

Break + theme combinations and the causative alternation

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I INTRODUCTION

Break is the epitome of change of state verbs that participate in the causative alternation. In fact, change of state verbs that show the causative alternation are referred to as *break*-verbs (Acedo-Matellán and Mateu 2014; Fillmore 1970; Hale and Keyser 1987; Levin 2017; Majid, Boster, and Bowerman 2008; Majid et al. 2017). However, for certain choices of theme argument, *break* does not alternate. These *break* + theme combinations show either only transitive or only intransitive uses.

Previous literature on the topic has concentrated on the transitive-only *break* + theme combinations, such as *break* + norm and *break* + record. The explanation offered for the obligatory transitivity of these combinations is that they describe events that necessarily require the intervention of an agent to be brought about (Alexiadou, Anagnostopoulou, and Schäfer 2006; Levin and Rappaport Hovav 1995; Piñón 2001). Obligatory agentive events cannot be expressed intransitively. A closer look at the empirical landscape shows that there are multiple examples of these combinations in which the subject is not agent, not even an animate entity. These examples seriously undermine the agent-based explanation for the nonalternation of these *break* + theme combinations.

This paper proposes a different account of the causative alternating behavior of *break* + theme combinations. The account proposes that *break* + theme combinations differ as to whether they require, allow, or prohibit the addition of a second participant in the lexical semantic level. *Break* + theme combinations which require the addition of a second participant will be obligatorily transitive; those which allow the addition of a second participant will show the alternation; whereas those which prohibit the addition of a second participant will be obligatorily intransitive.

In section 2, I examine in detail the empirical landscape of *break*. This examination is based on a corpus study of the verb *break* which I conducted. The discussion will allow us to establish which *break* + theme combinations alternate and which do not. It will also show that the agent-based explanation for the obligatory transitivity of certain *break* + theme combinations is empirically unmotivated.

Section 3 is the bulk of the paper. I first establish the desiderata that an analysis of the nonalternating behavior of *break* + theme combinations should have. In doing this, I show why previous explanations offered in the literature for the nonalternation of certain *break* + theme combinations are inadequate. Then, in section 3.2, I consider two approaches to the lexical semantics of *break* that meet the desiderata stated in the previous section. I adopt an approach which proposes that the meaning of the root *break* is minimally specified. The combination of the root with its theme argument yields a more specific meaning. At the root + theme level, depending on the meaning of the combination, *break* + theme combinations may require the addition of a second participant, allow the addition of a second participant,

or prohibit this addition. The first is the case for obligatorily transitive *break* + theme combinations; the second is the case for alternating combinations; while the latter is the case for the intransitive-only *break* + theme combination. What type of participant may be added is determined by the Direct Causation Condition (Rappaport Hovav and Levin 2012). Section 3.3 discusses the mapping of arguments from the lexical semantics level to the syntactic level. When a second participant is not added to the *break* + theme combination, then there is a single participant to be mapped onto the syntactic structure, the theme. This participant is mapped onto the complement position of the verb, from which it undergoes movement to Spec,TP. The result is an intransitive sentence. When a second participant is added to the *break* + theme combination – either in obligatorily transitive combinations or in transitive uses of alternating combinations – the two participants of the root are ranked with respect to each other in accordance with the Thematic Hierarchy. Then, as per Larson’s (1988) hierarchy-aligning algorithm, the lowest-ranked participant is mapped onto the lowest syntactic position, while the next lowest-ranked participant is mapped onto the next lowest syntactic position. The algorithm maps the theme onto the complement position of the verb, and the causer (or, in some cases, experiencer) participant is mapped onto a higher position. The derivation yields a transitive sentence.

Part of the motivation for the analysis proposed in section 3 is that the agent-based explanation for the nonalternation of *break* + theme combinations is empirically unmotivated. However, though there are multiple examples of obligatorily transitive combinations which do not have an agent subject, there are certainly other examples in which the subject of the *break* + theme combination is interpreted agentively. Section 4 discusses where the agentive interpretation of these examples comes from, given that obligatorily transitive combinations, such as *break* + norm and *break* + record, do not require the intervention of an agent. Following Van Valin and Wilkins (1996), I propose that these agentive interpretations are pragmatically derived.

Section 5 concludes, addresses open questions, and outlines avenues for future research.

2 THE EMPIRICAL LANDSCAPE OF *BREAK* + THEME COMBINATIONS

The causative alternation literature that has dealt with the question of why some *break* + theme combinations show the alternation, whereas others do not (Alexiadou, Anagnostopoulou, and Schäfer 2006; Levin and Rappaport Hovav 1995; Piñón 2001; Schäfer 2008) has focused on three *break* + theme combination meanings: ‘to separate into pieces’ (1), ‘to violate or disobey’ (2), and ‘to better’ (3).

- (1) Pat broke the window.
- (2) He broke his promise/the contract.
- (3) He broke the world record.

(Levin and Rappaport Hovav 1995: 79, 85)

However, *break* + theme combinations show a wider range of meanings. To determine what meanings these combinations may have, I conducted a corpus study of the verb *break* in the *Corpus of Contemporary American English* (COCA). This corpus study involved extracting all the examples with verbal *break* from the COCA, which amounted to 26,285 examples, and analyzing 1,000 randomly-sampled examples.¹ The analysis concentrated on identifying (i) the meaning of the *break* + theme combination

¹These 1,000 examples are available at <https://docs.google.com/spreadsheets/d/1m4T3ZLY8Uj9LduNRsbBq7InM41VNUqVnKMLtd0W1sFo/edit?usp=sharing>.

in the example, (ii) the type of frame in which *break* appeared (transitive vs. intransitive), and (iii) the semantic type of the arguments of the verb.² Based on this corpus study, I propose that there are eight different *break* + theme combinations, each of which gives rise to a particular meaning.³

In what follows I discuss each of these *break* + theme combinations. I first concentrate on the *break* + theme combinations that show the causative alternation; focus then on the *break* + theme combinations that are obligatorily transitive; and, finally, concentrate on the *break* + theme combination which only shows intransitive uses. For each *break* + theme combination, I mention what the semantic type of the theme argument is and, where appropriate, what range of subjects may appear with a given combination.

2.1 ALTERNATING *BREAK* + THEME COMBINATIONS

There are four *break* + theme combinations that show the causative alternation:

- (4) Alternating *break* + theme combinations
 - a. *break* + inanimate entity
 - b. *break* + device
 - c. *break* + state
 - d. *break* + new information

The *break* + inanimate entity combination expresses the meaning ‘to separate into pieces’.⁴ This meaning is considered to be the basic, core, or primary meaning of *break* (Kellerman 1978: 66, McNally and Spalek 2017: 5–9, Taylor 2007: 335–336).⁵ The inanimate entity may be an artifact, as in (5); a natural entity, as in (6); or a body part, as in (7).⁶ These examples show that the *break* + inanimate entity combination alternates.

- (5) a. Pat broke the window.
b. The window broke.

(Levin and Rappaport Hovav 1995: 79)

²See Pustejovsky and Batiukova (2019: 183–203) on semantic typing.

³The *Oxford English Dictionary* provides 42 definitions for the verb *break*, excluding idiomatic (e.g. *to break new ground*) and phrasal verb uses of *break* (e.g. *break down*, *break up*, or *break apart*). Nevertheless, I believe that these different definitions may be subsumed under the eight *break* + theme meanings that I propose. For example, among others, definitions 5a and 7a, shown in (i) and (ii), respectively, are encompassed by the meaning ‘to separate into pieces’.

- (i) To part or lay open the surface of (anything), as of land (by ploughing, etc.).
- (ii) *transitive*. To crush, shatter (e.g. a bone). to break the leg or arm: i.e. the bones of the limb.

⁴Crosslinguistically, events involving a ‘separation in the material integrity’ (Hale and Keyser 1987) of an entity are roughly categorized into two groups depending on “the *predictability of the locus of separation* in the affected object” (Majid, Boster, and Bowerman 2008: 242, see also Majid et al. 2007): while cutting events involve a predictable locus of separation, breaking events involve an unpredictable locus of separation. See Majid et al. (2007) for a study on the categorization of cutting and breaking events in four Germanic languages: English, German, Dutch, and Swedish.

⁵In section 3.2 I suggest that the meaning of the root *break* is minimally specified and that the combination of *break* with a particular theme is what yields a more specific meaning. Under this view, the meaning ‘to separate into pieces’ is not more or less basic than the other *break* + theme meanings.

⁶See below for more discussion on the *break* + body part combination.

- (6) a. “We should be thanking the coral reefs,” says Dave Vaughan, executive director of Mote Marine Laboratory & Aquarium’s Elizabeth Moore International Center for Coral Reef Research & Restoration. “They broke the waves. If they hadn’t, our homes would not have survived.” (from Google)
- b. I know the feeling, but I have to stop and start taking it in: the air infused by the iodine scent of kelp mixed with the spiced incense of the forest, the hiss of spray blowing off the tops of waves in the still moment before they crest and break on the reef. (from COCA)
- (7) a. At 18 months old, doctors wanted to break both of her feet to correct a bone misalignment, which caused her feet to turn outward. (from COCA)
- b. Pulling calves was hard work, and he’d been kicked once so hard his left femur snapped and he heard it break, like a stick on a knee. (from COCA)

Because of the type of event expressed by the *break* + inanimate entity combination, this combination allows “a range of subject types” (Rappaport Hovav and Levin 2012: 156). For example, when the inanimate entity is *window*, the subject of the combination may be an animate entity (8a), a natural force (8b), an instrument (8c), or a causing event (8d).⁷

- (8) a. Antonia broke the window.
 b. The wind/The storm/The explosion broke the window.
 c. The hammer broke the window.
 d. Will’s banging broke the window.

(Alexiadou and Schäfer 2006: 40, Kosta 2015: 578, Rappaport Hovav and Levin 2012: 156)

Above I mentioned that the inanimate entity may be a body part. The *break* + body part combination is different from other *break* + inanimate entity combinations in that, when the subject of the combination expresses the possessor of the body part, the sentence is ambiguous between an intentional and an unintentional interpretation. For example, sentence (9) can describe a situation in which Carrie intentionally broke her arm or one in which Carrie accidentally broke her arm. In the former case, Carrie is the agent or causer of the action. I will refer to this interpretation as the Agent interpretation. In the latter case, Carrie is the experiencer of the event. I will refer to this interpretation as the Experiencer interpretation. Examples (10a) and (10b) further illustrate the Agent and Experiencer interpretations of the *break* + body part combination, respectively. The Agent interpretation is the interpretation that subjects in other *break* + inanimate entity combinations show when their subject is a human. The Experiencer interpretation is exclusive of the *break* + body part combination.⁸

⁷Expressing a causing event in the subject position is a possibility for all the *break* + theme combinations that show transitive uses.

⁸Although I have labeled this combination as the *break* + body part combination, strictly speaking, the object of the verb *break* does not have to be a body part, but simply an inalienable part of the argument that occurs in subject position. For example, sentence (i) also shows this Experiencer interpretation.

- (i) The bike broke a spoke. (provided by Beth Levin)

The verb *puncture* also shows an Experiencer interpretation when its object, although not a body part, expresses an inalienable part of the argument that occurs in the subject position.

- (ii) The car punctured a tire. (provided by Beth Levin)

(9) Carrie broke her arm.

(Levin 1993: 103)

- (10) a. You took time off, as well, you even said you'd break your arm if they didn't let you do it.
b. i. "If I fall and break my hip, my daughter doesn't have to come from California and say, 'What on earth am I going to do with my mother?'" (from COCA)
ii. The Amish here in Lancaster County may go to the hospital if they break an arm or need surgery, but when it's time to give birth they stay home.

Another alternating *break* + theme combination is the *break* + device combination, which shows the meaning 'to cease to function'. The theme in this combination expresses a device or some more abstract entity designed for a particular purpose, such as *systems and applications* in (11a). Examples (11a) and (11b) show that this combination participates in the causative alternation.

- (11) a. One unfortunate law of operating-system upgrades – which applies equally to Macs and to Windows PCs – is that they will break some systems and applications, especially at first. (from COCA)
b. He said he would never buy such a service plan unless he knew the product it protected was guaranteed to break. (from COCA)

When used transitively, the *break* + device combination does not display a wide range of subjects. In fact, the subject of this combination is almost always a human, as in (12). In some cases, it may also be a computer software, as in (11a).⁹ The limited range of subjects that the *break* + device combinations shows is grounded in the type of event described by this combination. Given that in our world only humans can manipulate devices, only they can cause these devices to break.

- (12) Soon Thyodo understood that they were not stealing the jewels or the gold, silver, and bronze of his mechanism, but rather the whole device, and he set to chiding and scolding and bidding them to "Have a care, you dolt! You'll break it!" He felt obliged to begin dismantling the clock himself, lest it be damaged, and before another hour had paraded and sung, the chronologist came to the attention of Tan Gent.

The *break* + state combination is also an alternating one, as shown in (13). This combination expresses the meaning 'to stop, interrupt, or end'. In (13a) and (13b), for example, what is interrupted or ends is the state of being isolated.

- (13) a. Networking with other music teachers, both new and experienced, can be a professional life-line for beginning music teachers and can help to break the isolation of the first years of teaching. (from COCA)
b. Then, without warning, I was boxed in by trees in an enchanting forest of evergreens and birches with teardrop lakes that stretched to the Earth's edges. The isolation broke intermittently. I was revived by the sight of what Manitoba calls towns and what I refer to as generous rest stops. (from Google)

In transitive uses, the subject of the *break* + state combination may be a causing event (13a), a human (14), or an abstract entity (15).

⁹Computers may be regarded as extended humans.

- (14) Diane broke the silence.
- (15) a. This comment broke the silence and the floodgates opened. (from Google)
 b. However, since the discovery of informality, classical liberalism has begun to break those ties in Latin America, and it has become evident that it offers a different Peru and the rest of Latin America [...] (from COCA)

The last alternating combination is the *break* + new information combination, which expresses the meaning ‘to make/become known’. In (16a) and (16b), the new information theme is *this news* and *the story*, respectively. These examples show that the *break* + new information combination participates in the causative alternation.

- (16) a. We’ll break this news gently: For the next few months, you’ll be seeing red. (from COCA)
 b. Do you think the media voiced enough skepticism whether or not the guy was guilty? Because when the story did break, people were just reporting the story. (from COCA)

In transitive uses, there is only one type of subject which may appear with the *break* + new information combination: a subject which denotes a human, as in (16a). In our world, only humans can be the causers of the type of event described by the *break* + new information combination, as only they can disclose or divulge information.

2.2 TRANSITIVE-ONLY *BREAK* + THEME COMBINATIONS

There are three *break* + theme combinations which are obligatorily transitive:

- (17) Transitive-only *break* + NP combinations
- a. *break* + code
 - b. *break* + norm
 - c. *break* + record

The *break* + code combination expresses the meaning ‘to decipher’. As shown in (18), this combination does not display the causative alternation: it does not show intransitive uses. In effect, there are not any intransitive uses of the *break* + code combination in the 1,000 examples from the COCA that I analyzed. There is, however, one example of an intransitive use of this combination in the web, shown in (19).

- (18) a. The tribal dialects completely baffled the enemy, who repeatedly tried but failed to break the codes. (from COCA)
 b. * The secret code broke.
- (19) Almost sixty years later, Frank Rowlett, a cryptologic pioneer and head of the “Purple” team, remembered that historic day when the code broke. “What [Genevieve] Grotjan did was a big step forward and was very significant in the solution of Purple.” (from Google)

In spite of this example, I consider that the *break* + code combination only shows transitive uses for the following reasons. First, though some speakers judge example (19) acceptable,¹⁰ many other speakers consider it unacceptable. Second, even if example (19) were acceptable, it is clear that the intransitive use of

¹⁰These speakers consider that the intransitive use of *break* + code in (19) has the discourse effect of deemphasizing the efforts of the “Purple” team members in deciphering the code.

the *break* + code combination is not productive. As mentioned above, example (19) is the only intransitive use of this combination in the web. The example seems to be a one-off example.¹¹ On the basis of this single case, one cannot draw the conclusion that the *break* + code combination shows intransitive uses.

The *break* + code combination does not show a wide range of subjects. Due to the nature of the event described by a *break* + code combination, the subject can only be a human, as in (18a), or an entity with human-like deciphering abilities, such as a computer, as in (20).

- (20) The brain simulator doesn't have access to the processor's low-level operations – it can do math, but it does it organically, like we do. It's not fast enough to hack passwords, break keys, that kind of thing. (from COCA)

Another transitive-only *break* + theme combination is the *break* + norm combination, which displays the meaning 'to violate or disobey'. The theme in this combination denotes some sort of norm, rule, or code of conduct. Example (21) shows that the *break* + norm combination is obligatorily transitive.

- (21) a. He broke his promise/the contract.
b. * His promise/The contract broke.

(Levin and Rappaport Hovav 1995: 85)

Though it has been claimed that the reason why the *break* + norm combination is obligatorily transitive is that the event expressed by this combination necessarily requires the intervention of an agent to be brought about (Alexiadou, Anagnostopoulou, and Schäfer 2006; Levin and Rappaport Hovav 1995; Piñón 2001; Schäfer 2008), there are various examples in which the subject of this combination is not an agent (22), not even a human (23). It seems then that the correct generalization about the range of subjects that a *break* + norm combination allows is that the subject must denote either the entity (animate or inanimate) that carries out the action of breaking a rule, norm, contract, etc., as in (22), (23a), or (23b), or the action that the entity performs to break these norms, i.e. the causing event, as in (23c).

- (22) There's a young lady backstage, Amanda; she had to look up the word *fornication* in the dictionary to even know that she – what she did to break the law. (from COCA)
- (23) a. Most of Winsor's sculptures break a cardinal rule of minimalist aesthetics (and ethics): They dramatize relations between the inside and outside of an object. (from COCA)
b. The silence broke a rule of procedure. (provided by Beth Levin)
c. Oracle filed a formal bid protest with the U.S. Government Accountability Office (GAO) in August, complaining that the single-winner framing for the contract broke procurement rules. On Wednesday, the office denied Oracle's protest. (from COCA)

¹¹Bruthiaux (2001) documents one-off examples of intransitive uses of obligatorily transitive verbs in the domain of Information Technology (IT). Some of the examples that he provides are given in (i)-(iii). Although intransitive uses of these verbs may be salient in IT discourse, these uses seem to be "largely idiosyncratic with little or no probability of recurrence or spread" (Bruthiaux 2001: 29) into other discourse domains.

- (i) Close this dialog box when download completes.
(ii) Modem will disconnect after 20 minutes of inactivity.
(iii) If a valid response is not made, the menu will repeat.

(Bruthiaux 2001: 25)

The last *break* + theme combination which is obligatorily transitive is the *break* + record combination, which expresses the meaning ‘to better’. Example (24) shows that this combination does not participate in the causative alternation.

- (24) a. He broke the world record.
 b. * The world record broke.

(Levin and Rappaport Hovav 1995: 85)

As for *break* + norm, the explanation that has been offered in previous literature for the nonalternation of this combination is that it describes an event that requires the involvement of an agent to come about. Nevertheless, there are multiple examples of the *break* + record combination in which the subject is not an agent. Below I show some of these examples.¹²

- (25) a. What’s more, a PG film is more than twice as likely to break the \$60 million mark in domestic box-office receipts as its R-rated counterpart [...]
 b. So far this year, 11 people have been killed in this Caribbean island territory of 110,000 people, putting the Virgin Islands on a pace to break the record of 27 homicides set in 1989. (from COCA)
 c. The event is scheduled at the Andrew W. Mellon Auditorium in downtown Washington, and organizer Mike Wilkinson said it could break a world record.
 d. “Last year was the warmest year on record, but 1991 may break that record,” said Dr. Hansen, who has long predicted that global warming, caused by a rise in heat-trapping gases in the earth’s atmosphere, would become apparent in this decade. (from COCA)
- (26) a. The number of drownings, though, will likely not break the 1996 record of 27 in Harris County alone.
 b. Police have formed the Cold Squad to solve homicides as the city’s murder rate threatens to break a ‘93 record.
 c. In 1992, \$30 million worth of counterfeit dollars was seized overseas; last year the total hit \$120 million, and it [= the amount of counterfeit dollars seized overseas] is expected to break that record in 1994.
- (27) a. Jones is on a pace for 19 touchdowns this season, which would break the record of 14 held by Gale Sayers (1965) and Walter Payton (1977).
 b. He’s on a pace for 96 receptions, which would break the rookie record of 90 set by New England’s Terry Glenn in 1996.
 c. ... Frank Gore, who rushed for a team-record 1,695 yards, said after the season that he’s going to reach 2,200, which would break Eric Dickerson’s NFL record of 2,105.

Based on these examples, I suggest that the NPs that may appear in the subject position of a *break* + record combination are of two types. First, as shown in (25), the subject may express the entity that beats the established record. This entity is not required to act agentively or even be a human. A film, a territory,

¹²For the examination of the *break* + record combination, I analyzed all the *break* + record examples in which the subject was not a human which were present in the 26,285 *break*-examples extracted from the COCA. That is, I did not only analyze the *break* + record examples present in the 1,000 randomly sampled *break*-examples. In total there were 43 examples in which the subject of the *break* + record combination was not a human.

an event, and a date are all entities that may break records. Second, as shown in (26), the subject of a *break* + record combination may be an NP that denotes a function from space-time indices to values. The NPs *the number of drownings*, *the city's murder rate*, and *the amount of counterfeit dollars seized overseas* denote functions that return different values for different times and locations. For example, in (26a), the function \llbracket the number of drownings \rrbracket takes the time $t = 2006$ and the location $l =$ Harris County and surroundings,¹³ and returns a value, a specific number of drownings. In some cases, what appears in subject position is not the function, but the value that the function returns. In (27a), for example, the subject is *19 touchdowns*, which is the return value of the function \llbracket the number of touchdowns \rrbracket at a given space-time index.

The analysis of the NPs *the number of drownings*, *the city's murder rate*, etc. as functions from time-world indices to values is put forth by Montague (1973: 234–241). Montague (1973: 239) discusses what is known as Partee's Paradox: "From the premises **the temperature is ninety** and **the temperature rises**, the conclusion **ninety rises** would appear to follow by normal principles of logic; yet there are occasions on which both premises are true, but none on which the conclusion is" (see also Löbner 2018: 3–8). He explains this paradox by making reference to the intension and extension of an NP. In particular, he suggests that in *the temperature rises*, *rises* predicates about the intension of the temperature: "**The temperature** 'denotes' an individual concept, not an individual; and **rise**, unlike most verbs, depends for its applicability on the full behavior of individual concepts, not just on their extensions with respect to the actual world and (what is more relevant here) moment of time". In contrast, in *the temperature is ninety*, *is ninety* is an identity statement about the extension of the temperature (Löbner 2018: 5): "[...] the sentence **the temperature is ninety** asserts the identity not of two individual concepts but only of their extensions" (Montague 1973: 239). The extension of an NP is the referent of the NP at a given time-world index. In *the temperature is ninety*, 90 °F is the extension of the NP *the temperature*. The intension of an NP is a function "that return[s] for every index the extension at that index" (Löbner 2018: 6). In the *break* + record combination, we see that the subject position may be occupied by the intension of an NP or, alternatively, it may be occupied by the extension of this NP, the particular return value of the function at a given index.

The NPs that appear in the subject position of a *break* + record combination are in a way related to new the record that is established as a consequence of the destruction of the until-then valid record. In particular, we can say that these NPs refer either to the entity that establishes the new record (25) or to the value that the new record has ((26) and (27)). Information about the until-then valid record – i.e. the entity that established that record (old entity) and the value of that record (old value) – is also commonly expressed in *break* + record sentences. This information, however, is always optional. To the extent that it is expressed, it is expressed within the object DP that contains the noun *record*. The old entity may be expressed as a possessive modifier of the NP headed by *record* – *Northwestern's* in (28) – or within a reduced relative clause – *held by Gale Sayers (1965) and Walter Payton (1977)* in (27a) above. The old value may only appear as an *of*-complement of the N *record* – *of 90* in (27b) above.

(28) Duke opens its season in North Carolina next week and if it loses all 11 games, it will break North-

¹³The value of t is 2006, because the sentence in (26a) is extracted from the 2006 newspaper files in the COCA. The value of l is determined based on the larger context in which sentence (26a) occurs, shown below.

- (i) At summer's end, at least 23 children have drowned in Harris and surrounding counties. Last year there were 18. The number of drownings, though, will likely not break the 1996 record of 27 in Harris County alone. But officials say the numbers are still staggering.

western's record.

2.3 INTRANSITIVE-ONLY *BREAK* + THEME COMBINATION

There is only one *break* + theme combination which is obligatorily intransitive:

- (29) Intransitive-only *break* + theme combination
a. *break* + natural phenomenon

This combination expresses the meaning 'to start or appear'. In (30) I provide examples of this combination and in (31) I show that this combination does not show transitive uses.

- (30) a. Kevin drove them all the way back to Equinox, to the Goodbye Goose, as day began painfully to break. (from COCA)
b. Everything seemed possible, for surely another morning would break, and with it another chance to play the way each man secretly believed he could. (from COCA)
c. Bonington's team were nearing the summer when the monsoon broke. (from *Longman Dictionary of Contemporary English* 1995: 152)
- (31) * The Earth's rotation broke the day.

As suggested by the proposed meaning for the *break* + natural phenomenon combination, 'to start or appear', this combination has an appearance flavor. In fact, precisely because of this *break* + theme meaning, Levin (1993: 258) includes *break* among the verbs of appearance.¹⁴ Importantly, the *break* + natural phenomenon combination does not only have an appearance meaning, but also shows the argument realization options of this class of verbs.¹⁵ Among other properties, verbs of appearance allow *there*-insertion (32) and locative inversion (33), and disallow the causative alternation (34).

- (32) a. A ship appeared on the horizon.
b. There appeared a ship on the horizon.
- (33) a. A large ship appeared on the horizon.
b. On the horizon appeared a large ship.
- (34) a. * The magician appeared a dove from his sleeve.
b. A dove appeared from the magician's sleeve.

(Levin 1993: 258)

The *break* + natural phenomenon combination also shows these argument realization options. It allows *there*-insertion (35a) and locative inversion (36a), and disallows transitive uses, as shown in (31). As illustrated in the (b) examples in (35) and (36), other *break* + theme combinations, such as the *break* + inanimate entity combination, do not show these argument realization options.

- (35) a. Throughout the cycle of your great labor,/ You were brave on behalf of the SAINTS;/ At last, yes, there broke the dawn,/ Of your freedom, Oh, wondrous privilege! (from Google)

¹⁴Levin (1993: 259) observes that "some of the verbs listed, such as *break* and *open*, are basically verbs of change of state and are used as verbs of appearance in an extended, possibly figurative, sense".

¹⁵See Levin (1993: 258–259) on the argument realization properties of verbs of appearance.

- b. * There broke a vase.
- (36) a. Knowles leapt across the room so that they stood face to face, the doctor's eyes desperate, the eyes of the detective without expression. There into the tense hush broke the soft voice of the half-caste. (A.W. Upfield, *Wings above the Diamantina*, 1936, Collier Books reprint, New York, 1986, p. 281)
- b. * In the kitchen broke a vase.

That the *break* + natural phenomenon combination patterns like verbs of appearance as regards its causative alternating behavior will become relevant in section 3, where I will put forth an account of why some combinations alternate whereas others do not.

2.4 SUMMARY

There are eight different *break* + theme combinations, each with a particular meaning. These combinations show the following causative alternating behavior and meanings.

- (37) Alternating *break* + NP combinations
 - a. *break* + inanimate entity → 'to separate into pieces'
 - b. *break* + device → 'to cease to function'
 - c. *break* + state → 'to stop, interrupt, or end'
 - d. *break* + new information → 'to make known'
- (38) Transitive-only *break* + NP combinations
 - a. *break* + code → 'to decipher'
 - b. *break* + norm → 'to violate or disobey'
 - c. *break* + record → 'to better'
- (39) Intransitive-only *break* + NP combination
 - a. *break* + natural phenomenon → 'to start or appear'

3 THE NONALTERNATION OF *BREAK* + THEME COMBINATIONS

3.1 DESIDERATA FOR AN ANALYSIS

The discussion of the empirical landscape of *break* + theme combinations in section 2 suggests that an analysis of the (non)alternating behavior of *break* + theme combinations should have (at least) the following characteristics. First, the analysis should capture the observation that the meaning that the verb *break* exhibits in a particular *break* + theme combination depends on the semantic type of the theme argument it combines with. For instance, if the theme is an inanimate entity, the verb *break* will show the meaning 'to separate into pieces'; however, if the theme is a natural phenomenon, then the verb will bear the meaning 'to start or appear'. Second, the analysis should account for the obligatory transitivity of certain *break* + theme combinations in a way that is in line with the empirical data discussed in section 2. It is in this respect that previous explanations for the nonalternating behavior of certain causative verb + theme combinations (Alexiadou, Anagnostopoulou, and Schäfer 2006; Levin and Rappaport Hovav 1995; Piñón 2001; Schäfer 2008) show shortcomings.

The most influential explanation for the obligatory transitivity of certain causative verb + theme combinations, including *break* + theme combinations, is put forth in Levin and Rappaport Hovav (1995). These authors claim that the verb + theme combinations for which a given verb does not show the alternation are those which describe an eventuality that “cannot come about without the intervention of an agent”, since obligatorily agentive events cannot be described intransitively. According to this line of reasoning, example (41b) is unacceptable because the eventualities described by the combinations *break* + norm and *break* + record are eventualities which require the intervention of an agent to be brought about. In contrast, example (40b) is acceptable because the combinations *break* + inanimate entity or *break* + device do not describe eventualities that require the involvement of an agent.

- (40) a. Antonia broke the vase/the window/the bowl/the radio/the toaster.
 b. The vase/The window/The bowl/The radio/The toaster broke.
- (41) a. He broke his promise/the contract/the world record.
 b. * His promise/The contract/The world record broke.

(Levin and Rappaport Hovav 1995: 104–105)

This explanation for the obligatory transitivity of certain causative verb + theme combinations, which I have referred to as the agent-based explanation in previous sections, has been adopted by subsequent analyses of the causative alternation in a largely unmodified form (e.g. Alexiadou, Anagnostopoulou, and Schäfer 2006; Piñón 2001).¹⁶ Albeit “of astonishing crosslinguistic validity”¹⁷ (Schäfer 2008: 122), the agent-based explanation makes a prediction that, at least for the transitive-only *break* + theme combinations, is not borne out: that the subject of these combinations should be an agent. As shown in section 2.2, there are examples of *break* + norm and *break* + record which do not have an agent in the subject position, casting doubt on the claim that these combinations express eventualities that require the intervention of an agent to come about.

Rappaport Hovav and Levin (2012: 158) observe, apropos of the combination *clear* + table, that not every causative verb + theme combination which is obligatorily transitive requires an agent. Like the verb *break*, the verb *clear* shows the causative alternation for certain choices of theme argument, but not for others, as shown in (42) and (43). The *clear* + table combination is obligatorily transitive, even though the eventuality expressed by this combination does not require the intervention of an agent. Example (44) shows that this combination may take nonagentive subjects, such as *the wind*.

- (42) a. The wind cleared the sky.
 b. The sky cleared.

¹⁶Although the agent-based explanation is taken up in subsequent literature in a largely unmodified form, there is variation in how this explanation is incorporated into the causative alternation framework developed in each work. Levin and Rappaport Hovav (1995) adopt a derivational approach to the causative alternation, in which the transitive form is considered to be basic. The obligatory intervention of an agent in the events described by the nonalternating combinations precludes the application of the detransitivization operation, which can only apply if “the nature of the causing event is left completely unspecified” (Levin and Rappaport Hovav 1995: 107). Alexiadou, Anagnostopoulou, and Schäfer (2006), and Piñón (2001) adopt nonderivational approaches to the causative alternation. The obligatory intervention of an agent in the events described by the nonalternating verb + theme combinations prevents the derivation of the intransitive use of these combinations from a neutral verb form. For an overview of approaches to the causative alternation, see Alexiadou, Anagnostopoulou, and Schäfer (2006: 177–181); Levin (2015: 73–75); and Rappaport Hovav (2014: 11–21).

¹⁷For example, Ameka and Essegy (2007) explain the causative alternation patterns shown by cutting and breaking events in Ewe based on the degree of agentivity denoted by the relevant verbal roots.

- (43) a. The waiter cleared the table.
 b. * The table cleared.
- (44) The wind was enormous. There was a huge dinner table set-up, and the wind cleared the entire table onto the floor and blew over chairs.

(Rappaport Hovav and Levin 2012: 158)

To capture the obligatory transitivity of (44) and similar examples, Rappaport Hovav and Levin (2012) put forward the Proper Containment Condition, which states that “[w]hen a change of state is properly contained within a causing act, the argument representing that act must be expressed in the same clause as the verb describing the change of state” (Rappaport Hovav and Levin 2012: 173).¹⁸ In (44), for example, the change of state that the *clear* + table combination describes is properly contained in the act of removing things from the table, which explains why the argument that denotes the remover – *The waiter* in (43a) or *The wind* in (44) – must be obligatorily expressed.

Though the Proper Containment Condition accounts for the obligatory transitivity of *clear* + table combinations, this condition does not explain why examples such as those shown in (23), (25), (26), and (27) – some of which are repeated in (45) – do not show the causative alternation.

- (45) a. Most of Winsor’s sculptures break a cardinal rule of minimalist aesthetics (and ethics): They dramatize relations between the inside and outside of an object. (from COCA)
 b. What’s more, a PG film is more than twice as likely to break the \$60 million mark in domestic box-office receipts as its R-rated counterpart [...]
 c. The number of drownings, though, will likely not break the 1996 record of 27 in Harris County alone.

There is one important difference between *break* + norm and *break* + record examples, on the one hand, and example (44), on the other. In the latter example, the act of removing things from the table is coextensive with the cleaning event; in the *break* + record and *break* + norm examples, the event of breaking a record or a norm is not coextensive with any other event, in part due to the punctual aspectual nature of the events described by these *break* + NP combinations. The Proper Containment Condition accounts for the transitivity of examples in which the causing event and the caused event can be conceived of as coextensive. *Break* + norm and *break* + record examples do not fall under this characterization.¹⁹

In the rest of this section, I will propose an analysis of the alternating behavior of *break* + theme combinations that meets the desiderata mentioned in this section and is in line with the empirical landscape of *break* + theme combinations discussed in section 2.

3.2 THE LEXICAL SEMANTICS OF *BREAK*

There are (at least) two different analyses of the lexical semantics of the verb *break* that are consistent with the observation that there is a deterministic relationship between the meaning that the verb *break* exhibits in a sentence and the semantic type of the theme argument with which the verb combines. In what follows, I will present these two analyses and give reasons for why I adopt the second one.

¹⁸See Härtl (2003) for a similar explanation for the nonalternation of verbs like German *zerstören* and Kiparsky (1997) for a similar explanation for the nonalternation of certain denominal verbs.

¹⁹There is another difference between example (44) and example (45a). The former example is clearly dynamic, while the latter is more stative.

The two analyses assume, following Rappaport Hovav and Levin (1998), and Levin (1999), among others, that there are two aspects involved in a verb’s meaning: an idiosyncratic component and a structural component. This latter component is the aspect that “is grammatically relevant – for example, relevant to argument realization – and defines the grammatically-relevant semantic classes of verbs – that is, those semantic classes of verbs whose members share syntactically- and morphologically-salient properties” (Rappaport Hovav and Levin 1998: 106). The structural aspect of a verb’s meaning is its event structure template.²⁰ The idiosyncratic aspect of a verb’s meaning specifies a verb’s core meaning and “distinguishes that verb from other members of the same class” (Rappaport Hovav and Levin 1998: 106). Following what is now standard practice, I refer to this component of meaning as the root.²¹ The root determines the minimum number of participants involved in the event the root is associated with (Rappaport Hovav and Levin 1998: 108). For example, the root *run* is associated with a single participant, as “an event of running minimally involves a runner” (Levin 1999: 12); in contrast, the root *sweep* is associated with two participants, as a sweeping event “minimally involves a sweeper and surface” (Levin 1999: 12). The meaning of a verb results from the association of the root with a specific event structure template. A single root may be associated with more than one template (Rappaport Hovav and Levin 1998: 107).

Having spelled out these assumptions about a verb’s meaning, I now turn to the discussion of the two analyses of the lexical semantics of the verb *break*. The first analysis proposes that the different meanings that *break* exhibits in the *break* + theme combinations discussed in section 2 are the result of there being different roots that are all associated with the same phonological string, /breɪk/. Under this analysis, a different root would be responsible for each of the meanings listed in (37)–(39). In other words, we would have a root *break*₁ with the core meaning ‘separate into pieces’, a root *break*₂ with the meaning ‘cease to function’, a root *break*₃ with the meaning ‘stop, interrupt, or end’, and so on for the other meanings exhibited by *break*, as shown in (46). Each of these roots would select for a theme of a particular semantic type. For example, $\sqrt{\textit{break}_1}$ would select for a theme of the type ‘inanimate entity’, $\sqrt{\textit{break}_2}$ would select for a theme of the type ‘device’, etc. The composition between the root and the theme is not successful, unless the theme is of the appropriate semantic type.

- (46) a. *break*₁ ≈ ‘separate into pieces’
 b. *break*₂ ≈ ‘cease to function’
 c. *break*₃ ≈ ‘stop, interrupt, or end’
 d. *break*₄ ≈ ‘make known’
 e. *break*₅ ≈ ‘decipher’
 f. *break*₆ ≈ ‘violate or disobey’
 g. *break*₇ ≈ ‘better’
 h. *break*₈ ≈ ‘start or appear’

²⁰There is a limited set of event structure templates. Some of the event structure templates are the BECOME-template (ia) and the CAUSE-template (ib).

- (i) a. [BECOME [x <STATE>]]
 b. [[x ACT_{MANNER}] CAUSE [BECOME [y <STATE>]]]

(Rappaport Hovav and Levin 1998: 107)

²¹Rappaport Hovav and Levin (1998), and Levin (1999) refer to this component of a verb’s meaning as the constant.

To capture the alternating behavior of the *break* + theme combinations discussed in section 2, the multiple roots analysis would propose that the different *break* roots differ in the number of participants they are associated with. In particular, we would have to say that the roots in the transitive-only *break* + theme combinations (i.e. *break* + code/norm/record) are minimally associated with two participants: a theme and a causer; whereas the roots in the intransitive-only or the alternating combinations (i.e. *break* + inanimate entity/device/state/new information/natural phenomenon) are minimally associated with one participant: a theme. In the case of the alternating combinations, we would have to say that the root may be optionally associated with a second participant, which is usually a causer, but may be an experiencer in the case when the theme is a body part.

Though the multiple roots analysis is consistent with the empirical landscape of *break* presented in section 2, it has an inherent drawback: the stipulation that there are multiple *break* roots in the lexicon. Assuming that every meaning that a word shows corresponds to a distinct lexical entry would quickly lead us to a (more or less unjustified) proliferation of phonologically identical lexical entries in the lexicon. For a detailed discussion of the problems and limitations of a sense enumerative model of the lexicon, see Pustejovsky (1995: 39–60).

The second analysis of the lexical semantics of *break* that I will present below shows the advantage that it does not rely on the stipulation of eight different *break* roots in the lexicon. Under this second analysis, the meaning of the root *break* is minimally specified.²² The root *break* expresses a state, though exactly what state it expresses is difficult to pin down. Only after the root combines with the theme argument is a more specific meaning obtained – the meanings listed in section 2. The theme argument plays a determinant role in the specification of the meaning of *break*, a role that the causer argument, when present, does not play.²³ Given this, I propose that the minimally specified root *break* is only associated with one participant, the theme.²⁴

To capture the fact that some *break* + theme combinations alternate, whereas others do not, I propose that at the *break* + theme combination level, some combinations, due to the nature of the event expressed by the combination, require the addition of a second participant; other combinations allow the addition of a second participant, but do not require it; while still others prohibit the addition of a second participant. The combinations that follow the first option are the transitive-only combinations: *break* + code, *break* + norm, and *break* + record. The ones that follow the second option are the alternating combinations: *break* + inanimate entity, *break* + device, *break* + state, and *break* + new information. Finally, the combination that follows the third option is the intransitive-only combination *break* + natural phenomenon.

The first and second analysis differ in two important ways. First, while the first analysis proposes that there are eight different *break* roots in the lexicon, the second analysis proposes that there is only one *break*, which bears a minimally specified meaning. Second, while the first analysis proposes that some *break* roots are associated with one participant while others with two participants, the second analysis

²²See Spalek (2012) for a similar analysis of the Spanish verb *romper* ‘to break’: “The hypothesis defended is that verbs basically possess [sic] underspecified lexical entries, which are only fully fleshed out by context. This allows for a certain meaning variation in the overall denotation of the event, rather than placing all the burden on the verb alone thus forcing polysemy” (Spalek 2012: 153). See also Arad’s (2003) proposal that the meaning of certain Hebrew roots is underspecified: “The semantic content of the root is underspecified. It is convenient to think of this underspecified meaning as of a potential to be incarnated in many different ways” (Arad 2003: 744).

²³Marantz (1996) uses evidence such as this to argue that the internal argument is an argument of the verb, whereas the external argument is not: it is an argument of the VP.

²⁴See Rappaport Hovav and Levin 2012 for the claim that alternating change-of-state verbs are associated with a single argument.

proposes that the single *break* root is always associated with one participant and that the second participant is not associated directly with the root, but with the root + theme combinations. Both analysis are consistent with the empirical landscape of *break* described in section 2. Given that the second analysis does not lead to a proliferation of *break* roots in the lexicon, I will adopt this analysis here. However, the comments that follow, though stated in terms of the second analysis, are also applicable to the multiple roots analysis.

The *break* + natural phenomenon combination is the only combination that prohibits the addition of a second participant. In section 2.3 I discussed in detail this combination and showed that it not only has a verb of appearance meaning, but also shows the argument realization options of verbs of appearance: (i) *there*-insertion, (ii) locative inversion, and (iii) no transitive uses. Although I do not have an explanation for why the *break* + natural phenomenon does not show transitive uses, I would like to propose that the prohibition against the addition of a second participant is a general prohibition that verbs of appearance impose, and that the explanation for why verbs of appearance do not show the causative alternation will likely shed light on why the *break* + natural phenomenon combination does not alternate.

The other *break* + theme combinations either require or allow the addition of a second participant. This second participant is usually the causer of the event expressed by the *break* + theme combination.²⁵ In section 2 I discussed the range of subjects that the different *break* + theme combinations allow and I said that, while the *break* + inanimate entity combination allows a wide range of subjects, others combinations, such as the *break* + device or the *break* + new information combination, only appear with a highly limited range of subjects. Following Rappaport Hovav and Levin (2012: 166), I propose that the subjects that can appear with a *break* + theme combination are the subjects which can be conceived of as direct causers of the eventuality expressed by the *break* + theme combination. Rappaport Hovav and Levin (2012: 166) encode this generalization in the Direct Causation Condition:

- (47) The Direct Causation Condition: A single argument root may be expressed in a sentence with a transitive verb if the subject represents a direct cause of the eventuality expressed by the root and its argument.

(Rappaport Hovav and Levin 2012: 166)

The *break* + inanimate entity combination allows humans, natural forces, and instruments as subjects, because all of these entities may be conceived of as direct causers of the ‘separate into pieces’ event. However, the *break* + new information combination only allows humans as subjects, as humans are the only direct causers of a ‘make known’ event: only humans can reveal or spread information.

In section 2 I discussed a special subcase of the *break* + inanimate entity combination: the subcase in which the inanimate entity is a body part. We saw there that, when the subject of the *break* + body part combination was the inalienable possessor of the body part, transitive uses of the *break* + body part combination could receive two interpretations: the Agent interpretation, in which the subject – *Carrie* in (48), repeated from (9) – is interpreted as intentionally breaking her body part, and the Experiencer interpretation, in which the subject is seen as affected by the breaking of her body part. The addition of the causer participant in the Agent interpretation is regulated by the Direct Causation Condition discussed above. The addition of this participant is not different from the addition of a causer participant in the obligatorily transitive and alternating *break* + theme combinations. To account for the Experiencer interpretation of *break* + body part, however, we need to make an additional stipulation, namely, that the

²⁵I say *usually* given that, when the theme is a body part, the second participant may also be an experiencer. See below.

break + body part combination allows the addition either of a causer participant or an experiencer participant. When a causer participant is introduced, we obtain the Agent interpretation of the *break* + body part combination. However, when an experiencer is introduced, we get the Experiencer interpretation.²⁶

(48) Carrie broke her arm.

(Levin 1993: 103)

In Table 1 I summarize the discussion in this section. I show which *break* + theme combination require, allow, or prohibit the addition of a second participant. I concentrate on second participants introduced via direct causation.

root	1 st participant	2 nd participant introduced via direct causation
<i>break</i>	inanimate entity	(causer)
	device	
	state	
	new information	causer
	encrypted information	
	norm	
	record	
natural phenomenon	*causer	

Table 1: Participants in each *break* + theme combination

3.3 THE MAPPING FROM LEXICAL SEMANTICS TO SYNTAX

In this section, I discuss how the participants of the root *break* are mapped from the lexical semantics level to the syntactic level. The output of the lexical semantics level can be one in which *break* is associated with a single participant – the theme – or one in which *break* is associated with two participants – the theme, and the causer or experiencer (in the case of *break* + body part combinations). The former is the case in the *break* + natural phenomenon combination or the alternating combinations, when the option of not adding a second participant is chosen.²⁷ The latter scenario is the case in the transitive-only *break* + theme combinations as well as in the alternating combinations, when the option of adding a second participant is chosen.

The mapping from lexical semantics to syntax in cases in which *break* is only associated with the theme argument is the mapping that occurs with unaccusative verbs more generally (Burzio 1986, Levin and Rappaport Hovav 1995, Perlmutter 1978). The theme argument is mapped onto the complement

²⁶The availability of an Agent and an Experiencer interpretation in cases in which the subject is the possessor of the body part is not exclusive of the verb *break*. Other verbs in English show the same pattern. For example, according to Levin (1993: 103), sentences with the verbs *sprain* and *twist*, shown in (i) and (ii), also exhibit these two interpretations. See Levin (1993: 102–103) for a list of verbs that allow Experiencer interpretations when combined with a body part theme.

- (i) Monica sprained her wrist.
- (ii) Monica twisted her ankle.

²⁷The examination of what determines the addition of a second participant in the alternating *break* + theme combinations is beyond the scope of this paper. However, see Rappaport Hovav (2014) for a pragmatic explanation of the addition of the causer participant in alternating change of state verb + theme combinations.

position of the verb, as shown in (). There is no vP layer in the structure. The head *v* (or Voice, see Alexiadou, Anagnostopoulou, and Schäfer 2006, Kratzer 1996) is the head responsible for the introduction of the external argument. Since there is no external argument in these cases, there is no vP layer. Following standard assumptions in generative syntax, I assume that the theme argument undergoes movement from the complement position of the verb into the specifier position of T, in order to receive case. After movement of the theme, we end up with the syntactic structure shown in (), which is an intransitive structure.

When, in the lexical semantics level, the root *break* is associated (directly or indirectly²⁸) with two arguments, the mapping of arguments from lexical semantics to syntax involves an additional step, namely, the ranking of the two arguments based on the prominence relation between the two arguments. In particular, I propose that this ranking is made in accordance with the thematic hierarchy.²⁹ For the purpose of this paper, I adopt a thematic hierarchy in which the Causer argument is above the Experiencer argument, and the Experiencer argument is above the Theme argument, as shown in (49).³⁰

(49) Causer > Experiencer > Theme

I adopt Larson's (1988, 1990) algorithm for the mapping of thematic roles into syntactic position:

(50) If a verb α determines theta-roles $\theta_1, \theta_2, \dots, \theta_n$, then the lowest role on the Thematic Hierarchy is assigned to the lowest argument in constituent structure, the next lowest role to the next lowest argument, and so on.

(Larson 1988: 382)

In the transitive uses of *break* + theme combinations, the algorithm works in the following way. In cases in which the second participant in a *break* + theme combination bears the thematic role of causer, the theme participant is mapped onto the complement position of the verb, which is the lowest syntactic position. The causer participant, which is the next lowest participant, is mapped onto the next lowest syntactic position, which is the specifier position of vP, as shown in (). The causer DP undergoes movement from Spec,vP to Spec,TP.

In cases in which the second participant is an experiencer,³¹ the algorithm maps the theme participant onto the complement position of the verb. The experiencer participant, which is ranked higher than the theme in the thematic hierarchy, is mapped onto the next lowest syntactic position. The exact position in which the experiencer argument is mapped is unsettled. For example, Belletti and Rizzi (1988) argue that for *preoccupare*-type verbs, the experiencer occupies a higher position than the theme *within the VP*; whereas for *temere*-type verbs, the experiencer occupies a VP-external position (Spec,IP in their terms; Spec,TP in my terms). For concreteness, I assume that the experiencer in *break* + body part combinations is mapped onto the specifier position of VP. From this position it undergoes movement to Spec,TP, as

²⁸I make the qualification 'directly or indirectly', as in section 3.2 I said that the root *break* is only associated with a single participants, and it is the whole *break* + theme combination that introduces the second participant.

²⁹For a discussion of the role of thematic hierarchies in argument realization, see Levin and Rappaport Hovav 2005: 154–185.

³⁰The ranking of Causer, Experiencer, and Theme in this way has been proposed by, among others, Belletti and Rizzi 1988, Grimshaw 1990, Van Valin 1990, and Fillmore 1978. These papers do not talk about the role Causer, but Agent. I assume that Causers and Agents occupy the same position in the thematic hierarchy.

³¹Recall that these cases can only occur when the theme is a body part and the second participant is the possessor of the body part.

shown in ().³² What is crucial, however, is not the exact initial position onto which the experiencer is mapped, but just that the experiencer is mapped onto a higher position than the theme. The experiencer undergoes movement from its original merge position into Spec,TP.

In this section, I have spelled out how the mapping of participants from the lexical semantics level to syntactic position occurs. In the next section, I discuss where the agentive interpretation in the obligatorily transitive *break* + norm and *break* + record combinations come from, given that, based on the discussion in sections 2 and 3.2, these *break* + theme combinations do not require the introduction of an agent participant, but just of a causer participant.

4 THE AGENTIVE INTERPRETATIONS OF TRANSITIVE-ONLY COMBINATIONS

I have argued that the agent-based explanation for the obligatory transitivity of certain *break* + theme combinations is empirically unmotivated. These combinations do not necessarily describe events that require the intervention of an agent, as evinced by the examples in which the subject of these combinations is not an agent. It is certainly the case, however, that *break* + norm and *break* + record combinations in which the subject is a human, such as (51) or (52), may have an agentive interpretation: a human in the subject position of these combinations passes all of the tests of agentivity (Grafmiller 2013: 213–244, Lakoff 1966). In contrast, a non-human subject in this position fails all of these tests. I illustrate this with *break* + record examples; however, the same is valid for *break* + norm examples.

First, as shown in (53), a *break* + record combination with a human subject allows modification by agent-oriented adverbs, such as *intentionally* or *deliberately*, whereas combinations with a non-human DP in the subject position do not do so. Second, a *break* + record combination with a human subject may occur in the complement position of a control verb (54a), while one with a non-human subject may not (54b). Finally, only a *break* + record combination with a human subject may appear in the *What X did ...* construction, as shown in (55).³³

- (51) a. You are a lawyer and here you are out there proudly proclaiming how happy you are that you helped somebody break the law. (from COCA)
 b. Most American Muslims have no choice but to break the prohibition on usury to buy homes and automobiles, for example. (from COCA)
- (52) a. Mike Powell jumped 29 feet, 4-1/2 inches at the 1991 World Track and Field Championships in Tokyo to break the 23-year-old record. (from COCA)

³²Mapping the experiencer onto Spec,VP is consistent with the evidence from West Flemish (Abney 1987) and Dutch (Rooryck and Vanden Wyngaerd 2011, Scholten 2008) which suggests that *break* + body part combinations with an Experiencer subject are underlyingly unaccusative structures. The body part and the possessor of the body part are argued to be internal arguments of the verb.

³³This test is particularly illustrative of the lack of agentivity of *break* + record combinations with a non-human subject, as, in contrast to the other agentivity diagnostics, the ‘X’ in the *What X did ...* construction need not be a human, as shown in (i).

- (i) a. What the wind did was blow the tree down.
 b. What the computer is doing is calculating the correlation coefficient.
 c. What the bullet did was smash John’s collar-bone.

(Cruse 1973: 16)

- b. She was the other swimmer to break an East German world record, swimming the women's 200 breaststroke in 2:25.35, 1.36 seconds faster than the 1988 mark set by Silke Hoerner. (from COCA)
- (53) a. Mike Powell intentionally/deliberately broke the world record.
- b. i. #The mark intentionally/deliberately broke the mark of 8,490 points.
 - ii. #The city's murder rate intentionally/deliberately broke the 1993 record.
 - iii. #New York City intentionally/deliberately broke its snowfall record.
- (54) a. Mary's coach persuaded/challenged her to break the world record.
- b. #The President persuaded/challenged the number of drownings to break the record.
- (55) a. What Mike Powell did was the break the world record.
- b. #What the city's murder rate did was break the 1993 record.

Where does the agentive interpretation of *break* + record and *break* + norm combinations with a human subject come from, if the events described by these combinations are not necessarily agentive? Following Van Valin and Wilkins (1996), I suggest that the agentive interpretation of sentences in which a human DP occupies the subject position of a *break* + norm or a *break* + record combination is pragmatically derived, arising from “the interaction of the lexical properties of the [subject] NP argument with the semantics of the verb in the context of the clause as a whole” (Van Valin and Wilkins 1996: 310). In particular, that the human subject in these combinations is interpreted as an agent is a consequence of the following default interpretive pragmatic principle: “You may interpret effectors and effector themes which are humans as agents (in the absence of any information to the contrary)” (Holisky 1987: 118–199).

Evidence that the agentive interpretation of *break* + norm and *break* + record combinations with a human subject is not lexically, but pragmatically derived is that, as shown in (56), these combinations may occur with agency-cancelling adverbs (e.g. *inadvertently* and *accidentally*), a possibility that is not available to verbs which are lexically specified for agentivity, such as *murder* (57). Moreover, there are examples in which the humans in the subject position of these combinations carry out the events unintentionally, as shown in (58), repeated from (22). This would not be possible, if agentivity were lexically specified in these *break* + theme combinations.

(56) Lupita González inadvertently/accidentally broke the world record.

(57) * Larry inadvertently murdered his neighbor.

(Van Valin and Wilkins 1996: 310)

(58) There's a young lady backstage, Amanda; she had to look up the word *fornication* in the dictionary to even know that she – what she did to break the law. (from COCA)

5 CONCLUSION

The verb *break* is the epitome of causative alternating change of state verbs. However, for particular choices of theme argument, this verb does not show the causative alternation. Some of these *break* + theme combinations are only intransitive, while others are only transitive. The main explanation for the nonalternation of *break* + theme combinations offered in the literature – the agent-based explanation – focuses only on the obligatorily transitive *break* + theme combinations and, moreover, upon closer

examination of the empirical landscape, turns out to be empirically unmotivated. Contrary to what this explanation claims, the obligatorily transitive *break* + theme combinations do not necessarily require the intervention of an agent, as evinced by multiple examples of these combinations in which the subject is not an agent.

In this paper, I have developed an account of the nonalternation of certain *break* + theme combinations which is consistent with the empirical landscape of the verb *break*. The corpus study of the verb *break* which I have conducted revealed not only that there are some nonalternating *break* + theme combinations, but also that the verb *break* exhibits eight different meanings and that these meanings are dependent on the semantic type of the theme argument with which *break* combines. I have considered two approaches to the lexical semantics of *break*. The first approach involves saying that there are eight different *break* roots in the lexicon. Each of these roots has a particular meaning and requires a theme of a particular semantic type. The roots differ as to whether they are associated with one participant (intransitive-only and alternating *break* roots) or two participants (transitive-only *break* roots). Although empirically adequate, this approach has the inconvenience that it leads to a proliferation of lexical entries in the lexicon. To eschew this inconvenience, I considered a second approach to the lexical semantics of *break*. This approach proposes that there is a single *break* root in the lexicon. This root has a minimally specified meaning and it is the combination of the root with a theme of a particular semantic type that yields a more specific meaning. The root *break* is only associated with one participant, the theme. At the *break* + theme combination level, due to the nature of the meaning of the combination, some *break* + theme combinations require the addition of a second participant (transitive-only combinations), others allow but do not require the addition of this second participant (alternating combinations), while still another prohibits the addition of this participant (the intransitive-only *break* + natural phenomenon combination). The second participant in a *break* + theme combination is usually a causer. The range of semantic types that this causer participant may show is regulated by the Direct Causation Condition: only participants which can be conceived of as direct causers of the eventuality described by the *break* + theme combination can serve as the second participant of a given combination.

The lexical semantic level may output a configuration in which the root *break* is associated with a single participant (this is the case with the *break* + natural phenomenon combination or with the alternating combinations, when no second participant is added) or a configuration in which the root is associated (directly or indirectly) with two participants: the theme, and the causer or experiencer. In the first case, the single argument of the root is mapped onto the complement position of the verb, from which it undergoes movement to Spec,TP. In the second case, the mapping of arguments from lexical semantics to syntax is regulated by the thematic hierarchy. The participant with the lower thematic role, the theme, is mapped onto the lowest syntactic position. The second participant – either the causer or the experiencer – is mapped onto the next lowest position. In the case of the causer, this position is Spec,vP. In the case of the experiencer, I have considered that this position is Spec,VP. The causer and the experiencer move to Spec,TP from their respective original merge positions.

The analysis proposed here is consistent with the empirical landscape of the verb *break* and readily captures the fact that some *break* + theme combinations alternate, whereas others do not. However, there are a number of questions that remain open. I would like to mention two of them. First, the lexical semantics approach to *break* that I adopted makes the claim that the meaning of the root *break* is minimally specified. Although I said that the meaning denotes a state, I did not mention exactly what meaning the root *break* bears. This requires further investigation. Second, I have claimed that, due to the meaning of the *break* + theme combination, some combinations require the addition of a second participant, others allow the addition of a second participant, while others prohibit this addition. How-

ever, I have not specified, for example, what codes, records, and norms have in common, such that when they combine with the root *break*, they produce a *break* + theme combination that requires the addition of a second participant. Similarly, I have not specified why an appearance meaning, shown by verbs of appearance and the *break* + natural phenomenon combination, is incompatible with the addition of a causer participant.

There are also various avenues for future research. I have concentrated on *break* + theme combinations. However, there are other change of state verbs (e.g. *clear* and *lengthen*) that in principle alternate, but do not do so for certain choices of theme argument. I would like to examine the extent to which these verb + theme combinations are amenable to the analysis that I proposed here for *break* + theme combinations. In what ways does this analysis give us a more solid grasp of the nonalternating behavior of these verb + theme combinations than previous explanations proposed in the literature, including Levin and Rappaport Hovav's (1995) agent-based explanation, Rappaport Hovav and Levin's (2012) Proper Containment Condition, and Rappaport Hovav's (2014) pragmatic-based account of the causative alternation?

In addition to extending the analysis to other change of state verbs that do not alternate for certain choices of theme argument, I would also like to extend the analysis to change of state verbs that never alternate, such as *destroy* and *kill*. It is clear that the agent-based explanation is unable to account for the nonalternating behavior of these verbs, as their subject argument is not restricted to agents, but may also be a causer. Under my analysis, the obligatorily transitivity of these verbs would be a consequence of them requiring the addition of a second participant (see Rappaport Hovav 2014: 15 in this respect). Why this second participant is necessary would require further research. See Härtl (2003) for an explanation of the nonalternating behavior of German *zerstören* 'destroy' in terms of the temporal coextensiveness of the causative event and the change of state in the object.

Finally, examining the alternating behavior of change of state verbs in other languages is also an avenue for future research. We have seen that in English, the *break* + norm and *break* + theme combinations are obligatorily transitive. In Greek, however, these combinations participate in the causative alternation (Alexiadou, Anagnostopoulou, and Schäfer 2006). Likewise, while the English verb *destroy* does not show the alternation, its Greek counterpart shows transitive and intransitive uses (Alexiadou, Anagnostopoulou, and Schäfer 2006). It seems that the verb + theme combinations that require a second participant in English do not require a second participant in Greek. Is this variation the result of lexical idiosyncrasy? Could it be traced back to systematic meaning differences between the English verb + theme combinations and their Greek counterparts? Or is the variation a consequence of the different inventories of syntactic heads across the two languages, as Alexiadou, Anagnostopoulou, and Schäfer (2006) suggest? These are questions that I leave for future research.

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