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Variable agentivity: Polysemy or underspecification?

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Many English verbs typically used agentively allow non-agentive uses. Some recent approaches assume such verbs are unspecified for agentivity, although in principle, polysemy is also an option. We demonstrate the complexity of variable agentivity through an in-depth examination of the English verb *sweep*, which shows variable agentivity due to both underspecification and motivated polysemy. Drawing on corpus data, we identify two senses for *sweep*, each with unique argument realization options and interpretive properties. The prototypical uses of this verb, which involve the use of a broom, are obligatorily agentive; however, we claim they instantiate a specialized sense. We argue that the verb's basic sense, which underlies all its other uses, is unspecified for agentivity, being found with agentive and non-agentive subjects. We formulate event structures for both senses that encode the grammatically relevant components of meaning common across all the verb's uses: an entity moves along a surface while imparting a force via contact with it. We show that the event structure for the specialized sense, which fixes the moving entity to be a broom, is derived via established processes involving the lexicalization of instruments and routine goal-oriented activities. We demonstrate how the argument realization options and interpretive properties that the verb shows in each sense emerge from applying established principles of argument realization and semantic composition to these event structures.

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1 Introduction

Many English verbs which are often used with animate subjects interpreted as agents can also appear with inanimate subjects, which by their very nature cannot be understood as agents. This property is illustrated with transitive and unergative verbs from several semantic classes: change of state in (1), sound emission in (2), and surface contact in (3). The subject in the (a) but not the (b) sentences is interpreted as an agent, a term we use as “shorthand” for an animate DP whose referent is understood as acting intentionally, often engaged in a goal-oriented activity.¹

- (1) a. The kids toppled the (block) tower.
b. The wind toppled the tower.
- (2) a. I whistled happily.
b. The kettle whistled.
- (3) a. Taylor washed his car.
b. The waves washed the ship’s deck.

We refer to verbs taking either agentive or non-agentive subjects as *variably agentive verbs*.

The ubiquity of the phenomenon is not always fully appreciated since for most variably agentive verbs the first and often only examples that come to mind are agentive. If asked for a sentence with the verb *wash*, speakers will likely suggest (3a) rather than (3b). Or consider the verb *sweep*, whose variable agentivity shown in (4) is the focus of this paper. This verb figures prominently in prior work (e.g., Rappaport Hovav & Levin 1998; 2010), but that work only considers its agentive uses despite its many non-agentive uses.

- (4) a. Matt swept the walk.
b. The branch of the tree swept the window.

Even verbs which often describe activities crucially involving an animate entity’s mental state such as *explain* and *justify* can appear with abstract subjects that cannot be interpreted agentively.

- (5) a. Sam explained the problem to me.
b. Your background explains your behavior to me.
- (6) a. Bill justified his behavior.
b. That threat to your safety justifies an increase in security precautions.

¹ Many researchers (e.g., Folli & Harley 2005; 2008; Joo et al. 2022) treat inanimate subjects as agents in certain circumstances. Although we acknowledge, following Cruse (1973), Dowty (1991), Heidinger & Huyghe (2024), Schlesinger (1995), Van Valin & Wilkins (1996), among others, the complexity of the notion “agent”, we focus on the narrow notion described here since this notion is relevant to the phenomenon under study.

Of course, some verbs are obligatorily agentive. These include some verbs of killing such as *assassinate* and *murder* (e.g., Ausensi 2019; 2021) and other verbs necessarily requiring intention and the activation of a mental state, as in (7).

(7) appoint, chat, gossip, hunt, nominate, prowl, search (for), shop (for), stalk, ...

However, verbs that are obligatorily agentive seem to be the exception, as noted by Van Valin & Wilkins (1996: 310).

Given the pervasiveness of variable agentivity, the relation between the agentive and non-agentive uses of variably agentive verbs merits investigation. Here we consider two obvious options: either such verbs have a single sense unspecified for agentivity or they have two senses, i.e. they are polysemous.² On the single sense option their subject bears a semantic role compatible with either agentive or non-agentive interpretations. We consider two implementations of this approach. Holisky (1987) and Van Valin & Wilkins (1996) assume that variably agentive verbs like *kill* do not lexically attribute agentive properties to their subject, which is assigned the “effector” role.³ If an animate DP is chosen as the subject, it is attributed properties such as volition and intentionality via a pragmatic inference. Evidence that such properties are due to an implicature and not an entailment comes from the observation that verbs that allow inanimate DPs as subjects also allow a non-intentional interpretation with a human DP as subject.

(8) a. Larry accidentally killed the deer.
b. The explosion killed the deer. (Van Valin & Wilkins 1996: 309, (9c,d))

On this implementation of the single sense approach, aside from the properties directly stemming from the (non-)agentivity of their subjects, the syntactic and truth conditional properties of agentive and non-agentive instances of variably agentive verbs are expected to be identical. However, Alexiadou et al. (2017), Demirdache & Martin (2015), Folli & Harley (2005; 2008), Martin & Schäfer (2013), Schäfer (2012), among others, argue that the differences between agentive and non-agentive instances of variably agentive verbs go beyond the (non-)attribution of agentivity to the subject. They claim that with an inanimate subject such verbs must appear with a result phrase (or lexically entail a result). As evidence for this “resultative restriction” as Schäfer (2012: 133) calls it, they cite data such as (9) and (10). Assuming the resultative

² The vast literature on polysemy distinguishes various forms of this phenomenon. We will argue that the verb *sweep* shows a type of motivated polysemy, distinct from homonymy, but also distinct from the many types of polysemy which following Apresjan (1973) are called “regular polysemy”. See Note 26 and Section 3.5.1.

³ “Effector” is a semantic role used in Role and Reference Grammar (Van Valin & LaPolla 1997) for “the dynamic participant doing something in an event” (Van Valin & Wilkins 1996: 289; see also Van Valin & LaPolla 1997: 118); thus, it encompasses various types of causers, unlike “agent” on the strict definition. “Effector” corresponds roughly to Borer’s (2005) “originator”, Ramchand’s (2008) “initiator”, and Wolff et al.’s (2010) “force creator”.

restriction, the (a) sentences are ill-formed without the particle since without it they do not entail a result state, purportedly required with a non-agentive subject. The (b) sentences are grammatical without a particle because their subject is agentive.

- (9) a. The acid ate the metal ??(away).
 b. The kids ate the popcorn (up).
- (10) a. The washing machine chewed *(up) the laundry.
 b. The cowboy chewed the tough beef. (Folli & Harley 2005: 104, (24i-k))

These authors motivate a second implementation of the single sense approach. They capture the resultative restriction by associating agentive and non-agentive instances of a verb with different functional heads, different “flavors” of little *v*. The *v* functional head which assigns a non-agentive role to the subject selects a small clause with a result predicate. Any systematic differences between the semantics of sentences with agentive and non-agentive subjects are attributed to the functional head and not to the verb root. The implicit assumption, at least in some of this work, is that the contribution of the root associated with a given verb is the same across all its uses. This qualifies as a single sense approach where roots are compatible with – or unspecified for – distinct functional heads. We refer to the single sense approach as the underspecification approach⁴ since on either implementation the verb or root is not specified for agentivity and is compatible with either agentive or non-agentive subjects.

There is no reason to believe that the agentive and non-agentive uses of all variably agentive verbs are related in the same way, as pointed out by Alexiadou et al. (2017) and Martin & Schäfer (2013). It is possible that an underspecification account is appropriate in some instances and a polysemy account is appropriate in others, and a combination of the two is called for in still other instances. Resolving the issue of polysemy vs. underspecification requires in-depth studies which carefully track the syntactic and semantic properties of variably agentive verbs. Special attention must be paid to modulations in meaning accompanying systematic variations in agentivity that are indicative of general processes underlying variable agentivity. This paper presents such a study.

We scrutinize the English verb *sweep* which appears with agentive and non-agentive subjects across various syntactic frames. Our goal is to provide a maximally general analysis of its full range of uses, assuming that all its uses are lexically related and keeping the analysis compositional to the extent possible. We seek to account for the variation in both argument

⁴ A reviewer notes that some work uses the term “underspecification” to refer to an encoded unvalued feature which gets valued in some contexts. We do not believe that variably agentive verbs are underspecified in this sense; we do not believe that there is a grammatical [+/-agentive] feature relevant to them. However, in much of the polysemy literature the term “underspecification” is applied to a word sense which is unspecified for meaning components like agentivity (e.g., Frisson 2009; 2015; Vicente 2018); we adopt this use of the term.

realization and interpretation, while tracking the effects of variation in agentivity. We rely on principles of argument realization and composition which are generally applicable in English and not tailored to this verb. These desiderata lead us to conclude that there are two distinct sources for the agentive uses of *sweep*. The prototypical uses of this verb – which involve the use of a broom – are consistently and obligatorily agentive; however, we claim that they instantiate a specialized meaning of the verb. We argue that the basic meaning of the verb, which underlies all its other uses, is unspecified for agentivity: it is found with agentive and non-agentive subjects, with agentivity attributed to certain subjects by pragmatic inference, as in Holisky (1987) and Van Valin & Wilkins (1996). The specialized meaning is derived from the basic meaning via established processes involving the lexicalization of instruments and routine activities of agents; hence, the obligatory agentivity. Thus, the variable agentivity of *sweep* is due in some instances to motivated polysemy and in others to underspecification. The basic sense is unspecified for agentivity, and the specialized sense is purely agentive. We further show that non-agentive uses of *sweep* are attested without either an explicit or an implied result.⁵ This challenges the resultative restriction.⁶

The paper is organized as follows. Section 2 surveys the argument realization and interpretive properties of *sweep* and argues that it has the two just-mentioned senses. Section 3 presents event structures for the two senses, showing how their argument realization and interpretive properties follow from these event structures together with general principles of argument realization and semantic composition. This section also shows that the two senses instantiate a form of motivated polysemy and elaborates on how one sense is related to the other. Section 4 assesses the larger significance of the analysis.

2 Sweeping with and without a broom: Semantics and syntax

In this section we examine the range of syntactic frames that *sweep* is found in and their associated interpretive properties and show that the data motivate the association of two senses with this verb. We draw on a random sample of sentences with this verb taken from the Corpus of Contemporary American English (COCA; Davies 2008–). We restrict our discussion to physically instantiated instances and leave aside figurative instances such as those whose subjects are emotions, fads, and gazes (e.g., *Our gaze/The fad swept the class*); for discussion see McNally & Spalek (2022).

⁵ Alexiadou et al. (2017) include the German and French counterparts of *sweep* in a class of “optionally causative manner verbs”; they claim that such verbs entail a result when their subject is inanimate and hence non-agentive. This claim does not extend to the English verb *sweep* as shown in Section 2.2, nor does it extend to other English surface contact verbs (Levin 2023). The English data suggest that the French and German data should perhaps be examined more closely.

⁶ The resultative restriction is also questioned by Bruening (2010), Mateu & Rigau (2010: 264), and Rappaport Hovav (2016: 472).

Throughout this section, we illustrate our points whenever possible with attested examples. These are primarily drawn from COCA (followed by the superscript “C”); unattributed examples are constructed. Given the qualitative nature of our corpus study, we can make impressionistic claims about the frequency of the two senses of *sweep* and the relative frequency of the various syntactic frames but cannot make precise quantitative statements.

2.1 The prototypical use of *sweep*: Sweeping with a broom

The prototypical use of *sweep*, the use commonly mentioned first in major English dictionaries, is illustrated in (11).

- (11) a. ... he moved the desks and swept the floor ...^C
 b. We would sweep the carpeting around the pulpit ...^C
 c. They found her in Grant Park sweeping the sidewalks.^C
 d. As a final touch I swept the terrace.^C

This use is characterized by several intertwining properties. Some might be so obvious as to seem not worth mentioning, but they must be acknowledged because as shown in Section 2.2, they are not all shared by other uses of the verb. We propose an explanation for these properties in Section 3.5.

First, the examples in (11) entail the use of a broom; none of them can be understood as involving any other instrument. This entity is typically not expressed, although it can be in an instrumental phrase, especially if modified, as in (12a). Overt expression of any other instrument is infelicitous, as in (12b,c).

- (12) a. Everyone who has ever swept the floor (with a standard broom) ...⁷
 b. #I swept the floor with a shovel.
 c. #I swept the floor with my hands/with a newspaper.

Relatedly, the subject is entailed to be agentive and hence human.

- (13) #The wind swept the floor.⁸

⁷ Spector, Nicole. 2023. Where to find the best deals for spring cleaning items. GoBanking. March 29. <https://www.gobankingrates.com/saving-money/shopping/dollar-store-items-stock-up-for-spring-cleaning/>; accessed 7/13/2023. A reviewer does not find (12b,c) infelicitous, suggesting that they describe instances of sweeping “unlikely to have been successful”. That such an understanding is required confirms our point. These sentences only receive an interpretation in relation to a prototypical instance of sweeping with a broom, that is, with their instruments understood as manipulated as a broom normally is to fulfill the design purpose of a broom.

⁸ There are simple transitive uses of *sweep* with natural phenomenon subjects; however, we argue these involve another sense of the verb; see Section 2.2.

This follows since only agents can manipulate instruments such as brooms.⁹ Agentivity in the examples in (11) is not an invited inference as Van Valin & Wilkins (1996) argue for the verb *kill* – the action of sweeping must be executed intentionally. This requirement is brought out in (14), which invites a reading in which the sweeping is carried out intentionally, but the surface swept is not the intended one.

(14) We accidentally swept the carpeting around the pulpit.

Speakers we have consulted alternatively interpret such sentences as describing situations in which orders are misremembered or misinterpreted, so that the sweeper intends the sweeping but carries it out under mistaken circumstances. Thus, *sweep* contrasts with *break*, whose subject is unspecified for agentivity. *Casey accidentally broke the vase when she bumped into the table* allows a reading where the breaking event itself is unintentional.

Further, the verb's direct object must be understood as a surface that the broom moves over, and the surface must be a floor or other surface that humans tread on like a sidewalk, deck, or path.¹⁰

(15) #I swept the desk/the window/the refrigerator/the wall/the book.

The action of removing a thick layer of dust from a window with a broom cannot be described as *sweeping the window*, although as discussed in Section 2.2, it can be described as *sweeping the dust off the window*.

This use of *sweep* shows another interpretive property: the agent must use the instrument in the typical “action pattern” (Jackendoff 1990: 34) that allows its design goal to be achieved; the broom must be used in the canonical fashion (Kiparsky 1997: 482). This inference is non-defeasible. The scenario in (16) is not sweeping the sidewalk.

(16) My son swept the sidewalk. #He did it by pushing the litter into the gutter with the top of the broomstick.

There are other strongly invited inferences, which are defeasible. The first involves the existence of unwanted material on the surface. This commonly drawn inference is cancellable:

(17) My daughter swept the floor although she didn't have to because it was spotless!

⁹ The subject can also be a machine. Machines that operate under their own power are known to pattern in many ways like agents grammatically; agents perform intentional goal-oriented activities, and such machines are designed to perform these activities autonomously; see Alexiadou & Schäfer (2006), Grimm (2007), Schlesinger (1995), and Wolff et al. (2010).

¹⁰ A reviewer questions the restriction that the surface be a floor-like entity, pointing to web examples of sweeping a ceiling with a broom. We address this concern in Section 3.5.1, but point out that as with (12b,c), such sentences are understood as deviations from sweeping with a broom.

Second, although the action is performed to clean the surface through the removal of unwanted material, attainment of this goal is not entailed:

(18) After I swept the floor, there were still crumbs under the table.

Our claim will be that these uses are based on a specialized sense of the verb. We refer to the sense of the verb when it shows these interpretive properties as broom-*sweep*. This sense is attested in two syntactic frames: the transitive frame (already illustrated) and an unspecified object frame, where the surface is not expressed although its existence is still understood, as in (19).

(19) We scrub, sweep, mop, and polish, until the shop is positively gleaming.¹¹

The two syntactic frames characteristic of broom-*sweep* are among a larger set of frames attested with *sweep* that are treated together in Rappaport Hovav & Levin (1998; 2010). In one, which features a directional PP, the direct object can be understood as unwanted stuff moved along the surface, and the surface is either overtly expressed in the PP, as in (20a), or its existence is understood but unexpressed, as in (20b).

(20) a. Terry swept the leaves off the sidewalk.
b. Terry swept the crumbs into the corner. (Rappaport Hovav & Levin 1998: 97, (1c,d))

We argue, however, that these examples do not involve the broom-*sweep* sense since this syntactic frame does not *require* the interpretive properties characteristic of instances of broom-*sweep*. The surface need not be a floor-like entity, and a broom need not be used to remove unwanted material:

(21) I never saw him throw or sweep papers off the desk.^c

Even with a floor-like surface, the use of a broom need not be entailed:

(22) Utah sweeps it [= the gun] under the bed with his foot.^c

Relatedly, the action in (22) cannot be described using an unexpressed object, as shown in (23).

(23) A: What was Utah doing? [With (22) as context]
B: #He was sweeping.

(24) illustrates a range of non-broom-related happenings describable with *sweep*. These include sentences with both agentive and non-agentive subjects.

¹¹ Green, Jane. 2002. *Bookends*, 168. New York: Broadway Books.

- (24) a. Soon a torrent of rain sweeps the patio ...^c
 b. I swept the coins off the counter.¹²
 c. She swept it [=her hand] through her hair.^c
 d. ... when the branch of the tree swept the window...¹³
 e. Ash swept through the streets like snow.^c
 f. The harpist swept the strings of her instrument with a bow ...¹⁴
 g. It [=the wind] just swept the fire up the side of the mountain.^c

We argue in the next section that the verb has a second, non-broom-*sweep* sense that can be associated with the verb in various syntactic frames and is unspecified for agentivity.

On the analysis developed in Section 3, the non-broom-*sweep* examples involve the basic sense of the verb; we refer to this sense as *basic-sweep*. We take *basic-sweep* as the basic sense because as we show in Section 3.2, it is possible to specify a single meaning underlying all examples with the verb in the *basic-sweep* sense. The broom-*sweep* sense preserves this core meaning but it is narrowed; hence, its more restrictive interpretive properties. We attribute this narrower meaning to a regular process of lexicalization of instruments and routine goal-oriented activities. We show the syntactic properties of this narrowed sense follow from its narrowed meaning along with established properties of English word-formation.

2.2 *Basic-sweep*: Key syntactic and interpretive properties

In this section we show that if we identify those uses not necessarily involving a broom as representing the *basic-sweep* sense, we find that this sense appears in three syntactic frames: a simple transitive frame with only a subject and object; a transitive frame with an additional directional PP; and an unaccusative frame with a directional PP. As we illustrate these options, we highlight differences between the verb in its two senses. We take these differences as strong justification for recognizing two distinct but related senses of the verb.

2.2.1 The simple transitive frame

We begin by examining the properties of the verb in the *basic-sweep* sense in the simple transitive frame, i.e. with no directional PP. Instances of this frame can have either agentive or non-agentive subjects, although non-agentive subjects are more common in the corpus data, an observation we return to in Section 3.4.

¹² Ferguson, Mike. 2017. The tale of the dark roast. *Sprudge*. October 26. <https://sprudge.com/the-tale-of-the-dark-roast-127280.html>; accessed 7/25/2023.

¹³ Hall, Lindsey. 2020. Spiders. Lindsey Hall writes. <https://lindseyhallwrites.com/2020/10/23/spiders/>; accessed 7/25/2023.

¹⁴ Roddy, Michael. 2015. Simon Rattle and new Paris hall impress in Mahler. Reuters. February 19. <https://www.reuters.com/article/uk-france-philharmonie-idUKKBN0LN0SR20150219>; accessed 7/28/2023.

- (25) a. ... frigid waves swept the deck.^C
 b. The north wind swept the open tundra ...^C
 c. ... the Everglades will become a kind of ecological desert, a desiccated meadow swept by huge fires each dry season.^C
 d. ... when the branch of the tree swept the window...¹⁵
 e. ... my dirty hand swept the surface.¹⁶
 f. Miriam gently swept the strings of her harp with slim, white fingers.¹⁷

Although the direct object is understood as a surface, it need not be floor-like. As (25) shows, instances of this frame need not involve the manipulation of a broom, nor the removal of stuff, unwanted or otherwise, from the surface; nor is achieving cleanliness a necessary goal.

The verb with the basic-*sweep* sense in the simple transitive frame lacks an unspecified object counterpart, unlike the verb with the broom-*sweep* sense in the same frame. Omitting the argument representing the surface leads to unacceptability:

- (26) *The frigid waves/huge fires/branch swept.

This obligatoriness holds even with an agentive subject; (27) is not an alternate description of the event described in (25f).

- (27) *Miriam gently swept.

Basic-*sweep* shows another distinctive property: agentive instances in the simple transitive frame very strongly prefer a *with* phrase specifying either an instrument or body part; omitting the *with* phrase in (25f) degrades the sentence.¹⁸ In contrast, simple transitive instances of basic-*sweep* show no such requirement. We offer an explanation for this property in Section 3.4.

2.2.2 The transitive+PP frame

The verb in the basic-*sweep* sense in the simple transitive frame is relatively infrequent in our corpus. It is more often found in a transitive frame with a directional PP, which we refer to as the transitive + PP frame. In this frame, the verb again displays variable agentivity, but the direct object is understood as a moving entity instead of a surface, as illustrated with agentive examples in (28) and non-agentive examples in (29).

¹⁵ Hall, Lindsey. 2020. Spiders. Lindsey Hall writes. <https://lindseyhallwrites.com/2020/10/23/spiders/>; accessed 7/25/2023.

¹⁶ Liddy, Sadie. n.d. You. <https://www.crookedtree.org/sites/default/files/inline-files/you-sadie-liddy.pdf>; accessed 11/23/2023.

¹⁷ Douglas, Lloyd C. 1942. *The robe*. Chapter 1. Boston: Houghton Mifflin. Project Gutenberg Australia. <https://gutenberg.net.au/ebooks04/0400561h.html>; accessed 12/1/2023.

¹⁸ Agentive instances of basic-*sweep* in the simple transitive frame without a *with* phrase require heavy contextual support. One of the rare examples is *He swept the strings of the guitar like they were lost memories*. (https://www.instagram.com/thejoshwalker_/p/Cvh7oS0Onbk/?img_index=1; accessed 5/26/2024).

- (28) a. She began to sweep her fingers over the strings.¹⁹
 b. She swept the brush through Megan’s shiny hair ...²⁰
 c. I swept the coins off the counter ...²¹
- (29) a. ... the wind swept the fires quickly through the top growth ...²²
 b. ... the swift water swept the truck from the road.^c
 c. Behind her the wind swept the leaves into the room ...^c

The nature of the moving entity depends on the subject’s agentivity. With an agentive subject, three options are attested. First, quite often the moving entity is a body part of the agent, as in (28a); its motion is under the agent’s control. Second, the moving entity may be an entity that is not only ontologically an instrument but is manipulated by the agent in a way that fulfills its design purpose. For instance, in (28b) the sweeping is also a brushing. This option seems to be infrequently attested, a point we return to in Section 3.4. Third, often the moving entity is a *displaced entity*, a physical object moved by the subject, whose ontological type is irrelevant to the motion, as in (28c).²³

With non-agentive subjects, as in (29), only the displaced entity option is attested. The body part and instrument options are not found since only agents have body parts and manipulate instruments. In Section 3.3 we show that the instrument, body part, and displaced entity options all fulfill the same requirement that the basic-*sweep* sense imposes on uses of the verb.

In the transitive+PP frame both the direct object and directional PP are obligatory, independent of the nature of the moving entity – whether an instrument, body part, or displaced entity – and the agentivity of the subject. Basic-*sweep* then does not allow unspecified objects unlike broom-*sweep*.

- (30) a. Pat swept *(a brush) *(through her wavy hair).
 b. Pat swept *(her hand) *(over her face).
 c. The tsunami swept *(the debris) *(off the beach).
 d. Pat swept *(the coins) *(into the jar).
 e. The wind swept *(leaves) *(into the room).

¹⁹ L’Engle, Madeleine. 1995. *Troubling a star*, 146. New York: Laurel Leaf.

²⁰ The dancing angels. 2012. Blog post. August 28. <https://jimrit.wordpress.com>; accessed 1/10/2021.

²¹ Ferguson, Mike. 2017. The tale of the dark roast. *Sprudge*. October 26. <https://sprudge.com/the-tale-of-the-dark-roast-127280.html>; accessed 7/25/2023.

²² Fox, Robin Lane. 2007. Greek and unique. *The Financial Times*. October 12. <https://www.ft.com/content/2dfa1c88-7864-11dc-8e4c-0000779fd2ac>; accessed 7/28/2023.

²³ There are rare simple transitive instances of *sweep* with the displaced entity as direct object, as in ... *they let her read instead of forcing her to move haystacks or sweep cow dung*^c. Such examples seem to involve the use of a broom; however, since displaced entities as direct objects of *sweep* otherwise only occur with the basic-*sweep* sense, it seems likely that they nevertheless involve basic-*sweep*. We leave further investigation for future research.

Conversely, an unspecified object sentence like *I swept this morning* cannot be used to describe sweeping an insect out of a room with one's foot or even spending the morning sweeping insects out of a room with one's foot.

In the transitive + PP frame, the PP often includes a DP understood as the surface, as in (30a–c). Even when not expressed, a surface is still understood in this frame, and its identity is often recoverable from context or inferable given world knowledge, as in (30d,e).

2.2.3 The unaccusative+PP frame

Since broom-*sweep* is obligatorily agentive, it is not expected to show the causative alternation (Levin & Rappaport Hovav 1995; Reinhart 2002; Rappaport Hovav & Levin 2012; Alexiadou, Anagnostopoulou & Schäfer 2015), and indeed it is not found in an unaccusative frame representing an anticausative counterpart of the transitive frame.

(31) Danny swept the floor./*The floor swept.

In the transitive frame, the verb with the basic-*sweep* sense, even with a non-agentive subject, lacks an unaccusative, anticausative counterpart:

(32) a. The branches swept the window./*The window swept.
b. The north wind swept the open tundra ...^c/*The open tundra swept.

Since the subjects in the simple transitive frame can be non-agentive, the lack of an unaccusative counterpart for this frame cannot be attributed to the agentivity of the subject. In contrast, the verb in the transitive + PP frame with a displaced entity object has an unaccusative counterpart which also takes an obligatory directional PP:

(33) a. ... fire swept *(through their home) ...^c
b. The flood ... swept *(across the flats to the sea).^c
c. ... a flashy new car swept *(in through the open gateway) ...²⁴

That is, basic-*sweep* is not found in an unaccusative frame when its subject is the surface, as in (32), but it is found in such a frame when the subject is the displaced entity and then only in the presence of a directional PP, as in (33). We account for these observations in Sections 3.3 and 3.4.

As with their transitive + PP counterparts, the PPs in the unaccusative + PP frame often include a DP interpreted as the surface, as in (33a,b); however, the surface may be left unexpressed, although its existence is still understood, as in (33c). Interestingly, the subject – the displaced entity – in the unaccusative + PP frame may be understood as agentive:

²⁴ Upfield, A.W. 1985 [1950]. *The widows of Broome*, 4. New York: Scribner's.

(34) Liddie swept *(into the room).^c

In Section 3.3 we analyze displaced entity subjects in the unaccusative + PP frame as internal arguments,²⁵ so such examples represent variable agentivity on a different argument than in the basic-sweep transitive + PP frame; thus, they are not relevant to this paper.

Summarizing, the distributional and interpretive properties of *sweep* in the basic-sweep sense and the broom-sweep sense differ. Semantically, the verb in the basic-sweep sense may or may not be agentive; there is no inference of unwanted stuff on the surface nor of performing the action to achieve cleanliness of the surface; there is no necessary inference that an instrument is used; and the surface argument is not constrained to be floor-like. Syntactically, the verb in the basic-sweep sense can occur in an unaccusative frame unlike in the broom-sweep sense. In contrast, in the broom-sweep sense the verb is attested with unspecified objects, but in the basic-sweep sense it is never found with such objects in any syntactic frame. Finally, agentive simple transitive basic-sweep strongly prefers a *with* phrase, unlike simple transitive broom-sweep. Thus, variation in interpretive properties is accompanied by variation in argument realization options. We consider this solid evidence that the verb *sweep* is polysemous. This conclusion receives independent support from (35), which illustrates the application of a standard identity test for polysemy (adapted from Zwicky & Sadock 1975; Cruse 1986; Asher 2011: 63–64).²⁶ The oddness of these examples – a zeugma effect – follows if the two conjuncts involve distinct senses of *sweep*.

- (35) a. #The sailor swept the deck and so did the rain.
 b. #The sailor swept the deck and then the rain swept it.

2.3 Basic-sweep as a motion and sustained contact verb

We now show that the constellation of syntactic frames characteristic of *sweep* in the basic-sweep sense is representative of the members of the larger class of verbs that *sweep* belongs to, motion and sustained contact verbs. This class, called “wiping verbs” in Levin (2017), constitutes a manner subclass within Levin’s (1993) verbs of removing (see also Levin & Rappaport Hovav 1991) and includes *rub*, *scrape*, and *wipe* as well as *sweep*. Using *rub* and *scrape* as examples, we show that verbs in this class occur in the same syntactic frames as *sweep* in the basic-sweep sense.

²⁵ Following much literature, we assume manner of motion verbs with agentive subjects are unaccusative when used to describe directed motion events (e.g., Hoekstra 1984; Levin & Rappaport Hovav 1995).

²⁶ We argue in Section 3.5.1 that *sweep* allows a form of motivated polysemy; however, as shown in (35), this form of polysemy is distinct from the much-discussed forms of polysemy which allow two senses of a word to be “co-predicated” in the context of conjunction, ellipsis, or anaphora (Cruse 1995; Pustejovsky 1998; Asher 2011; Dölling 2021). For example, the noun *newspaper* allows co-predication of publication and publisher senses: *The newspaper is printed on yellow paper and has a young chief executive* (Dölling 2021: 15, (52)). Such instances of polysemy are forms of “regular polysemy” (Apresjan 1973), a term encompassing many types of systematic polysemy (e.g., Nunberg & Zaenen 1992; Pustejovsky 1995; 1998), not all of which allow co-predication; see Dölling (2021) for discussion.

Thus, the phenomenon we are scrutinizing is not idiosyncratic. Since *rub* and *scrape*, unlike *sweep*, lack a specialized sense, the shared properties of these three verbs support our contention that basic-*sweep* is “basic”: it shows just the properties of a verb of motion and sustained contact.

The verbs *rub* and *scrape* appear in a simple transitive frame with both agentive and non-agentive subjects:

- (36) a. Wearily Sarah rubbed her forehead.^c
 b. I got too close to the fence and scraped it with the tractor.^c
- (37) a. ... his front tire rubbed the rear tire of the bike ahead ...^c
 b. Branches and undergrowth slashed at their jackets, scraping the fabric with slithering sounds.^c

However, these verbs differ from *sweep* in one respect: as simple transitives they lack a use where a specific instrument is understood.

These two verbs also appear in the transitive+PP frame, where they are found with displaced entities as direct objects with both agentive and non-agentive subjects, as in (38a,b) and (39a,b), and when their subject is agentive, they are found with body part and instrument direct objects too, as in (38c,d) and (39c,d).

- (38) a. Outside a wind bangs the iron roof and rubs branches against each other making a high-pitched see-saw sound...^c
 b. Ashley rubs conditioner into her hair.^c
 c. She rubbed a hand across her thick dark hair.^c
 d. Emmanuel rubs the towel against his head ...^c
- (39) a. ... winds that scrape branches along the windows all day are spooky when home alone.^c
 b. At lunch, no one scraped their food into the new composting bins.^c
 c. I scrape my fingers over the paper as I leave the office ...^c
 d. He scraped the spoon across the bottom of the now-empty bowl ...^c

Again, with *scrape* the surface may be expressed in the directional PP, as in most of the examples in (39), or if not expressed, as in (39b), its existence is understood. Uses of *sweep* and *scrape* with an unexpressed surface describe the removal of some material – the displaced entity – from a surface, with the PP indicating the eventual location of this material. However, *rub* cannot be used to describe such scenarios due to its lexicalized meaning; the action must take place over the surface itself, which must be expressed. *Rub* and *scrape* are also attested in the unaccusative + PP frame with the displaced entity as subject, as in (40) and (41), although neither is attested in this frame as often as *sweep*, it being particularly rare with *rub*.

- (40) a. ... the leaves went whoosh as the rake scraped along the hard ground.^c
 b. ... the legs [of the chair] scraped across the tile floor ...^c
 c. ... I listened to the water slowly scraping across the rocks.^c
- (41) a. This will stop the shoe and sock from rubbing against bare skin.^c
 b. Outside a branch mewed, rubbing against the eave ...^c

Since this constellation of syntactic frames is a hallmark of verbs of motion and sustained contact, an analysis of such verbs should give rise to precisely these frames. On the common assumption that there is a correlation between facets of meaning and argument realization options,²⁷ a prerequisite for an analysis is identifying the grammatically relevant meaning components these verbs share. In Section 3 we argue that these are motion and sustained contact and that they are applicable to the verb *sweep* in both senses. All instances of the verb in the syntactic frames for both senses involve the movement of an entity over a surface through sustained contact. These shared meaning components contrast with others that are not shared: the necessary involvement of an agent and inferences of removal of unwanted stuff or of attainment of cleanliness. The analysis of basic-*sweep* and broom-*sweep* and the relation between them presented in Section 3 builds on these insights.

3 Basic-*sweep* and broom-*sweep*: Compositionality and lexicalization

In this section we provide an account of the patterns of variable agentivity identified in Section 2. We offer schematically formulated event structures for the basic-*sweep* and broom-*sweep* senses and argue that these representations are appropriate both for the derivation of the argument realization options manifested by the verb in each sense and for capturing the relation between the senses.

3.1 Assumptions about lexical representation and argument realization

We take the verb *sweep* to have a single root, $\sqrt{\text{SWEEP}}$, associated with two senses, basic-*sweep* and broom-*sweep*.²⁸ It is not surprising that a single root is associated with these two senses since they share key elements of meaning.

²⁷ This formulation is meant to be neutral with respect to whether a projectionist or a neo-constructionist approach to argument realization is adopted. Our intention is not to choose between these approaches, but rather to show what any theory needs to account for.

²⁸ We believe that the choice between the two meanings associated with the root $\sqrt{\text{SWEEP}}$ cannot happen via the contextually determined allophony assumed in Distributed Morphology (Harley 2014), but space considerations prevent us from elaborating.

Multiple studies of regularities in the syntax-semantics mapping have shown that certain conceptual elements matter to the grammar. The distinction between the elements of meaning that matter to the grammar and those that do not corresponds to what is characterized as the distinction between the “structural” vs. “idiosyncratic” elements of meaning by Rappaport Hovav (2017) and Rappaport Hovav & Levin (1998; 2010); see also Beavers & Koontz-Garboden (2020), Fillmore (1970), Grimshaw (2005), and Lieber (2004). The structural component of a word’s meaning is often instantiated in an event structure, and the assumption is that properties of the event structure either determine the mapping to syntax (Rappaport Hovav & Levin 1998) or are directly encoded in the syntax (e.g., Borer 2005; Folli & Harley 2005; Ramchand 2008; Mateu 2012; Acedo-Matellán & Mateu 2014; Alexiadou et al. 2015).

The event structures which figure in much previous work are not sufficiently rich to account for all patterns of argument realization attested across the semantic classes of verbs whose members show shared argument realization options. Consider English verbs of contact, which fall into at least three subclasses: verbs of simple contact (e.g., *touch*), verbs of motion and subsequent contact (e.g., *hit*), and verbs of motion and sustained contact (e.g., *sweep*). The last two classes – often treated together as “surface contact verbs” – figure prominently in discussions of manner verbs, and their argument realization options are often derived from their classification as manner verbs (Rappaport Hovav & Levin 1998; 2010). However, the members of these two subclasses display somewhat distinct patterns of argument realization (Levin 2017), and simple contact verbs show yet another. Such observations suggest that although the notion “manner” is relevant to certain generalizations relating to argument realization, finer-grained distinctions are also necessary. Therefore, the event structures we develop in Section 3.2 include semantic notions which have not often figured in event structures previously: these are contact and force transmission. Our ability to account for the range of argument realization phenomena characteristic of *sweep* and other verbs of motion and sustained contact with these enriched event structures suggests that we have identified facets of meaning relevant to a theory of event structure.

3.2 The event structure of *sweep*

In Section 2 we pointed out that all instances of *sweep* entail notions of motion and sustained contact. The notion of contact has not figured in most theories of event structure and deserves closer scrutiny. Contact can be conceived of in spatial or force-dynamic terms, and we argue that the force-dynamic perspective is relevant to *sweep*’s argument realization options. The proposal that force-dynamic notions matter to argument realization is not new (Talmy 1988; 2000; Croft 1991; 1998; 2012; Wolff et al. 2010; Goldschmidt & Zwarts 2016; Levin to appear; for an alternate instantiation of this idea see Copley & Harley 2015).

Motion is an inherently spatial notion: translational motion necessarily involves a *theme* – a moving entity – and a path of motion. But contact can be construed in two ways. From a spatial perspective it involves a theme being located contiguously to a ground, the entity referred to as the surface in Section 2. This perspective focuses on spatial and topological relations between the entities in contact. However, when contact comes about via the imparting of a force through motion as it does with *sweep* and other verbs of motion and sustained contact and with verbs of motion and subsequent contact, it can be viewed from a force-dynamic perspective.²⁹ From this perspective, contact involves a *force bearer*, an entity imbued with a force (Levin to appear; see also Goldschmidt & Zwarts 2016) that imparts this force to a second entity, a *force recipient*, i.e. the surface, throughout the contact.

The force-dynamic perspective on contact allows us to account for the distinct argument realization patterns of the three types of contact verbs. The simple contact verb *cover* in its stative use describes contact between two entities without entailing any notion of imparting force or motion, as in *The snow covered the mountain*. Given this, its event structure must involve only the purely spatial notion of contact, contrasting with contact verbs of the other two types. As mentioned in Section 3.1, verbs of motion and sustained contact such as *sweep* show somewhat different argument realization options from verbs of motion and subsequent contact such as *hit*. The latter involve a force bearer making contact at a point rather than the sustained contact over a surface characteristic of the former. The existence of force transmission and the nature of the contact – at a point vs. over a surface – has repercussions for argument realization, so it seems reasonable that these notions be encoded in the event structure of verbs of these types (Levin 2017).³⁰

Our proposed event structure for basic-*sweep* appears in (42) (cf. McNally & Spalek 2022: 1952).

(42) “x moves across a surface y while x imparts a force to y through contact”³¹

This event structure is intended to represent only the grammatically relevant facets of basic-*sweep*’s full “conceptual content” and is assumed to be relevant for all verbs of motion and sustained contact. The full conceptual content of each verb would include further details that

²⁹ Force-dynamic notions may also be relevant to the characterization of manners of motion (Geuder & Weisgerber 2006).

³⁰ See Levin (to appear) for a force-dynamic analysis of the argument realization options of certain verbs of motion and subsequent contact and Goldschmidt & Zwarts (2016) for discussion of how the notion of force figures in the conceptual content of such verbs.

³¹ The structure in (42) is formulated so that the motion predicate is the “main” predicate while the contact predicate is “subordinated”. We maintain this formulation in the event structure even when the contact predicate determines argument realization. This asymmetric formulation is necessary for the purposes of encoding the predicates in English prose, but there is no theoretical significance to the subordination relation.

distinguish that verb from other verbs of motion and sustained contact. For example, *sweep* involves extended movement across a planar surface (McNally & Spalek 2022) with contact during the trajectory of movement, while *rub* involves contact with the application of pressure and back and forth or circular movements.

We assume that when an event structure includes two grammatically relevant predicates, the argument realization principles are applied with respect to only one – in (42) either motion or imparting force through contact. Distinct argument realization options emerge depending on the predicate that the principles are applied to.³² In Section 3.3 we show how to derive the argument realization options attested with basic-*sweep* when the motion predicate determines argument realization, and in Section 3.4 we discuss the argument realization options when the predicate involving imparting force through contact determines argument realization. In Section 3.5 we turn to broom-*sweep*. In each section we draw on general argument realization principles independently motivated in the literature; that is, principles not tailored to *sweep*. These principles are set out in (43)–(45).

- (43) Simple motion along a path is expressed via a small clause.
- a. An entity in motion along a path is the subject of a small clause.
 - b. A path is the predicate of a small clause; its reference object, if expressed, is the object of the P heading the predicate of the small clause.
- (44) A force recipient is an internal argument.³³
- (45) An effector is an external argument.

The principle in (43) applies to motion predicates and that in (44) applies to a range of predicates including predicates of imparting force through contact. A principle such as (45) is often posited and applies to various event structures; relevant here is that in circumstances delineated in Section 3.4 it can apply to force bearers as well as to more prototypical effectors such as agents.

3.3 When the motion predicate determines argument realization

On our analysis, the unaccusative + PP frame for basic-*sweep* as in (46) simply represents the realization of the event structure in (42) when the motion predicate determines argument realization.

³² By determining *sweep*'s argument realization options, the availability of two predicates in the event structure gives rise to a form of “argument alternation”. We suggest that the alternate realizations of arguments shown by locative alternation verbs (Rappaport & Levin 1988), by substance emission verbs and precipitation verbs (Levin & Krejci 2019), and by *drown* (Rappaport Hovav 2017) might receive such an analysis, so the mechanism proposed here is not specific to *sweep*.

³³ Force recipients that are the surface arguments of surface contact verbs are expressed internal to the VP across languages but not always as direct objects, as in English. In some languages including Swedish (Lundquist & Ramchand 2012), inanimate force recipients are expressed in a PP, and in still others all force recipients, whether animate or inanimate, are expressed as obliques (Levin 2015).

(46) The fires swept quickly through the top growth.

In (46) both motion and imparting force through contact are understood; however, we assume that the motion predicate in the event structure (42), repeated as (47), serves as the input to the argument realization principles. We indicate the crucial role of the motion predicate by bolding it.³⁴

(47) “**x moves across a surface y** while x imparts a force to y through contact”

The relevant argument realization principle is (43). As a motion predicate is involved, the small clause takes the form of a PP as PPs express the path of motion. Applying (43) to (47) results in x, an entity in motion along a path, being realized as the subject of the small clause, and y, as a reference object with respect to x’s path, being realized in an appropriate PP, the predicate of the small clause. Since small clauses are complements of a verbal head, the result is an unaccusative structure:

(48) [_{VP} *sweep* [_{PP} x [_{PP} P y]]]

(49) ... [_{VP} the fires_x [_{VP} swept [_{PP} t_x through the top growth_y]]]

As shown in Section 2.2 both the DP and PP are obligatory in the unaccusative + PP frame. This obligatoriness follows because by hypothesis they form a small clause, and both elements of a small clause are obligatory.

We analyze basic-*sweep*’s transitive + PP frame as the causativized counterpart of the unaccusative + PP frame. The event structure (50) is derived from (47) by the addition of a ‘cause’ predicate, with z interpreted as the cause of the motion, indicated by the added bolded material. The application of the argument realization principles results in a syntactic structure for (51), repeated from (29a), as in (52).

(50) “**z causes** x to move across a surface y while x imparts a force to y through contact”

(51) ... the wind swept the fires quickly through the top growth ...³⁵

(52) ... [_{VP} the wind_z [_{VP} swept [_{PP} the fires_x [_{PP} through the top growth_y]]]] ...

Application of (43) again gives rise to a small clause in the form of a PP.³⁶ (45) applies to z, which as a cause, i.e. an effector, is realized as the external argument in (52). The postverbal DP and the PP in (51) are both obligatory since they form a small clause.

³⁴ McNally & Spalek (2022) also recognize that the notion of motion is as important as the notion of contact to the analysis of *sweep*, but they cut the data somewhat differently. As they focus on figurative uses of the verb, they do not provide an account of the argument realization options.

³⁵ Fox, Robin Lane. 2007. Greek and unique. *The Financial Times*. October 12. <https://www.ft.com/content/2dfa1c88-7864-11dc-8e4c-0000779fd2ac>; accessed 7/28/2023.

³⁶ A reviewer asks how we would handle examples such as *Tracy swept the crumbs into a pile*, which have been analyzed as creation event descriptions. Such examples could be treated as involving a metaphorical goal – the created entity

Sentences such as (46) and (51) can be considered a causative alternation pair. As is typical of the English causative alternation, the external argument in the causative variant may be either an inanimate cause or an animate agent (e.g., Reinhart 2002; Rappaport Hovav & Levin 2012; Alexiadou et al. 2015). Indeed, basic-*sweep* appears in the transitive + PP frame with both non-agentive subjects, as in (51), and agentive subjects, as in (53), repeated from (28b,c).

- (53) a. She swept the brush through Megan's shiny hair.³⁷
 b. I swept the coins off the counter ...³⁸

The proposal that the transitive + PP frame receives a causative analysis deserves further scrutiny. Causative event structures are bieventive and are argued to allow for modification of the entire event or of the non-causative subpart of the event. Indeed, both interpretations are found when *again* occurs with the causative change of state verb *close* in (54) (e.g., Morgan 1969: 61–62; Dowty 1979: 252–253; von Stechow 1996). In contrast, (55) with the non-causative manner verb *kick* only allows a reading where *again* scopes over the entire event.

(54) The manager closed the door again.

(55) The player kicked the ball again.

The proposed causative analysis of the transitive + PP frame receives support from (56), which adds *again* to (53b).

(56) I swept the coins off the counter again.

It has the two expected readings: the action of sweeping the coins off the counter is repeated or the coins are off the counter a second time. However, many transitive + PP sentences with basic-*sweep* are unambiguous with *again*: (57), based on (53a), only has the interpretation that the brush was moved through the hair a second time; thus, *again* must take scope over the entire causative event.

(57) She swept the brush through Megan's shiny hair again.

This lack of ambiguity is not a reason to reject the causative analysis of the transitive + PP frame. A narrow scope reading of *again* emerges when a causative event includes a result state or result location for *again* to scope over, but not all sentences with a causative analysis involve a result state or location. For example, (58a) and (58b) are typically given a causative analysis as their

– but as otherwise having an analysis analogous to other instances of the transitive + PP frame. Nevertheless, they deserve closer attention in the future.

³⁷ The dancing angels. 2012. Blog post. August 28. <https://jimrit.wordpress.com>; accessed 1/10/2021.

³⁸ Ferguson, Mike. 2017. The tale of the dark roast. *Sprudge*. October 26. <https://sprudge.com/the-tale-of-the-dark-roast-127280.html>; accessed 7/25/2023.

verbs participate in the causative alternation, yet they do not include a result state or location. Concomitantly, they lack the narrow scope reading of *again*. In contrast, (59), which includes a result location, allows both readings.

- (58) a. The child flew the kite again.
 b. The player bounced the ball again.
- (59) The player bounced the ball into the corner again.

Returning to (57), the brush indeed moves along a path as required by *basic-sweep*'s event structure; however, the agent is not carrying out this action to change the location of the brush. Thus, a narrow scope reading is not expected. The availability of a narrow scope reading for *again* is a sufficient diagnostic for a causative structure, but not a necessary one.³⁹

In Section 2.2 we pointed out that in the transitive + PP frame when the subject is an agent, the direct object may have several instantiations. Given the event structures in (47) and (50), a sentence with the verb in the *basic-sweep* sense must include an entity moving in a “sweeping” manner across a surface. The event structure imposes no restrictions on this entity, allowing it to be instantiated by a displaced entity, an instrument, or a body part, as each can move while maintaining contact with a surface. As shown in Section 2.2, in the absence of an agent, the moving entity can only be instantiated by a displaced entity, as in the unaccusative + PP frame example (60a) and the transitive + PP frame example (60b).

- (60) a. The debris swept in through the Genaldon River Valley ...⁴⁰
 b. The flood swept the debris in through the Genaldon River Valley.

In an agentive instance of the transitive + PP frame, the requirement for a moving entity can be met not only by a displaced entity as in (61a), but also by an instrument as in (61b) or a body part as in (61c), as these move along a path in a “sweeping” manner, while contact is maintained. Since instruments and body parts are under the control of an agent, these options are available only when *z* in (50) is realized as a DP interpretable as an agent.⁴¹

- (61) a. Pat swept the coins off the counter.
 b. Pat swept the brush through her hair.
 c. Pat swept her hand over her face.

³⁹ A reviewer suggests that (56) involves a small clause but (57) does not. We take both to involve a small clause, as this analysis can explain why both the postverbal DP and PP are obligatory whether or not the PP describes a result location.

⁴⁰ Lindsey, Rebecca. 2003. Collapse of the Kolka Glacier. *Earth Observatory*. NASA. August 15. <https://earthobservatory.nasa.gov/features/Kolka>; accessed 7/22/2023.

⁴¹ An entity which is ontologically an instrument can be understood as a displaced entity when not fulfilling its design purpose, as in *I accidentally swept the brush off the dresser*.

The requirement is that there be a moving entity; the varying instantiations of this requirement depend on the ontological nature of the argument chosen.⁴²

When the motion component determines argument realization, unaccusative + PP and transitive + PP frame pairs may arise that constitute a causative alternation pair, as in (49) and (51) or (60a) and (60b); however, for most choices of DPs filling the argument positions in these frames it is difficult to construct such a pair. Instances of *sweep* in the transitive + PP frame rarely have a corresponding sentence in the unaccusative + PP frame. For example, (62a) lacks an unaccusative + PP counterpart (62b).

- (62) a. The man swept the roll through the gravy on his plate.^c
 b. *The roll swept through the gravy on his plate.

Similarly, most instances of the unaccusative + PP frame lack transitive + PP counterparts, as shown by (63a), repeated from (33b), and (63b).

- (63) a. The flood ... swept across the flats to the sea.^c
 b. *The hurricane swept the flood across the flats to the sea.

In contrast to the wide range of DPs found as objects in the transitive + PP frame, in our corpus data the unaccusative + PP frame is found with a restricted set of DPs as subjects. Often these DPs denote natural phenomena such as *fire*, *flood*, *storm*, or *wind*. These data reflect general constraints on the DPs that can fill the argument positions in the two variants constituting a causative alternation pair; these constraints apply to *sweep* just as they do to other causative alternation verbs, as we now show.

Rappaport Hovav & Levin (2012) and Rappaport Hovav (2014) argue for an account of the causative alternation in which the variants meet distinct constraints. This account dictates that some causative variants lack anticausative counterparts and some anticausative variants lack causative counterparts. They propose that all else being equal, if an agent directly causes (and accompanies) an entity's motion, it must be mentioned in the description of that entity's motion, as (64) and (65) illustrate.

- (64) [Context: Alex dragged a box to the table.]
 A. What happened?
 B. #The box went to the table.
- (65) [Context: Alex rode his bicycle over the bridge.]
 A. What happened?
 B. #The bicycle went over the bridge.

⁴² On this analysis differences in interpretation related to the ontological type of the moving entity are also expected with simple motion verbs. This prediction is borne out, as evidenced by *I moved the cup*; *I moved my hand*; *I moved the sponge over the stain*.

Rappaport Hovav (2014) argues that the obligatoriness of the agent follows from pragmatic principles, but what matters here is the consequences for *sweep*'s argument realization options.

One consequence is that an unaccusative + PP frame is only possible when the event described does not necessarily include the presence of an agent. Returning to *sweep*, this condition is satisfied when the moving entity is understood as capable of self-motion, such as when it is a natural phenomenon, as in (66a), or an animate entity, as in (66b). It is also satisfied when the moving entity is a “projectile”, a physical object which moves due to being imbued with kinetic energy (Kearns 2000: 241; Grimm 2007; Levin 2020, to appear), as in (66c,d).

- (66) a. ... fire swept through their home ...^c
 b. Liddie swept into the room.^c
 c. The debris swept in through the Genaldon River Valley ...⁴³
 d. Ash swept through the streets like snow.^c

In fact, as mentioned, the DPs most often attested in COCA as subjects in the unaccusative + PP frame denote natural phenomena; thus, they fall into one of the relevant ontological categories.

Other types of entities can only move in a “sweeping” manner if the agent is continuously involved as the motion continues, and this agent must be expressed, explaining the unacceptability of the examples in (67).

- (67) a. *The brush swept through her hair.
 b. *The coins swept across the counter.

Thus, an unaccusative + PP variant may not always be available as an alternate description of a situation described by a transitive + PP variant. For instance, (62a) lacks an unaccusative + PP counterpart (62b) because the agent is continuously involved in the roll's motion.

We turn now to why so many unaccusative + PP instances lack a transitive + PP causative counterpart. As noted, most often the DPs found as subjects in the unaccusative + PP frame denote natural phenomena. The causative variant must involve direct causation (Wolff 2003; among many others; Rappaport Hovav & Levin 2012), yet there are few identifiable (direct) causes of events involving natural phenomena. Therefore, most unaccusative + PP instances will lack a causative transitive + PP counterpart, as in (63). Nonetheless, there are occasional exceptions such as (46) and (51) and also (68a) and (68b), where the wind can be construed as a direct cause of the “sweeping” motion of the fire.

- (68) a. The fire swept up the side of the mountain.
 b. ... it [= the wind] just swept the fire up the side of the mountain.^c

⁴³ Lindsey, Rebecca. 2003. Collapse of the Kolka Glacier. *Earth Observatory*. NASA. August 15. <https://earthobservatory.nasa.gov/features/Kolka>; accessed 7/22/2023.

Also attested are unaccusative + PP instances whose subjects qualify as projectiles; their motion can also be directly caused by natural forces, as in (60a,b), which describe the motion of debris.

In this context we return to an observation from Section 2.4: *rub* and *scrape* are less often attested in the unaccusative + PP frame than *sweep* is. We attribute this to the type of motion and sustained contact that these verbs lexicalize, which requires the intervention of a person more often than with *sweep*. But such instances are occasionally found. Although usually an unaccusative frame is not possible when an agent's presence is necessary, Rappaport Hovav (2014: 25–26) notes that in certain instances, including when the agent is recoverable in context (e.g., it is previously mentioned), it can be left unexpressed. In fact, the unaccusative + PP instances of *scrape* in (40a,b), repeated in (69), meet this condition. In (69a) the subject is an instrument manipulated by an unexpressed agent, while in (69b) it is a physical object whose motion is brought about either voluntarily or involuntarily by a person.

- (69) a. ... the leaves went whoosh as the rake scraped along the hard ground.^c
 b. ... the legs [of the chair] scraped across the tile floor ...^c

3.4 *Sweep* with the contact predicate determining argument realization

As noted in Section 2.2, the verb in its basic-*sweep* sense is found in a simple transitive frame, as in (70), repeated from (25d).⁴⁴

- (70) ... when the branch of the tree swept the window ...⁴⁵

On our analysis, this frame arises when the contact predicate of the event structure in (42), repeated in (71), determines argument realization (indicated in bold).

- (71) “x moves across a surface y while **x imparts a force to y through contact**”

As discussed in Section 3.2, from a force-dynamic perspective a surface contact event involves two participants, a force bearer and a force recipient; however, the notion “force bearer” does not figure in the argument realization principles (43)–(45). In (71), as x imparts a force to y, the surface y is a force recipient and is realized as an internal argument by (72), repeated from (44). x, which imparts a force to y, is the force bearer, and we propose that it qualifies as an effector and is realized as an external argument by (73), repeated from (45).

- (72) A force recipient is an internal argument.

- (73) An effector is an external argument.

⁴⁴ See Appendix 1 for arguments that such instances are indeed true transitives and not unaccusatives in disguise as has been argued for transitive sentences with simple contact verbs such as *cover*.

⁴⁵ Hall, Lindsey. 2020. Spiders. Lindsey Hall writes. <https://lindseyhallwrites.com/2020/10/23/spiders/>; accessed 7/25/2023.

Two types of force bearers qualify as effectors. First, force bearers that are natural phenomena such as wind or fire qualify since they are inherently self-energetic. Second, force bearers that are projectiles qualify as they can impart their kinetic energy to another entity through contact just as natural phenomena and machines can. In fact, the majority of simple transitive instances of *basic-sweep* have such subjects. The sentences in (74) illustrate this point as well as how the application of the argument realization principles gives rise to simple transitive instances of the verb in the *basic-sweep* sense.

- (74) a. The north wind_x swept the open tundra_y ...^c
 b. A hurricane of projectiles_x swept Chih-Yuen_y [= a ship] ...^c

Nevertheless, there are occasional simple transitive examples whose subject is an animate entity, understood as an agent in the strict sense, as in (75a) and (75b), repeated from (25f).

- (75) a. The harpist swept the strings of her instrument ??(with a bow) ...⁴⁶
 b. Miriam gently swept the strings of her harp ??(with slim, white fingers).⁴⁷

An account needs to explain why such examples require a *with* phrase specifying a body part or an instrument, a property which as mentioned in Section 2.2.1, sets simple transitive *basic-sweep* apart from simple transitive *broom-sweep*. Given *basic-sweep*'s event structure, any instance of this sense must include a moving entity and a surface, and when the contact predicate determines argument realization, these are understood as a force bearer and force recipient, respectively. The animate subject in examples like (75) is not a force bearer unlike the subjects of non-agentive instances of transitive *basic-sweep*. However, a force bearer is still needed for the sentence to be acceptable, and the *with* phrases in (75) provide one (unless one is contextually recoverable; see Note 18). In (75b) the force bearer is the harpist's fingers, which move over the surface while imparting a force to it. In (75a) the force bearer is an instrument manipulated by the subject, which could be considered an extension of the subject comparable to a body part (Rissman et al. 2022). As such force bearers are not self-energetic, they do not qualify as effectors and are expressed in an appropriate PP. Instead, the animate subject, as an intentional entity, qualifies as an effector and is realized as the subject by (73); it is understood as acting intentionally by pragmatic implicature. As with non-agentive instances of transitive *basic-sweep*, the force recipient is realized as the object by (72). We leave investigation into the scarcity of agentive instances of transitive *basic-sweep* for the future.

⁴⁶ Roddy, Michael. 2015. Simon Rattle and new Paris hall impress in Mahler. Reuters. February 19. <https://www.reuters.com/article/uk-france-philharmonie-idUKKBN0LN0SR20150219>; accessed 7/28/2023.

⁴⁷ Douglas, Lloyd C. 1942. *The robe*. Chapter 1. Boston: Houghton Mifflin. Project Gutenberg Australia. <https://gutenberg.net.au/ebooks04/0400561h.html>; accessed 12/1/2023.

Our goal in Section 3.3 and this section was to show how the choice of predicate determining argument realization together with general argument realization principles predicts the argument realization options for *basic-sweep*. How does a speaker choose which predicate determines argument realization? That decision depends on the type of event description a speaker wants to communicate. If the path of motion is important, then the motion predicate must be chosen: it allows for the expression of a path. To convey that the leaves a gardener is sweeping end up off a path, the motion predicate must determine argument realization since it allows the specification of the properties of the path. If the imparting force through contact predicate were chosen, facets of the path could not be expressed. If contact is important and the path does not matter, then the imparting force through contact predicate can be chosen. When describing a person's cape sweeping the floor, the nature of the path is unimportant, so the imparting force through contact predicate can be chosen; it does not matter that the path is left unexpressed.

3.5 Broom-sweep revisited

We now spell out the proposal from Section 2 that the *broom-sweep* sense represents a narrowing of the conceptual content of the *basic-sweep* sense by means of a lexicalization process attested elsewhere in English. We then demonstrate how the distributional and interpretive properties associated with the verb in the *broom-sweep* sense follow.

3.5.1 Deriving *broom-sweep* from *basic-sweep*

As mentioned in Section 2.4 instances of the verb in the *broom-sweep* sense maintain the motion and imparting force through contact components of *basic-sweep*. However, *broom-sweep* requires an agent who manipulates a broom in a specific action pattern over a floor or comparable surface while imparting a force to this surface through contact to achieve the goal for which the broom is designed. To indicate the broom's critical contribution we propose *broom-sweep*'s event structure involves a minimal adjustment to *basic-sweep*'s event structure (42): the variable representing the moving entity x is restricted to being a broom:

(76) “ x_{broom} moves across surface y while x_{broom} imparts a force to y through contact with y ”

We now show how the “lexicalization” of broom as the moving entity is responsible for key interpretive properties of *broom-sweep*. Fixing x to be an entity that is ontologically an instrument gives rise to the inference that the relevant activity involves an agent who manipulates this instrument in the action pattern used to achieve its design goal. Although *broom-sweep* is not a denominal verb, English has many verbs that take their name from an artifact that is ontologically an instrument, as in (77); that is, these verbs also lexicalize an instrument.

(77) comb, funnel, hoe, mop, plow, rake, saw, shovel, staple, towel, whip, ...

As Kiparsky (1997: 482) notes, denominal verbs derived from nouns denoting an artifact describe the canonical use of the artifact denoted by the base noun, and when this artifact is an instrument, they describe an agent manipulating the instrument for its intended purpose. Thus, *sweep* in its broom-*sweep* sense shows the characteristic interpretation of verbs that lexicalize an instrument. The observation that the surface is interpreted as a floor-like entity follows as this sense involves the canonical use of a broom: it is designed to remove unwanted material from such a surface. As mentioned in Note 10, occasional deviations from the floor-like entity restriction are allowable if a broom still fulfills its design purpose through movement over and contact with a planar surface so that the surface is being treated as floor-like, as in (78), whose adverb *literally* signals that it involves an atypical instance of broom-*sweep*.

(78) I've literally swept the ceiling with a broom.⁴⁸

Since the instrument is lexicalized, and thus the variable *x* representing the moving entity in (76) is “lexically saturated”, the broom need not be independently expressed as an argument. If expressed, it is in a PP, preferably modified so as to contribute to the meaning of the sentence, as in (12a), repeated as (79).

(79) Everyone who has ever swept the floor (with a standard broom) ...⁴⁹

The same felicity conditions on the (non-)expression of lexicalized instruments apply to denominal verbs (Harley & Haugen 2007: 9–10; Haugen 2009: 256):

(80) Everyone who has ever mopped the floor (with a standard mop) ...

The optionality of the *with* phrase distinguishes broom-*sweep* from basic-*sweep* when it takes an agentive subject in the simple transitive frame. As discussed in Section 3.4, such instances of basic-*sweep* strongly prefer a *with* phrase specifying either a body part of the agent or an instrument, as in (81), repeated from (75a) and (24f)/(75b). As also discussed in Section 3.4, as basic-*sweep* does not lexicalize the moving entity, it must be expressed if it is not recoverable from context.

(81) a. ... the harpist swept the strings of her instrument *(with a bow) ...⁵⁰
 b. Miriam gently swept the strings of her harp *(with slim white fingers).⁵¹

⁴⁸ https://www.reddit.com/r/CleaningTips/comments/q4xnl2/whats_the_easiest_way_to_clean_years_of/?rdt=50628; accessed 11/24/2023.

⁴⁹ Spector, Nicole. 2023. Where to find the best deals for spring cleaning items. GoBanking. March 29. <https://www.gobankingrates.com/saving-money/shopping/dollar-store-items-stock-up-for-spring-cleaning/>; accessed 7/13/2023.

⁵⁰ Roddy, Michael. 2015. Simon Rattle and new Paris hall impress in Mahler. Reuters. February 19. <https://www.reuters.com/article/uk-france-philharmonie-idUKKBN0LN0SR20150219>; accessed 7/28/2023.

⁵¹ Douglas, Lloyd C. 1942. *The robe*. Chapter 1. Boston: Houghton Mifflin. Project Gutenberg Australia. <https://gutenberg.net.au/ebooks04/0400561h.html>; accessed 12/1/2023.

Although we cannot predict that the verb *sweep* would have the sense we refer to as broom-*sweep*, a verb with this meaning is expected. As noted, English regularly forms verbs that designate the activity canonically associated with an instrument. Typically, such verbs share a root with the noun naming this instrument, as in (77). English exceptionally lacks a denominal verb *broom*, but the verb *sweep* has the properties expected of this verb were it to exist. The verb *sweep* then blocks the existence of the expected verb *broom*, much as the noun *guide* blocks the existence of **guider*.

As discussed in Section 2, the verb in the broom-*sweep* sense is found in unspecified object contexts, and such contexts must be interpreted as involving broom-*sweep*.

(82) Yesterday, I swept in the morning.

This sense is licensed in this frame because sweeping the floor with a broom is a culturally recognized routine activity⁵² (e.g., Brisson 1994; Mittwoch 2005; Glass 2022). The generalization that denominal verbs, especially those derived from artifacts, are interpreted as describing canonical uses of the artifacts is distinct from the generalization that some of them come to refer to culturally recognized routine activities. The first generalization holds of all denominal verbs derived from artifact names. It is this second generalization which is associated with the unspecified object frame. For example, the denominal verb *funnel* must refer to an activity involving the canonical use of a funnel; it cannot describe an event of pushing sand off a table and into a cup by moving a funnel in a “sweeping” motion across the table. However, since there is no recognized routine activity associated with this artifact, the verb is not found in the unspecified object frame, contrasting with the denominal verb *mop*.

(83) a. ?I funneled all morning.
b. I mopped all morning.

Verbs denoting activities of agents have a tendency to become associated with narrowed meanings even if they do not lexicalize an artifact. There are other non-denominal verbs with specialized meanings referring to culturally recognized routine activities carried out by agents, and in each instance, it is the specialized meaning which is understood when the verb occurs in the unspecified object frame. For example, the verb *bake* has a range of meanings (Atkins et al. 1988):

(84) a. I baked cookies this morning.
b. The potatoes are baking in the oven.
c. The sun is baking the creek bed.
d. The bricks are baking in the sun.
e. I baked this morning.

⁵² Rappaport Hovav & Levin (1998: 115) propose that unspecified objects are licensed because *sweep* is a manner verb and its surface argument is not a “structure” argument, an argument required by the event structure. However, they recognize that being a manner verb is a necessary condition for allowing unspecified objects, but not a sufficient one.

The meaning components common across instances of *bake* are a change of state that comes about through the application of heat. But *bake* has a narrower use to describe the agentive activity of making baked goods. The verb has this meaning in the unspecified object frame, as in (84e), which cannot for example refer to baking potatoes. Comparable non-denominal verbs are *clean* (Levin & Rappaport Hovav 2014) and *wash* (Alexiadou et al. 2017). Thus, there is a regular process of lexical specialization that involves routine activities of agents, and this specialization gives rise to the unspecified object frame with these verbs. This narrowing of meaning to refer to conventionalized agentive activities is independent of the lexicalization of an instrument: *clean*, *wash*, and *bake* do not lexicalize an instrument. However, since instruments are designed for goal-oriented activities which may become routine, verbs derived via the lexicalization of an instrument can come to refer to conventionalized activities of agents as *sweep* does.

3.5.2 Deriving the argument realization and further interpretive properties of broom-sweep

Transitive instances of the broom-*sweep* sense with the surface expressed as object, as in (85), repeated from (11d), arise when the imparting force through contact predicate in (76) determines argument realization.

(85) As a final touch I swept the terrace.^c

The argument realization principles apply to (85) just as they do when this predicate determines argument realization with basic-*sweep*'s event structure giving rise to its simple transitive instances.

In Section 2.1 we noted that sentences with broom-*sweep* often strongly implicate the existence of unwanted material on the surface as well as its successful removal. These observations also follow from the lexical saturation of the variable *x*, the moving entity, in (76). As discussed in Sections 2.2 and 3.3, basic-*sweep* allows some latitude in the interpretation of this entity: it can be a displaced entity, a body part, or an instrument, with the last two options only compatible with an agentive subject. This latitude is not displayed by broom-*sweep*. Given its event structure, the moving entity must be a broom. Instances of broom-*sweep* cannot entail any other moving entity — even unwanted material that is being displaced — since *x* is already saturated and must be interpreted as a broom. Rather, the inferences about unwanted material arise because of the conceptual content of the lexicalized element: a broom is an instrument designed to remove unwanted material, and sentences with broom-*sweep* must involve the goal-oriented activity a broom is designed for.

We argued in Sections 2.2.2 and 2.2.3 that instances of *sweep* in the transitive+PP and unaccusative frames do not involve broom-*sweep* since they are not semantically constrained to refer to canonical floor-sweeping events. In fact, the motion predicate in (76) *cannot* determine

argument realization with *broom* lexicalized although the broom is entailed to move. This option is unavailable because by argument realization principle (43a), the moving entity, the broom, has to form a small clause with a PP describing its path, as in (86).

(86) $[_{VP} \textit{sweep} [_{PP} x_{\textit{broom}} [_{PP} P y]]]$

As the variable *x* representing the moving entity is lexically saturated, it is unavailable for syntactic expression. This option is still unavailable when the broom is modified, as in (87).

(87) I swept the plastic broom over the floor.

(87) is acceptable, but not as an instance of broom-*sweep*; it does not have to describe a canonical floor-sweeping activity. Rather, it could describe “sweeping” the broom over the floor for any purpose. In contrast, (88), a transitive instance of broom-*sweep*, can only refer to the routine activity of using a broom to clean the floor.

(88) I swept the floor with a plastic broom.

Before concluding, we address an issue raised by a reviewer. On our account, examples of the transitive + PP frame such as (24h), repeated as (89), are a fairly direct reflection of lexical structure (with an added external argument).

(89) It [= the wind] just swept the fire up the side of the mountain.^c

The reviewer correctly points out that in Rappaport Hovav & Levin (1998) such transitive + PP examples are taken to involve Template Augmentation (1998: 111), with the surface argument left unexpressed and the PP representing a result phrase which introduces a second event which “augments” *sweep*’s own simple event structure to create a causative event structure. Resultatives with selected objects such as (90) or with non-selected objects such as (91) are also derived by Template Augmentation, with (90) adding a result AP and (91) adding a full small clause with the verb *sweep*’s own surface argument left unexpressed.

(90) Sam swept the floor clean.

(91) They swept the night away.

The reviewer asks how we would handle examples such as (90) and (91) and whether it is preferable to provide a unified account of these examples and examples of the transitive + PP frame as in Rappaport Hovav & Levin (1998). We consider it an advantage of our account that these two types of examples receive distinct analyses. (91), a non-selected object resultative, can only be understood as broom-*sweep*. Our account predicts this since only on that sense is the verb found in the unspecified object frame, allowing for a non-selected object. Selected object resultatives, in contrast, are found with both broom-*sweep*, as in (90), and basic-*sweep*, as in *The wind swept the fields bare*. The basic-*sweep* resultatives have a surface as object, setting them apart

from examples of the transitive + PP frame, suggesting that they require a different account. (89) cannot be derived from Template Augmentation with the internal argument of *sweep* – i.e. the surface – omitted since unspecified objects are available only for broom-*sweep*, but this sentence has only a basic-*sweep* interpretation. In general, our study focuses on sentences directly reflecting lexical structure such as the transitive + PP frame examples; we leave fuller discussion of the resultative examples for future work.

4 Variable agentivity revisited

In Section 1 we reviewed two types of analyses of variable agentivity: an underspecification account where agentivity is contextually determined, either pragmatically or syntactically, and a polysemy account where agentivity is lexically encoded in one of two polysemes. In this paper we show that both types of accounts are necessary to handle the complex pattern of variable agentivity manifested by *sweep*. The variable agentivity manifested by instances of the verb in the basic-*sweep* sense is attributable to its associated event structure, which is unspecified for agentivity. An agentive reading arises, typically via pragmatic inference, when the subject is animate. The obligatory agentivity of instances of the verb in the broom-*sweep* sense is attributable to a form of motivated polysemy: this sense is associated with a narrower version of basic-*sweep*'s event structure whose properties require obligatory agentivity. This narrowed event structure arises through an independently established process which lexicalizes a participant in an event structure, saturating the variable with the conceptual content of a nominal (*broom* for *sweep*), thereby restricting this participant. This process typically gives rise to denominal verbs, but with *sweep* exceptionally it does not. Events involving the canonical use of a broom represent a routine goal-oriented activity; therefore, this sense of the verb allows unspecified objects. On this analysis the prototypical instances of the verb reflect a sense which is not its “basic” sense. The verb *sweep* is not unique in this respect: as we showed, *bake* also exemplifies a verb whose prototypical instances, which describe a routine goal-oriented agentive activity, involve a specialized sense and not the verb's basic sense, which is observed elsewhere.

Underspecification figures differently in our analysis of *sweep* than in some other work discussed in Section 1. This work takes an underspecification approach to the variable agentivity of manner verbs – and *sweep* is such a verb – based on the assumption that the distribution of agentive and non-agentive subjects with such verbs is determined by their syntactic context, an assumption embodied in the resultative restriction. According to this restriction, non-agentive external arguments require a causative event structure with a result phrase in the VP (or if a result phrase is absent, a result is necessarily inferred). However, non-agentive instances of the verb in the basic-*sweep* sense in the simple transitive frame counterexemplify the restriction. (92), for example, is an acceptable transitive sentence with an inanimate external argument, yet there is no explicit or implied result.

(92) A breeze moved the willows, the tips of their branches sweeping the ground.^c

Folli & Harley (2008) refine the resultative restriction, proposing it applies to external arguments that lack teleological capability. This revised restriction also does not hold: branches are not teleologically capable, yet (92), as noted, is acceptable without a result phrase. Underspecification plays a part in the analysis of *sweep*'s variable agentivity, but it is resolved in context via a pragmatic inference.

The motivated polysemy displayed by *sweep* must be distinguished from what is called “regular polysemy”, a phenomenon most often discussed with respect to nouns (e.g., *book* referring to the tome or the text; see Note 26). The motivated polysemy exhibited by *sweep* is not as systematic as many forms of polysemy in the nominal domain. First, it is an idiosyncratic fact about English that broom-*sweep* lexicalizes a broom. Second, as discussed in Section 2.2.3, the two senses of *sweep* cannot be co-predicated while many forms of regular polysemy in the nominal domain allow this; see Note 26. Thus, it is important to scrutinize other instances of polysemy related to variable agentivity to determine whether they too represent some kind of general process of motivated polysemy.

Our paper shows that polysemy and underspecification are behind *sweep*'s variable agentivity, but it is possible that when the variable agentivity of a wider range of verbs is investigated other factors may be at play, requiring other analytic options. Clearly, much remains to be explored in the landscape of variable agentivity.

Supplementary file

Appendix 1 can be found here: <https://doi.org/10.16995/glossa.10774.s1>

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