call ‘thematic integration’) is fulfilled in TrACs. While DP_{NOM} is not interpreted as an argument of the verb/Voice (cf. the conclusions in section 3.1.4.), it is obligatorily interpreted as the possessor of the internal argument DP_{ACC} , more concretely, as the holder of the attribute denoted by DP_{ACC} (Recall from section 3.2. that I lack an ultimate explanation as to why other possessive relations are not possible in TrACs (cf. (43) vs. (44)), thus, the proposal laid out here overgenerates).

However, the Theta Criterion requires, for good reasons, that θ -roles are assigned locally under m-command. Thus, DP_{ACC} cannot have assigned its possessor role directly to DP_{NOM} in Spec, VoiceP . The locality of θ -role assignment could be upheld if the derivation of TrACs involved possessor raising. DP_{NOM} would be externally merged in the possessor slot inside the internal argument DP (as in (60)), from where it A-moves to check the D-feature of $\text{Voice}_{\text{Expl}}$, thereby ending up in Spec, VoiceP as in (61). However, there are arguments against possessor raising in TrACs (though I do not want to exclude the possibility of languages that form TrACs this way). First, many of the languages discussed in section 2 can, and often must feature an overt possessive pronoun inside of DP_{ACC} in TrACs, and such possessive pronouns are typically taken as an argument against possessor raising (Deal 2017).³⁷ Second, possessor raising would be an instance of left branch extraction, which is otherwise not attested in, for example, English, French, or German. Finally, if the D-feature on Voice in (61) could be checked via internal Merge/movement, then it is hard to prohibit that the full internal argument DP in (60) moves to Spec, VoiceP and, thereby, prohibits anticausative morphology (see the discussion of the lack of anticausative morphology in TrACs below).

To conclude, DP_{NOM} in TrACs is interpreted as the possessor of DP_{ACC} , but neither canonical θ -role assignment nor possessor raising can achieve this. TrACs, therefore, imply that the Theta Criterion only requires that a DP is thematically integrated, i.e., receives an interpretation as an argument of a predicate. This can be reached via local θ -role assignment (a

³⁷ The presence of a possessive pronoun saturating the possessor slot of DP_{ACC} also argues against ‘delayed gratification’, a mechanism proposed to handle instances of long-distance θ -role assignment, whereby a predicate’s open variable is semantically passed up the tree so that a DP merged in some distance from the predicate can saturate this variable (see Wood 2014, 2015, Myler 2016, Wood and Marantz 2017).

process that I understand as saturation of a predicate’s variable). But TrACs suggest that a DP can be thematically integrated into a (complex) argument-predicate structure also via co-valuation with a pronoun that has, itself, saturated the variable introduced by some predicate. In (61), the possessive pronoun saturates the possessor variable provided by the property noun *temperature* and DP_{NOM} is thematically integrated into the structure of TrACs as it is obligatorily co-valued with this pronoun by binding it.³⁸ Thematic integration via co-valuation is not unprecedented. In the hanging-topic left-dislocation structures in (62a, b), the sentence-initial DP *the soup* is base-generated in a position where it cannot be assigned a θ -role. Still, it does not fall victim to the Theta Criterion, arguably because it is co-valued with a pronoun in a θ -position, in (62b) with a possessive pronoun. (62b) has the same truth-conditional meaning as the corresponding structure in (62c) without left-dislocation, but left-dislocation has the information structural effect of shifting the sentence topic. As mentioned in section 3, TrACs and their canonical anticausative variants equally differ in information structural packaging.

- (62) a. *The soup* - we will serve *it* now.
 b. *The soup* - I do not like *its* taste/temperature/color.
 c. I do not like the taste/temperature/color of the soup.

There are also apparent differences between TrACs and hanging-topic left-dislocation. One relates to the mode of co-valuation, binding in TrACs vs. coreference in left-dislocation, but most importantly for our purposes, DP_{NOM} in TrACs is located in Spec,VoiceP, and this has several morpho-syntactic consequences. First, the structure in (61) predicts the absence of anticausative morphology even though the structure is semantically anticausative. Since Voice has exactly one D-feature triggering external Merge, SE and the possessor DP_{NOM} are predicted to be in complementary distribution in Spec,VoiceP. In languages like Greek, anticausative morphology is triggered by the spell-out rule in (52), which applies if Spec,VoiceP is empty. Since Spec,VoiceP is filled in (61), the rule is predicted not to apply (I turn to the availability of "active" expletive Voice in Greek below). Similarly, (61) predicts the presence of causative morphology in languages like Turkish or Japanese, as the relevant Voice heads in these languages are assumed to be subject to the mirror-image of the spell-out rule in (52), which reflects morphologically that Spec,VoiceP is filled.³⁹ Further, TrACs assign accusative even though they do not assign an external argument θ -role, in violation of Burzio's Generalization (BG; Burzio 1986). The literature has shown that violations of BG are real and systematic and, both, the effects originally subsumed under BG as well as its exceptions are best captured within

³⁸ As mentioned in section 2, Japanese and Turkish realize DP_{ACC} in TrACs as a bare noun. I assume that a covert possessive pronoun inside DP_{ACC} gets bound by DP_{NOM} in these languages. As mentioned in fn. 3, at least in German, some TrACs allow to replace the possessive pronoun in DP_{ACC} with a definite determiner. The properties of definite possessives have been prominently investigated in the context of inalienable possession constructions involving body parts as in (i). Two broad types of analysis have been proposed for structures as in (i) with a definite DP_{ACC}, either as involving raising of the possessor DP out of the DP_{ACC} (see, e.g., Landau 1999, Nakamoto 2010) or as involving some kind of binding relation between DP_{NOM} and the possessor slot inside of DP_{ACC} (see, e.g., Gueron 1985, Vergnaud & Zubizarreta 1992, Koenig 1999 for quite different implementations of such a binding relation). As said in the main text, both types of analyses are, *prima facie*, compatible with my analysis of TrACs.

(i) Er hob seine Hand/ die Hand.
 He.NOM raised his hand.ACC/the hand.ACC
 'He raised his hand.'

³⁹ Wood & Marantz (2017) provide an analysis of causative morphology in Japanese adversity causatives whose logic is like the one presented here (though these authors do not assume binding but 'delayed gratification' (cf. fn. 37) for the thematic integration of the DP_{NOM} as a possessor of DP_{ACC}). However, there are important differences between adversity causatives and TrACs. First, the possessive relation is of a different type in TrACs than in adversity causatives (attribute-holder vs. kinship relation). Second, the DP_{NOM} in adversity causatives is not only a possessor but it also receives the role of an affected argument from the functional head hosting it.

a theory of dependent case (Marantz 1991, Baker 2015, Schäfer & Anagnostopoulou, to appear, for a recent review). In a dependent case theory, the distribution of nominative and accusative case in TrACs finds the very same explanation as in canonical lexical causative structures. For two DPs within the same local domain (VoiceP), and both without lexical or inherent case, the one c-commanded by the other receives dependent accusative, the one that is not c-commanded, receives default nominative. Finally, the observation that TrACs necessarily select the auxiliary *have* can equally be related to Spec,VoiceP being filled by a DP (Schäfer 2008; Myler 2016). *Have*-selection, like morphological accusative, is, thus, ultimately a response to a syntactic property; it is not a response to the verb assigning an external argument θ -role (pace, e.g., Haider & Rindler-Schjerve 1987). German marked anticausatives also select *have* because the specifier of VoiceP is filled by a DP (a SE-reflexive pronoun). Romance SE-marked anticausatives, on the other hand, typically select *be*. This cannot refute the proposal that marked anticausatives in Romance also feature SE in Spec,VoiceP. It is an independent property of the Romance clitic SE that it shifts *have* to *be*, as the same happens in semantically reflexive construals including anaphoric direct and, crucially for theoretical reasons, even indirect object SE. Further, there are Romance dialects where all structures involving the SE-clitic feature *have* while unmarked anticausatives select *be* (Manzini & Savoia 2001, 2007).

4.3. The distribution of expletive Voice

In this section, I take up three empirical observations about TrACs that need some further discussion in light of the proposal that TrACs involve 'active' expletive Voice in (53c).

First, if TrACs involve expletive Voice projecting a specifier, such a specifier must be available even in languages like Greek where expletive Voice used in canonical marked anticausative does not project a specifier and, thus, is realized with NACT-morphology due to the spell-out rule in (52). I conclude that the choice between (53c) (Voice_{Expl} with D-feature) and (53d) (Voice_{Expl} without a D-feature) is not a parameter set once and for all in individual languages (pace Schäfer 2008, Alexiadou et al. 2015). Instead, the variant with D-feature must, in principle, be available across languages. Which one is used to form marked anticausatives depends on the morpho-syntactic means otherwise available in a language. Greek normally does not use 'active' Voice_{Expl} in (53c) because it lacks a suitable argument expletive (SE). Since TrACs provide a context in which checking the D-feature on active Voice_{Expl} becomes possible with an ordinary DP carrying semantic content, Greek can use this Voice head in TrACs.

Second, since TrACs involve Voice_{Expl}, it is, prima facie, surprising that roots forming unmarked canonical anticausatives can form TrACs (cf. examples in (5), (6), (9a), (10a)). Such roots were characterized as involving the feature specification in (58c) repeated in (63).

(63) $\sqrt{C} [v_{<s>}, v_{<e>}, (\text{Voice}_{\{\text{Theta}/\text{Expl}\}})]$ (alternates; unmarked anticausative)

This specification says that roots of this type can combine with Voice_{Theta} and Voice_{Expl}, but are not forced to do so. When they combine with Voice_{Theta}, an external argument is entailed. According to (63), such roots can formally also combine with Voice_{Expl}. However, I argued that the use of Voice_{Expl} is filtered out as uneconomical in the formation of canonical anticausatives because i) its presence is only possible but not enforced (cf. the brackets expressing optionality in (63)) and ii) the presence vs. absence of Voice_{Expl} has no semantic effect (cf. fn. 32). In order to allow roots characterized by (63) to combine with Voice_{Expl} to form TrACs, ii) should, thus, not apply in TrACs. Indeed, TrACs differ from their canonical anticausative variant in their information structural partitioning. Further, they involve a binding relation between DP_{NOM} and the possessive pronoun in DP_{ACC}. However, I would suggest that both effects are only consequences of the relevant property that switches off ii) in TrACs: Spec,VoiceP is filled by a DP that does make a semantic contribution because it does carry inherent semantic content

(and, indirectly, receives a possessor role). Thus, the economy considerations on the use of $\text{Voice}_{\text{Expl}}$ that normally apply with roots of type (63) do not apply in TrACs.

English only forms unmarked anticausatives (recall that English lacks SE-reflexives). Under the present proposal, this means that English anticausatives lack $\text{Voice}_{\text{Expl}}$ (cf. fn. 34). In TrACs, however, English makes available a sentence internal specifier for DP_{NOM} . This DP does not receive a θ -role from the verb but it controls verbal agreement. That this position is, indeed, the canonical external argument position, Spec, VoiceP , can be concluded from TrACs involving the verb *rise/raise* (cf. 25a-c), one of the few English verbs where the transitivity of the lexical causative variant is morphologically reflected via stem allomorphy. Thus, English allows $\text{Voice}_{\text{Expl}}$ with a D-feature if this D-feature can be checked.⁴⁰

Finally, recall from section 3.2. that lexical causative verbs that lack a canonical anticausative variant cannot form TrACs even if they do not lexicalize a fixed scale. This is formulated in (64a). (64a) raises the question of how 'pure unaccusative' verbs, verbs of change of state or location that lack a lexical causative variant, behave concerning the formation of TrACs. Does, as a further restriction on TrACs, (64b) hold true?

- (64) a. A root can form a TrAC iff it can form a canonical anticausative verb.
 b. A root can form a TrAC iff it can form a lexical causative verb. (to be rejected)

I read (64a) as a lexical-semantic correlation. Since TrACs do not come with any external argument entailments, they are possible only with roots that are not lexically or conceptually enforced to carry such entailments. (64b), on the other hand, looks like a formal syntactic correlation. TrACs merge a non-canonical external argument in Spec, VoiceP , and this might only be possible with roots that allow for a canonical use of Spec, VoiceP anyway.

In (58d), I had given a preliminary characterization of roots forming pure unaccusatives. This is repeated in (65a). Such roots do not combine with any type of Voice , whether thematic or expletive. If this characterization is correct and exhaustive, (64b) should hold. Further, it would predict that pure unaccusatives never appear with the kind of morphology that we find on marked anticausatives.

- (65) a. $\sqrt{\text{D}} [\text{v}_{\langle \text{s} \rangle}, \text{v}_{\langle \text{e} \rangle}]$ (pure unaccusative; unmarked, TrACs excluded)
 b. $\sqrt{\text{D}} [\text{v}_{\langle \text{s} \rangle}, \text{v}_{\langle \text{e} \rangle}, (\text{Voice}_{\text{Expl}})]$ (pure unaccusative; unmarked, TrACs not excluded)
 c. $\sqrt{\text{D}} [\text{v}_{\langle \text{s} \rangle}, \text{v}_{\langle \text{e} \rangle}, \text{Voice}_{\text{Expl}}]$ (pure unaccusative; marked, TrACs not excluded)

However, from a formal perspective, the characterizations in (65b,c) are equally conceivable. Verbs formed from such roots would also be pure unaccusatives as they would lack a lexical causative variant due to the unavailability of $\text{Voice}_{\text{Theta}}$. But they would combine, optionally or obligatorily, with $\text{Voice}_{\text{Expl}}$. The canonical unaccusative variant would be morphologically unmarked in the case of (65b) due to economy considerations discussed above and morphologically marked in the case of (65c). Further, roots of both types should, in principle,

⁴⁰ As an architectural alternative (see Wood 2014, 2015, Wood & Marantz 2017), one could assume that verbs undergoing the causative alternation by definition combine with Voice , either $\text{Voice}_{\text{Theta}}$ to form lexical causatives or $\text{Voice}_{\text{Expl}}$ to form anticausatives or TrACs. In English, $\text{Voice}_{\text{Expl}}$ would always remain covert under this proposal (cf. fn. 34). For a language like Greek, the difference between marked and unmarked anticausatives could be implemented by assuming that the rule in (52) applies to $\text{Voice}_{\text{Expl}}$ only in the context of a set of particularly listed roots. For languages like German or French, one could assume that roots forming marked anticausatives select for $\text{Voice}_{\text{Expl}}$ with D-feature such that SE must be merged while roots that form unmarked anticausatives select for $\text{Voice}_{\text{Expl}}$ without D-feature such that SE is not merged. However, since there are roots that form unmarked anticausatives as well as TrACs (in French, at least), we would still need some reasoning as to why a specifier on $\text{Voice}_{\text{Expl}}$ becomes available if and only if such a root appears in TrACs. I leave it open to future research whether the mentioned architectural alternative makes different empirical predictions than the proposal in the main text.

be able to form TrACs (or, terminologically more consistent, they should be able to form 'transitive unaccusatives'; having clarified this, I will stick with the term TrAC for simplicity).

To investigate whether (65b, c) are possible, we need to identify pure unaccusative verbs that do not lexicalize a fixed scale of change. The German verb *fallen* (to fall) is a case in point. This verb does not lexicalize a fixed dimension of change as it is compatible with various property concept nouns (e.g. *prize, temperature, speed, volume, mood, ...*) in its internal argument position.⁴¹ This is exemplified in (66). (This verb also forms the PP-variant, not exemplified here). (67a) shows that the verb lacks a lexical causative variant. And (67b) shows that the verb does not form the corresponding TrAC.

- (66) a. Der Preis des neuen iPhones fiel schnell.
the price of.the new iPhone fell quickly
'The price of the new iPhone fell quickly.'
- (67) a. *Der Wettbewerb/Die Industrie fiel den Preis des neuen iPhones schnell.
the competition/the industry fell the price of.the new iPhone quickly
'The competition/the industry made the price of the new iPhone fall quickly.'
- b. *Das neue iPhone fiel schnell seinen Preis.
the new iPhone fell quickly its price
'The new iPhone fell quickly in its price.'

I have not found any pure unaccusative verb in German that forms TrACs.⁴² While this is compatible with the hypothesis in (64b), there is evidence that roots of type (65b, c) exist. While most pure unaccusatives in French also do not form TrACs, at least one verb does, apparently for purely idiosyncratic reasons. Consider the two French unaccusative verbs *tomber* (to tumble, to fall) and *chuter* (to fall). These verbs are essentially synonymous. Like German *fallen* (to fall), both combine with various property concept nouns in their internal argument position. This is exemplified in (68a, b) with examples from the internet. (These verbs also form the PP-variant, not exemplified here). Finally, (69a) shows that both verbs lack a lexical causative use. To express such a causative meaning, a periphrastic construction as in (69b) must be used.

- (68) a. Le prix de l'essence tombe enfin.
the price of the gas falls finally
'Gasoline prices are finally falling.'
- b. Le prix de la console chute sur Amazon.
the price of the console falls at Amazon
'The console price drops on Amazon.'
- (69) a. *Le président/ le beau temps tombe/chute le prix du pétrole.
the president/the good weather falls / falls the price of.the oil
- b. Le président/le beau temps fait tomber/chuter le prix du pétrole.
the president/the good weather makes fall/ fall the price of.the oil
'The president/the good weather caused the oil price to fall.'

⁴¹ For examples where the verb combines with a DP of type <e> in its internal argument position (*The rock fell*), one could assume that the verb is associated with a default scale. Alternatively, this verb could be polysemous between a verb of change with and without a lexicalized scale (cf. the discussion of *r(a)ise* in section 3.2).

⁴² (i) lists some further German unaccusative verbs that behave similar to *fallen* in (66) and (67a, b).

(i) (an)wachsen (*grow (up)*), (an)steigen (*rise (up)*), klettern (*climb*), hochgehen (*go up*), schrumpfen (*shrink*), zurückgehen (*go back*)

So far, the two verbs behave the same. When it comes to TrACs, however, they differ. While TrACs formed with *tomber* are strictly ungrammatical, TrACs with *chuter* are well-formed. Two examples of TrACs formed with *chuter* from the internet are given below.

- (70) a. Cette Smart TV chute son prix.
 this Smart TV falls its price
 'This Smart TV drops its price.'
- b. Le Xiaomi le moins cher avec 5G chute son prix dans PcComponentes.
 the Xiaomi the less expensive with 5G falls its price in PcComponentes
 'The cheapest Xiaomi with 5G drops its price in PcComponents.'

Thus, while the behavior of French *tomber* is correctly characterized by the specification (65a), the behavior of *chuter* is, in fact, correctly characterized by the specification in (65b). It does not combine with Voice_{Theta}, but it combines with Voice_{Expl} to form TrACs. This shows that the hypothesis in (64b), while describing a strong tendency, is not a conceptual necessity.

Finally, roots of type (65c) exist, too. Such roots only form unaccusative verbs, and these are necessarily marked with "anticausative" morphology. Two German examples are *sich erkälten* (get a cold) and *sich verspäten* (delay). These verbs are instances of inherently reflexive verbs in that the reflexive pronoun *sich* (SE) cannot be replaced by a referential DP (cf. deponent verbs in Greek that necessarily appear with NACT-morphology). For earlier stages of German, lexical causative uses of these verbs are attested, but they became obsolete over time (Kunze 1995). Further, these verbs are unaccusative in so far as their full DP argument is an internal argument of the verb. This can be concluded, for example, from the observation that these verbs allow for a prenominal use of their perfect participles (see footnote for examples).⁴³

5. Locating (anti-)causative morphology in grammar

To recap, across languages, verbs undergoing the canonical causative alternation can be subject to particular morphological marking strategies such that their lexical causative variant or their anticausative variant is obligatorily marked with an extra morpheme, typically called causative and anticausative marker, respectively. Further, a particular subset of verbs undergoing the causative alternation allows, besides a canonical anticausative construal, a non-canonical anticausative construal involving a DP_{NOM} and a DP_{ACC}, called transitive anticausative (TrAC). The relation between the two construals is characterized by three observations: i) A verb's canonical anticausative construal and the corresponding TrAC are truth-conditionally

⁴³ By far not all inherently reflexive verbs are unaccusative in this sense. Many of them are unergative in so far as their full DP behaves like an external argument (cf. Kunze 1995 for a discussion of many German examples). *sich beeilen* (to hurry), *sich sonnen* (to sunbathe) or *sich wehren* (to defend oneself) are examples. These verbs, too, had canonical transitive uses at earlier stages of the language. As is normal for transitive verbs, they could be reflexivized (e.g., *to defend someone* vs. *to defend oneself*). The reflexive uses became more and more frequent until the disjoint uses became obsolete. Consequently, their full DP is an external argument, and *sich* (SE) is (the residue of) an internal argument anaphor (cf. Schäfer 2012b). As predicted by this analysis, these verbs do not allow for a prenominal use of their perfect participles (ib) while SE-marked unaccusatives do (iib). Further, their DP_{NOM} behaves like an agent in that it must be able to control the verbal event while this is not the case with SE-marked unaccusatives (cf. (ia) vs. (iia)).

- | | | | |
|---------|---|----|---|
| (i) a. | Der Mann/??Der Zug/*Der Monsun beeilte sich.
the man/ the train/ the monsoon hurried SE
'The man/??train/*monsoon hurried.' | b. | *der beeilte Mann/Zug/Monsun
the hurried man/train/monsoon
'*the hurried man/train/monsoon' |
| (ii) a. | Der Mann/der Zug/der Monsun verspätete sich.
the man / the train/the monsoon delayed SE
'The man/train/monsoon was late.' | b. | Der verspätete Mann/Zug/Monsun
the delayed man/train/monsoon
'the late man/train/monsoon' |

equivalent. Both express anticausative semantics lacking any external argument entailments. ii) TrACs never feature anticausative morphology, even if their verb is obligatorily marked in its canonical anticausative use. iii) TrACs necessarily feature causative morphology if their verb is obligatorily marked in its lexical causative use. All in all, TrACs show the semantics of their canonical anticausative variant but the morpho-syntax of their lexical causative variant.

One theoretical conclusion from TrACs is then that anticausative semantics must be dissociated from anticausative morphology (cf. Embick 1997, 2004, Schäfer 2008, 2017, and Alexiadou et al. 2006, 2015, who arrive at this conclusion because the morphology found on anticausatives is often also found with semantically different diatheses such as generic middles or passives) and lexical causative morphology must be dissociated from causative semantics. Even if these kinds of morphology and semantics strictly correlate in a verb's canonical causative or anticausative use, this correlation breaks down in TrACs.

The property of TrACs triggering this breakdown is their formal transitivity featuring a DP_{NOM} and a DP_{ACC} . Crucially, this transitivity results from cross-breeding in syntax two argument structural domains, the domain of the verb and the domain of the verb's internal argument, a property concept noun. The possessor of the latter is realized in the canonical external argument position of the former. As a second conclusion then, the circumstances under which this correlation between morphology and semantics breaks down cannot be characterized by any lexical-semantic properties of the verb involved including its causative or anticausative argument structure, but they are decisively syntactic in nature. More generally, when syntactic circumstances bleed the correlation between semantics and morphology, this means that this correlation is negotiated at the level of syntax.

The syntactic theory of the causative alternation developed in the previous section can handle the breakdown of the correlation between (anti-)causative morphology and (anti-)causative semantics because i) it anchors the presence of (anti-)causative morphology in properties of the syntactic structure, in particular of Voice and because ii) different syntactic structures can lead to anticausative semantics. Thereby, the theory makes use of the architectural design of grammar argued for in Distributed Morphology (Halle & Marantz 1993, 1994, Alexiadou et al., to appear) and related theories where morphology is assumed to interpret and realize syntactic structure and syntactic structure provides the input to the computation of semantics. The theory proposed acknowledges an abstract lexical residue underlying anticausative morphology. Roots canonically forming marked anticausatives have the idiosyncratic property to necessarily appear in the context of Voice (cf. 58b). But the syntax of Voice can vary, and this variation is reflected in the morphology.

6. Conclusions

This article investigated transitive anticausatives (TrACs, cf. *The water raised its temperature*), which can be found in various languages from different language families. The morpho-syntax of TrACs is transitive, as they feature two DPs with structural case, an external argument DP_{NOM} , and an internal argument DP_{ACC} , select auxiliary *have*, and their verb appears in its canonical transitive morphological shape. Despite being morpho-syntactically an external argument, DP_{NOM} in TrACs does not receive any external argument θ -role from the verb. TrACs denote anticausative events of change, logically entailed by their canonical anticausative counterpart (*The temperature of the water rose*).

A key property of TrACs and their canonical anticausative variants is the possessive relation introduced inside the verb's internal argument DP. TrACs can only be formed with verbs of change allowing for a DP in their internal argument position to specify the (scalar) property along which the verb measures change. Such a DP selects a possessor, which is interpreted as the holder of the property characterized by this DP. Such a holder can be expressed in the syntax of internal possession, leading to a canonical anticausative construal,

or in the syntax of external possession, leading to the construal as TrAC. Since TrACs are logically entailed by their canonical anticausative counterparts, I concluded that DP_{NOM} in TrACs does not receive any θ -role from the verb at all but it is merely interpreted as the possessor of the internal argument DP via binding a possessive pronoun inside the latter.

While TrACs denote anticausative events, they never feature anticausative morphology even if their verb must do so in its canonical anticausative construal. Relatedly in causativization languages, even though TrACs denote anticausative events, they obligatorily feature causative morphology if the verb does so in its canonical lexical causative construal. TrACs, thus, feature a morphology-semantics mismatch, which indicates that so-called anticausative and lexical-causative morphology is only imperfectly correlated with the respective semantics. To derive this imperfective correlation, I analyzed TrACs within the syntactic theory of the causative alternation developed by Schäfer (2008) and Alexiadou et al. (2015). In this framework, the presence of (anti-)causative morphology is ultimately computed based on formal syntactic information, namely whether the canonical external argument position (Spec, VoiceP) is filled by a DP or not. The interpretation of this DP as a canonical external argument, as in lexical causatives, or merely as the possessor of the internal argument DP, as in TrACs, does not matter. Whether this ultimate analysis of TrACs turns out to be on the right track or not, I hope to have convinced the reader that TrACs should inform our theorizing on the causative alternation and the architecture of grammar more generally. TrACs point to an architecture of grammar where morphology interprets syntax and syntax feeds the semantic component.

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