

Chapter 2

The Causative Alternation

The first instance of Baker’s Paradox I will discuss is the English *causative/inchoative alternation*. A *causative alternation* relates pairs of transitive and intransitive verbs sharing a root, where the transitive variant can be interpreted as, roughly, “cause to V-intransitive.” For example, the verb *break* has both a transitive and an intransitive use, illustrated in (1a) and (1b) respectively.

- (1) a. John broke the vase.
b. The vase broke.

The intransitive variant in this case describes an eventuality in which the *theme* participant (the vase) undergoes a change of state, becoming, for example, broken; this type of meaning is called *inchoative*. The transitive variant describes the causation of this state; hence, it is called *causative*. The causative alternation of principal interest in this chapter relates causative and inchoative verbs, and is called the *causative/inchoative alternation*, but I abbreviate it to “the causative alternation.”

The productivity of this alternation can be illustrated by the fact that there are many verbs that undergo it (hundreds are listed in Levin 1993, §1.1.2.1), and by the fact that novel verbs alternate. New verbs entering the language, such as *de-Bushify*,

show the alternation; (2a) is attested¹ and grammatical constraints do not prevent people from saying (2b).

- (2) a. We have to de-Bushify U.S. foreign policy in Iraq.
 b. U.S. foreign policy in Iraq is slowly de-Bushifying.

I anticipate (2b) being attested soon after Barack Obama takes office next month.

Despite the productivity of the alternation, not all intransitive verbs have associated causative transitive variants; consider *giggle*:

- (3) a. *Don't giggle me!
 b. I giggled.

Likewise, there are some transitive verbs without associated intransitive variants, like *lose*:

- (4) a. I lost my key.
 b. *My key lost.

Thus, although it is productive, the causative alternation does not produce every imaginable pair of verbs such that one describes the causation of the eventuality described by the other. This situation makes for an instantiation of Baker's Paradox, comprising the following premises: (i) that the alternation is productive (*productivity*), (ii) that there are some verbs that arbitrarily fail to undergo the alternation despite meeting the criteria governing its productivity (*arbitrariness*), and (iii) that no evidence regarding the inability of certain verbs to undergo the alternation is available for the learner (*no negative evidence*).

The purpose of the present chapter is to deny the "arbitrariness" premise for the instantiation of Baker's Paradox in this domain. This is not an uncontroversial

¹www.neilrogers.com/news/articles/2004070918.htm

position to take; Braine and Brooks (1995) and Bowerman and Croft (2008) argue for the opposite. Since an arbitrary exception is a verb that simply fails to undergo the alternation despite meeting the criteria governing the productivity of the alternation, it is necessary to show either that a given verb does undergo the alternation or that it does not meet the associated criteria, in order to show that it is not such an exception. Thus, a crucial step in the argument either for or against arbitrariness is to establish what these criteria are. Establishing the criteria is the focus of §2.1, which explains how the distinction between *internal* and *external causation* is related to status of a verb as alternating or non-alternating, largely following Levin and Rappaport Hovav (1995). In §2.2, I will apply these criteria to examples that have been held up as putative arbitrary exceptions, and show that these examples fail to meet the criteria for participating in the alternation.

In order to render the non-arbitrariness claim falsifiable, it is necessary to have a means for determining whether or not a verb meets the criteria. One of the challenges in doing so stems from a lack of reliable independent diagnostics for internal vs. external causation. An additional contribution of this chapter is a semantic diagnostic for distinguishing internal and external causation. Although I limit my attention to cases that have been claimed to be arbitrary exceptions in the literature, rather than addressing every verb in English, I conclude from my examination of proposed counterexamples that the onus is on proponents of arbitrariness premise to find new counterexamples, and moreover to establish that the criteria for participating in the alternation are met in these cases.

2.1 Defining the criteria

Whether or not a verb meets the criteria for undergoing an alternation depends, of course, on what the criteria for undergoing the alternation are. Pinker's (1989) characterization of the semantic distinctions relevant to the causative alternation, discussed in §2.1.1, have been very influential; even recently, arguments for arbitrariness in the causative domain have presupposed his *narrow-range rules* to represent the semantic criteria for undergoing the causative alternation. §2.1.2 describes the more up-to-date characterization of the criteria offered by Levin and Rappaport Hovav (1995); this is the set of criteria that should be taken as the basis for arguments either in favor of or against arbitrariness.

2.1.1 Pinker's (1989) narrow-range rules

According to Pinker's (1989) proposal, children have a *broad-range rule*, which provides the necessary conditions for a verb to alternate, along with a set of *narrow-range rules*, which provide the sufficient conditions. The broad-range rule for the causative alternation is shown in Figure 2.1 (taken from Marcotte 2006; Pinker repeats the structure of the caused event on the righthand side rather than using a coindexation tag as shown in the figure). It relates two "thematic cores," i.e., classes of verb meanings that are systematically related to particular types of argument structures. It permits interconversion between (i) a verb describing a 'dynamic' event (say, e_1), in which some participant Y acts, and (ii) a verb describing a complex event in which Y is acted upon (say, e_2), of which e_1 is an effect. Being a broad-range rule, it specifies only the necessary conditions for a verb to undergo the causative alternation; not all lexical semantic representations matching one of the thematic cores subject to the broad-range rule can be converted to a representation matching the other thematic core, but all instances of this rule match this general pattern.

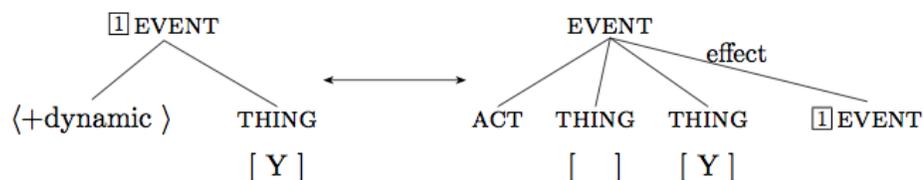


Figure 2.1: The broad-range rule for the causative alternation (Pinker 1989)

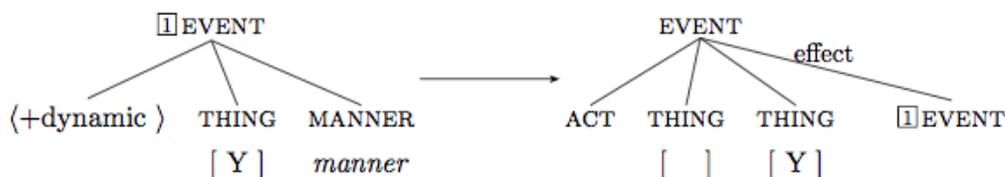


Figure 2.2: A narrow range rule for the causative alternation (Pinker 1989)

The lexical semantic representation of a verb must also match a thematic core described by a *narrow-range rule* in order to alternate. There are some verbs whose meaning is consistent with one or the other side of the broad-range rule, which are not predicted to have associated transitive or intransitive forms. Broad-range rules drop away by the time adulthood is reached, and only narrow-range rules are left; hence, narrow-range rules constitute Pinker’s claim about adult knowledge.

A narrow-range rule for verbs of manner of motion such as *roll* is given in Figure 2.2 (again, taken from Marcotte 2006). In the case of *roll*, the *manner* element would be *rolling*. This rule allows all manner of motion verbs to alternate. Pinker lists two narrow-range rules for the causative alternation, pertaining to two verb classes:

(5) Verb classes with narrow range rules

- a. change of state verbs: *melt, open, break, shrink, shatter, ...*
- b. manner-of-motion verbs: *slide, skid, float, roll, bounce, ...*

The following semantic classes *lack* narrow range rules, according to Pinker:

- (6) Verb classes lacking narrow range rules
- a. inherently directed motion verbs: *go, come, rise, fall, exit, ascend, leave, arrive, ...*
 - b. change-of-existence verbs: *appear, disappear, expire, vanish, ...*
 - c. action verbs: *jump, walk, talk, climb, drink, sing, ...*
 - d. verbs of emission: *glow, glisten, sparkle, blaze, shriek, buzz, bubble, leak, ooze, smell,....*

This system of narrow-range rules may appear quite intricate and “arbitrary” in a sense. However, by claiming that the causative alternation is governed by narrow-range rules, Pinker is claiming that the causative alternation is not arbitrary, but predictable based on these semantic criteria, and advocating a solution to Baker’s Paradox that involves denying arbitrariness (criteria-governed productivity), just as this dissertation aims to do. Even if the criteria that he proposes do not perfectly capture which verbs alternate and which verbs do not, the larger point that the causative alternation is predictable based on semantic criteria may still hold, and I argue that in fact, it does.

2.1.2 Levin and Rappaport Hovav’s (1995) analysis

2.1.2.1 Internal vs. external causation

Despite being narrow in range, Pinker’s classes do not always make the right cuts in the right locations. A more accurate account relies on the contrast between *internally caused* and *externally caused* eventuality types (Smith 1970; Levin and Rappaport Hovav 1995). An *internally caused* eventuality is one in which “some property inherent

to the argument of the verb is ‘responsible’ for bringing about the eventuality” (Levin and Rappaport Hovav 1995:91). Agentive intransitive verbs such as *play* and *speak* (Pinker’s “action verbs”) are internally caused because the subject argument is the agent of the event.² Verbs do not have to be agentive to be internally caused; some nonagentive verbs taking animate arguments such as *blush* and *tremble* are also internally caused, because the eventuality comes about as a result of bodily physical processes. Even verbs with inanimate arguments can be internally caused. These include verbs of emission, such as *burble* (sound emission), *flash* (light), *stink* (smell), and *ooze* (substance). The eventualities described by these verbs come about solely because of the subject argument: “For example, only embers, lights, and certain substances glow since only they have the necessary properties” (ibid, p. 92).

In contrast, *externally caused* verbs “imply the existence of an ‘external cause’ with immediate control over bringing about the eventuality described by the verb: an agent, an instrument, a natural force, or a circumstance” (Levin and Rappaport Hovav 1995:92). Prototypically alternating verbs such as *break* and *open* fall into the externally caused class.

2.1.2.2 Direction of derivation

Externally caused verbs are basically causative, hence transitive, according to Levin and Rappaport Hovav (1995), and are subject to a detransitivization process deriving the intransitive variant. Evidence for the treatment of the inchoative variant of the causative/inchoative alternation as derived from the causative variant comes from a typological study of four verbs including *break* and *laugh* in sixty languages by Nedjalkov (1969), who finds that transitive causative *break* is usually morphologically unmarked, while for *laugh*, the transitive causative form is usually morphologically

²“Internally caused” and “externally caused” are not really properties of verbs, but rather of the eventualities they describe, but this is a convenient shorthand.

marked (Levin and Rappaport Hovav 1995:87–88). For *break*, the intransitive is identical to the transitive in 19 out of 60 languages, and morphologically derived from the transitive in 22 out of 60 languages. (In the remaining languages, the transitive is derived from the intransitive for *break*.) By sharp contrast, the causative form of *laugh* is morphologically marked in 54 out of 60 languages (Levin and Rappaport Hovav 1995:87–88).

The issue of which form is derived is important because it is relevant to the issue of what putative arbitrary exceptions in this domain would be exceptions *to*. Since transitive verbs are the “input” to the rule generating the causative alternation, exceptions to this rule would constitute transitive causative verbs that do not detransitivize. If there were intransitive verbs that failed to show transitive forms despite being externally caused, they would constitute exceptions to the generalization that externally caused verbs are basically transitive.

Levin and Rappaport Hovav (1995) assume that the semantic representation corresponding to the intransitive variant is derived from that of the transitive variant through a detransitivization process that converts a representation like (7a) to a representation like (7b).³ In these representations, unbound variables (also called “open variables”) are the event participants that end up linked to argument positions and expressed syntactically. The number of open variables corresponds to the number of syntactic arguments, so existentially binding one of the variables corresponding to a transitive verb renders it intransitive.

- (7) a. $[[x \text{ DO-SOMETHING}] \text{ CAUSE } [y \text{ BECOME } STATE]]$
 b. $\exists x [[x \text{ DO-SOMETHING}] \text{ CAUSE } [y \text{ BECOME } STATE]]$

For example, the transitive variant of the externally caused verb *break* has the representation in (7a) with *BROKEN* filling in for *STATE*. To derive the intransitive

³Lexical decompositions using a CAUSE primitive are motivated by considerations discussed by e.g. Dowty (1979).

variant of *break*, the causer variable x is existentially bound, producing a structure like (7b). After existential binding, there is only one unbound variable, so the formula represents the meaning of an intransitive verb. Notice that this analysis, along with those of Chierchia (2004) and Koontz-Garboden (2007), treat externally caused verbs as having semantics involving causation even in their intransitive variants.^{4,5}

2.1.2.3 Linking rules

According to Levin and Rappaport Hovav (1995), the reason that internally caused verbs fail to alternate has to do with *linking rules*. Linking rules relate positions in the semantic representation associated with a verb with positions at the level of *argument structure*, which consists of a list of the participants that are expressed as syntactic arguments in the clause headed by the verb. Argument structure is commonly assumed to contain a distinguished position for the *external argument*, which is normally mapped to the subject position (Williams 1980; Grimshaw 1990). The first element in the list of *internal arguments* is mapped to direct object position when the external argument is mapped to subject position, but can otherwise surface as the subject of the clause.

Using these assumptions about argument structure, Levin and Rappaport Hovav (1995) posit a linking rule that maps the *immediate cause* to the external argument position (the Immediate Cause Linking Rule). As an external argument, the immediate cause surfaces as the syntactic subject, whether it is an internal cause or an

⁴Chierchia (2004) argues that modification by *da sè* ‘by itself’ in Italian is a diagnostic for the existence of a CAUSE eventuality in the semantics of the verb, and in particular, implies that the antecedent is the *sole cause* of the event. But there are examples that cannot easily be accommodated even under this characterization, e.g. *The baby finally walked by itself*. There is no support for *walk* as a causative verb. Modifiability with *by itself* under the ‘without outside help’ interpretation does not seem to be a reliable diagnostic for the presence of causative structure in the verb (or for internal vs. external causation, as mentioned in an earlier footnote).

⁵See also Koontz-Garboden (2007:265–268) for another argument for the presence of CAUSE in the semantics of alternating verbs from the *feel-like* construction in Albanian.

external cause. The causer of an externally caused eventuality (e.g. the breaker in a breaking event) and the causer of an internally caused eventuality (e.g. the giggler in a giggling event) both count as the immediate cause, so they are both mapped to subject position. The non-causer argument of an externally caused verb is mapped to an internal argument by the Default Linking Rule, which maps an argument to the internal argument position if no other rule has applied. The internal argument position at argument structure corresponds to the direct object of a clause, except when the causer is existentially bound, in which case it is expressed as the subject. (In the latter case, since the subject corresponds to an internal argument, the verb is *unaccusative*; see Burzio 1986.)

The Immediate Cause Linking Rule explains why internally caused verbs cannot have lexical causatives, as follows (Levin and Rappaport Hovav 1995:144):

The Immediate Cause Linking Rule associates the single argument of [internally caused verbs] with the external argument position in the argument structure. The causative counterpart of such a verb would involve the introduction of an external cause, which itself must be the external argument of the causative verb by the Immediate Cause Linking Rule. Since the linking of the internal cause argument would not be affected by the introduction of the external cause, the external cause would compete for the single external argument slot in the argument structure with the verb's own argument. The unavailability of sufficient positions for the two causes would prevent the existence of lexical causative uses of internally caused verbs.

Under this explanation for the inability of verbs describing internally caused eventualities to form lexical causatives, a clash arises from competition between the internal and the external cause for the external argument position.

As noted by Levin and Rappaport Hovav (2005:70), the concept of immediate cause can perhaps be identified or replaced with Van Valin and Wilkins's (1996) notion of *effector*, which is defined as "the dynamic participant doing something in an event" (Van Valin and Wilkins 1996:289), and corresponds to a particular position

in the predicate decomposition structure (the first argument of the predicate **do'**). This notion is more general than agency, and also includes inanimate causers such as natural forces and instruments. Van Valin and Wilkins argue that the notion of effectorhood is more relevant to argument realization than the notion of agency, which they take to be a cancellable pragmatic entailment rather than a lexical specification in most cases (although some verbs, like *murder*, lexicalize agency). The Immediate Cause Linking Rule can be recast using the notion of effectorhood as follows:

(8) **Effector Linking Principle**

The effector corresponds to the external argument; all other roles are linked to the internal argument position.

Levin and Rappaport Hovav's (1995) explanation for why internally caused verbs fail to alternate would apply in the same way under this assumption. That is, the internal and external causes are both effectors, and would therefore compete for the external argument position.⁶

Levin and Rappaport Hovav (1995) note that another explanation for the inability of internally caused verbs to form lexical causatives comes from the notion that lexical causatives must express direct causation (Pinker 1989). Lexical causatives, unlike periphrastic causatives with *make*, are incompatible with interpretations under which there is an intervening cause (Shibatani 1976; Wolff 1999). For example, the lexical causative in (9a) is compatible with a smaller range of interpretations than the periphrastic causative in (9b).

- (9) a. John broke the glass.
 b. John made the glass break.

⁶Role and Reference Grammar has its own theory of linking, which incorporates the notion of the semantic *macroroles* Actor and Undergoer. Semantic macroroles determine which argument is expressed as the *privileged syntactic argument* (which is roughly equivalent to the notion of grammatical subject). For present purposes, however, it is not necessary to introduce this additional concept into the theoretical framework.

Only (9b) is compatible with a scenario in which John sneezed, scaring the cat, causing the cat to jump onto the table, breaking the glass. (9a) is not compatible with this scenario (or to use (9a) in this scenario would constitute an unusual conceptualization of the event).⁷ This *directness constraint* (that lexical causatives must express direct causation)⁸ could be used to derive the incompatibility of internally caused verbs with lexical causatives: The internal cause could be seen as an intervening cause, making causation indirect. For example, the internal cause of a giggling event is the giggler. Causation of a giggling event by an outside agent or force would therefore necessarily be indirect, because the giggler is an intervening cause. Since lexical causatives must express direct causation, an indirectly caused eventuality would not be expressible as a lexical causative.

Rather than being in competition with the explanation based on direct causation, the explanation based on conflicting immediate causes can be seen as a particular way of explaining the directness constraint: The directness constraint can be re-interpreted as a requirement that an effector be linked to an external argument position. Thus, not only does the Effector Linking Principle in (8) predict that internally caused verbs do not alternate, it also allows the direct causation constraint to be derived as a consequence.

Levin and Rappaport Hovav (1995) argue for a linking rule system that is slightly more complex than (their version of) the Effector Linking Principle because there is a class of internally caused verbs that are unaccusative, namely, internally caused

⁷It would seem that indirect causation is not entirely incompatible with lexical causatives, since lexical causatives can be modified by *indirectly*, as in *John indirectly broke the glass*, which explicitly asserts indirectness of causation (Ivan Sag, p.c.). Such a case may still be conceptualized differently from the corresponding periphrastic causative, however, perhaps attributing more responsibility to *John* (Beth Levin, p.c.).

⁸This statement is not completely accurate; it must be revised to account for the fact that in languages with morphological causatives such as Japanese and Hungarian, a single word can express indirect causation. Shibatani's (1976) distinction between *lexical* and *productive* causatives might be useful toward this aim.

change of state verbs such as *bloom*. If the argument of an internally caused change of state verb were an effector, then it would be expected to be mapped to the external argument position, counter to fact. Levin and Rappaport Hovav (1995) explain the unaccusativity of such verbs using ordered linking rules. They posit a rule linking arguments that undergo a directed change to the internal argument position (the Directed Change Linking Rule), which takes precedence over the rule linking the immediate cause to the external argument position. The participant in the eventuality described by an internally caused change of state verb is subject to both linking rules, because it is both an immediate cause and also the undergoer of a directed change. Since the Directed Change Linking Rule applies first, the participant is linked to the internal argument position.

Another possible explanation for the unaccusativity of internally caused change of state verbs would posit that their theme argument is not in fact an effector, even though the argument of internally caused verbs generally is. This latter solution receives support from the fact that internally caused change of state verbs actually do have a restricted type of lexical causative (Wright 2002). The following corpus examples, taken from Wright (2002:341), illustrate this:

- (10) a. Early summer heat blossomed fruit trees across the valley.
 b. Salt air and a few other common pollutants can decay prints.
 c. Raindrops selectively erode clay particles.
 d. The onset of temperatures of 100 degrees or more, on top of the drought, has withered the crops.

The availability of lexical causative uses of these verbs (along with their unaccusativity) can be explained if the undergoer of the change is not an effector. Under this assumption, there would be no clash between the causer and the causee arising from competition for the external argument position. (Note: This analysis would imply

that not all internal causes are effectors; only subjects of unergative verbs like *giggle* are.) This assumption simplifies the linking rule system, making it possible to maintain the Effector Linking Principle, rather than having to use ordered linking rules.

2.1.2.4 Non-caused eventualities

Although internal vs. external causation is the primary semantic distinction relevant to the causative alternation, the picture is somewhat more complicated because not all intransitive verbs can be classified as either internally caused or externally caused. There is a third class, which we might call *non-caused*. Like internally caused verbs, they fail to alternate. This class includes verbs of existence and appearance, such as *appear*, *emerge*, *exist*, *flourish*, and *thrive*, along with verbs of spatial configuration such as *stand* and *sit*, in their stative uses. About these verbs, Levin and Rappaport Hovav (1995:148–149) say that “the notions of external and internal causation do not seem relevant to their semantic characterization.” In a footnote (Chapter 4, fn. 7, p. 298), they suggest that verbs of inherently directed motion such as *come* and *go* should also be classified in this way:

It is interesting that there is no need to subdivide the verbs of inherently directed motion according to internal and external causation in order to account for their properties. In fact, the meaning of these verbs seems to leave open whether they are to be understood as denoting internally or externally caused eventualities ... These verbs lexicalize a direction, rather than a means or manner. Means or manner, when lexicalized in the verb, can determine whether or not a verb will be agentive, and hence whether the verb can describe an internally caused eventuality, but direction, it seems, does not have this effect. In this respect these verbs are more like verbs of existence and appearance.

I take this discussion to imply that verbs of inherently directed motion fall into this third class, neither internally nor externally caused, but non-caused.

2.1.2.5 Agency restriction on detransitivization

Further complicating the picture is that not all externally caused verbs can be detransitivized; it appears that verbs that require their subject argument to be an agent such as *assassinate* cannot.

- (11) a. John assassinated JFK.
 b. *JFK assassinated.

According to Levin and Rappaport Hovav (1995:102), the relevant generalization is that “the transitive causative verbs that detransitivize are those in which the eventuality can come about spontaneously without the volitional intervention of an agent.” Thus, the causative alternation is governed by the following pair of generalizations (punctuation mine; op. cit: 105).

- (12) a. If the eventuality described by a verb has an external cause, the verb is basically transitive.
 b. Moreover, if this eventuality can occur without the direct intervention of an agent, then the external cause does not have to be expressed in the syntax.

The first generalization concerns which verbs are basically transitive, and the second generalization concerns which of those detransitivize.

Why don't verbs that lexicalize agency detransitivize? Levin and Rappaport Hovav (1995:108) suggest the following answer: “If the verb lexically specifies something about the nature of the external cause, then it cannot be lexically bound, and the intransitive form of the verb would not be attested.” I believe that a potentially more explanatory solution lies in Marcotte's (2005) proposal that when an externally caused verb is detransitivized, it is not the doer of the causing event that is existentially bound, as in (7b), but rather the entire causing event, as in (13):

(13) $\exists x$ [[x CAUSE [y BECOME *STATE*]]

In (13), the entire causing event is existentially bound, whereas in (7b), only the effector role is existentially bound. When the entire causing event is existentially bound, the effector role is no longer part of the representation, because the causing event is no longer specified as an action carried out by an effector. Suppose that the agency entailment is specified as a constraint on the effector role. This is plausible, because being an effector is a necessary condition for exhibiting agency (see Van Valin and Wilkins 1996). Without an effector role in the representation, the verb cannot express an agency entailment for it.

2.1.2.6 Causativization of manner-of-motion verbs

For Levin and Rappaport Hovav (1995), “the causative alternation” refers only to those transitive/intransitive pairs that are derived in the same way that the two argument structures for *break* are derived, that is, detransitivization (or not) of an externally caused verb. Other “causative pairs” – pairs of verbs v and v' such that v means *cause to* v' – may be derived in other ways. In addition to the causative alternation, “English has a more restricted phenomenon of causativization of agentive verbs of manner of motion in the presence of a directional phrase” (p. 119), for example:

(14) The general marched the soldiers to the tents.

Levin (1993) calls this the *induced action alternation*. This causativization process produces transitive uses of verbs like *walk*, *gallop*, *jump*, and *march* despite the fact that they are internally caused. In this case, the transitive variant seems to be derived from the intransitive variant, as evidenced by the fact that in many languages, the transitive variant of this type of verb is morphologically marked (Levin and Rappaport Hovav 1995).

2.1.2.7 Causativization of internally-caused change of state verbs

The existence of the lexical causatives of internally-caused change of state verbs, as shown in (10), brings up the issue of the correctness of the generalization that only externally-caused verbs undergo the causative alternation. These would appear to exemplify non-externally-caused verbs undergoing the causative alternation. However, these transitive uses do not seem to be related to the intransitive uses via the causative/inchoative alternation, but rather by a separate process. One difference between these causatives and *break*-type causatives is that these show a narrower range of subjects than *break*-type verbs; the causer is always a natural force, rather than an agent (Wright 2001), perhaps due to the fact that only natural forces are capable of directly causing these events, as proposed by Levin (2007). Another difference between the causative variants of internally vs. externally caused change of state verbs is apparent in Hebrew, where the transitive variant of these internally caused change-of-state verbs is marked, as Doron (2003) shows. This evidence suggests that unlike externally-caused verbs like *break*, internally caused change of state verbs may participate in a causative alternation in which the transitive variant is derived from the intransitive variant.

2.1.3 Summary

To summarize, externally caused verbs (e.g. *break*) undergo the causative alternation unless they are agentive (e.g. *cut*); internally caused verbs (e.g. *laugh*) and non-caused verbs (e.g. *come*) do not. Furthermore, in addition to the causative alternation proper (the causative/inchoative alternation), there is a causativization process that applies to agentive verbs of manner of motion in the presence of a directional phrase (e.g. *march ... to the tents*). There is also a productive process (perhaps only for some speakers) that transitivizes intransitive internally caused change-of-state verbs

(e.g. *Strong winds eroded the cliffs*). In the following section, I advance the claim that these are the generalizations that a learner must acquire, and that it is not necessary to memorize arbitrary exceptions to them.

2.2 Explaining the exceptions

Now that the productive generalizations driving the causative alternation(s) in English and the criteria governing them have been established, the question of whether or not there are arbitrary exceptions to them can be addressed.

2.2.1 Non-pertinent types of arbitrariness

Some of the examples that have been brought up in support of the idea of arbitrariness are not arbitrary exceptions in the relevant sense. Again, an arbitrary exception is a verb that fails to have a use as part of a productive pattern, despite meeting the criteria associated with it. From the perspective of Baker's Paradox, these are the exceptions of interest.

Positive exceptions constitute a type of "arbitrariness" that is worth distinguishing from the type of exception that is of interest. In some cases, it appears as if an internally caused verb has both transitive and intransitive variants, but in fact there are two senses of the verb, one which is internally caused and one which is externally caused. Levin and Rapaport Hovav list the following examples:

- (15) a. The baby burped.
 b. The nurse burped the baby. (Smith 1970:107)
- (16) a. The doorbell buzzed/rang.
 b. The postman buzzed/rang the doorbell.

- (17) a. The flashlight beamed/shone.
 b. We beamed/shone the flashlight.

In the case of *burp*, notice that it can only be used when the burper is incapable of burping without outside help, for example, under certain circumstances, as a baby. This is evidence that transitive and intransitive *burp* have two separate senses, which supports the idea that transitive and intransitive *burp* are two separate lexical items.

Positive exceptions do not give rise to Baker's Paradox, but they could present a learning problem if they were too numerous. As Braine and Brooks (1995:365) put it, if the rate of positive exceptions is too high, this would make "the category induction problem facing the child infeasible." (By "the category induction problem" I assume Braine and Brooks mean "problem of inducing categories based on observations.") If there are 20 verbs in a given class, and all of the verbs but one alternate, then a constraint on the class is learnable through statistical association between class membership and failure to alternate. If 10 of the 20 verbs are positive exceptions, then there would be no statistical association between class membership and alternating status. On other other hand, if those 10 verbs form a coherent subclass on their own, then they are not positive arbitrary exceptions, and an association between semantic class and syntactic behavior can be identified.

Braine and Brooks (1995) point to verbs like *walk*, *march*, and *gallop* as systematic positive exceptions to Pinker's non-alternating narrow-range subclass of "volitional or internally caused action" verbs ("action verbs"). Unlike *burp*, these verbs are not positive arbitrary exceptions; it is *not* the case that they simply happen to have a dual classification as internally and externally caused. Rather, they are subject to their own productive rule, which has different properties than the causative/inchoative alternation. The existence of such exceptions does not mean that the learning problem is infeasible.

The classification of a verb as internally or externally caused can also be seen as “arbitrary” in the sense that a verb that is internally caused can have a translation equivalent in another language that is externally caused. As Levin and Rappaport Hovav (1995:98–99) emphasize:

The distinction between internally and externally caused eventualities is a distinction in the way events are conceptualized and does not necessarily correspond to any real difference in the types of events found in the world. In general, the relation between the linguistic description of events and the events taking place in the real world is mediated by the human cognitive construal of events, which is what we take our lexical semantic representations to represent.

One example they give is *deteriorate*, which for them (and me) is conceptualized as internally caused, but for some people apparently is conceptualized as externally caused, as the attested sentence *The pine needles were deteriorating the roof* suggests. This flexibility only exists within a certain semantic range; an agentive verb like *run* should not be conceptualizable as externally caused.

Another example is the Italian translation equivalent of the English verb *blush*, *arrossire*, which describes essentially the same type of event, but *arrossire* is conceptualized as an externally caused change of state verb, and *blush* is conceptualized as an internally caused verb, as Levin and Rappaport Hovav (1995:9,159–160) point out, building on observations by McClure (1990). This difference in semantic classification is supported, firstly, by the morphology: *arrossire* = *a* + *rosso* + *ire* contains the word for ‘red’ and literally means ‘become red’, whereas *blush* describes an ongoing activity. Moreover, *blush* and *arrossire* have different aspectual properties: in English, one can blush *for ten minutes*, but not *in ten minutes*; in Italian, the reverse holds. Thus, in English, *blush* describes an *activity* in Vendler’s (1957) sense, while in Italian, *arrossire* describes an *accomplishment*. Concomitantly, *arrossire* takes the auxiliary *essere* ‘be’ as opposed to *avere* ‘have’, showing that it is an unaccusative verb, as

predicted by its semantic classification as externally caused, rather than internally caused. There is therefore a sense in which the categorization of a verb as internally or externally caused is arbitrary. This sense of arbitrariness is the one evoked in de Saussure's (1916) phrase, "the arbitrariness of the sign." The classification of a verb as internally or externally caused depends on the conceptualization of the event that the verb names. Only because it is necessary to learn the meaning of each verb is it necessary to learn for each verb whether or not it is internally caused.⁹

That the semantic classification of a verb into one category or another is to some extent arbitrary does not imply the existence of arbitrary exceptions to a productive generalization. For example, take the generalization, "externally caused verbs have transitive forms." This generalization is consistent with any semantic classification of a given verb, so long as the verb behaves syntactically in accordance with the generalization. Suppose that *deteriorate* is externally caused; under this assumption, the generalization is satisfied so long as *deteriorate* has a transitive form. On the other hand, if *deteriorate* is internally caused, then the generalization does not require the verb to have a transitive form, and can be satisfied if it does not. Under either assumption, the generalization can be satisfied.

What constitutes an arbitrary exception in the domain of the causative alternation? In fact, there are two instantiations of Baker's Paradox in this domain, corresponding to the pair of productive generalizations governing the causative alternation given in (12), repeated here:

- (18) a. If the eventuality described by a verb has an external cause, the verb is basically transitive.
- b. Moreover, if this eventuality can occur without the direct intervention of an agent, then the external cause does not have to be expressed in the syntax.

⁹See also Pinker (1989:302) for discussion.

Generalization (18a) predicts that any verb that is externally caused should have a transitive use. Any externally caused verb that fails to exhibit transitivity would then constitute an arbitrary exception to this particular productive generalization. Generalization (18b) would be violated by any externally caused verb without a required agent that does not have an intransitive use.

In a critique of Pinker (1989), Bowerman and Croft (2008) argue for the existence of arbitrary exceptions of both types – transitive and intransitive – claiming that “there are verbs that satisfy the restrictions and yet do not alternate,” (p. 284). The verbs they point to are *go*, *disappear*, *cling*, *glow*, *die*, *knock (down)*, and *lose*. In order to show that these verbs “satisfy the restrictions,” it is necessary to apply independent diagnostics to evaluate their semantic classification. For example, a verb that fails to exhibit a transitive form can be argued to be an arbitrary exception to the rule that externally caused verbs are basically transitive, only if it can be shown to be externally caused. Regardless of whether one is arguing for arbitrariness or non-arbitrariness, it is necessary to establish whether or not the item meets the criteria governing the pattern, in order to make a valid argument.

Reliable diagnostics for evaluating internal vs. external causation are not easily found, but there are several types of evidence that can be used, and I propose an additional test as well in §2.2.2.2. The available evidence indicates that the verbs that have been held up as putative arbitrary exceptions actually fail to meet the criteria governing productivity in this domain, and therefore need not be individually memorized as exceptions.

2.2.2 Diagnostics

2.2.2.1 Existing diagnostics of internal causation

How does one establish that a given verb is internally or externally caused? One potential diagnostic suggested by Levin and Rappaport Hovav (1995) is the interpretation of *by itself* as a modifier of the verb. As they point out, when modifying a verb like *laugh*, *by itself* receives an interpretation meaning roughly “alone” or “unaccompanied,” as in *the baby cried by herself*. With an externally caused verb like *open*, a sentence like *the door opened by itself* receives an interpretation according to which there is no cause for the opening of the door other than the door itself. According to Levin and Rappaport Hovav’s (1995) interpretation, the *by itself* phrase has the effect of co-identifying the external cause with the undergoer when it receives the “without outside help” interpretation. A problem for this assumption is the availability of the “without outside help” reading with clearly agentive verbs such as *eat*: *The baby ate all by herself!* This means that the interpretation of *by itself* is not a reliable diagnostic for internal vs. external causation.¹⁰

Another independent diagnostic for establishing the status of a verb as internally caused is suggested by Atkins and Levin (1995), who use corpus data to investigate the range of intransitive subjects with which verbs appear: The eventualities that are internally caused tend to have intransitive subjects limited to things that “have (or can be conceived of as having) ‘self-controlled’ or ‘autonomously-controlled’ bodies” (Atkins and Levin 1995:101). Their findings are included in the discussion below.

2.2.2.2 Direction of Force Principle

I would like to offer an additional way to identify internally caused eventualities, having to do with direct vs. indirect causation. A definitional feature of an internally

¹⁰It may be that allowing the ‘without outside help’ reading for *by itself* is a necessary but not sufficient condition for being externally caused (Beth Levin, p.c.).

caused eventuality is that it cannot be directly caused by an outside entity (i.e., an entity distinct from the affected participant), since the direct cause either is or comes from within the affected participant. By showing that an eventuality can only indirectly be caused by an outside entity, one can argue for the status of an event as internally caused.

Direct vs. indirect causation is related to the individuation of events, in the following way: “When the causation is direct, [a] sequence of events can be viewed as a single event; otherwise, it cannot be viewed as a single event” (Wolff 2003). The idea that events are delimited on the basis of *causal chains* is put forth by Croft (1990, 1991). Croft (1991:169) explains the concept of a causal chain as follows: Atomic “events... have causal directionality, and they can be linked into a series of causally related events such that the endpoint or affected entity of the causally-preceding atomic event is the initiator of the next atomic causal event. This series I will call a *causal chain*.” This notion underlies the concept of the *simple event*, which is characterized using Lakoff’s (1987) idea of an “idealized cognitive model” as follows:

(19) The Idealized Cognitive Model of a Simple Event

- a. Simple events are segments of the causal network.
- b. Simple events involve individuals acting on other individuals (transmission of force).
- c. Transmission of force is asymmetric, with distinct participants as initiator and endpoint.
- d. Simple events are nonbranching causal chains.
- e. Simple events are independent; that is, they can be isolated from the rest of the causal network.

(Croft 1991:269, Croft 1998:47–48)

The idea of *isolation* from the rest of the causal network, mentioned in the final point, is key to the identification of simple events. “In order for an event to be easily isolable from the causal network, it must be conceptualized as not having a clear prior cause and not itself causing another event – that is, the event must have a clear starting point and a clear endpoint” (Croft 1990:58). If two events are part of the same simple event, and one causes the other, then the causation is direct; if the two events are not part of the same simple event, then the causation is indirect.

To facilitate the process of identifying simple events, I propose the following principle:

(20) **Direction of Force Principle**

When direction of force changes from one event in a causal network to the next, the event bringing about the change in direction of force constitutes a starting point for a simple event.

If a resulting event primarily involves motion in the same direction that the force of the causing event was exerted in, then the resulting event can be conceived of as directly caused by the causing event. Otherwise, an intermediate cause is posited.

For example, in the case of breaking a vase with a hammer, the hammer-moving event along with the breaking event primarily involves motion in the same direction in which the hammer is swung. But when internally caused events are caused by an outside force, there is often a change in the direction of action. For example, if my roommate makes me laugh, her joke can be seen as moving “in” toward my face, causing breath and sound to come “out” away from my face, in the opposite direction. The resulting event involves motion in the opposite direction from the causing event. In the case of verbs of emission, what is emitted comes “out” in all directions, whereas any outside force would come “toward” or “in” from some particular direction. Blushing involves less motion, but can be seen as the result of

blood (or redness) filling the face, from within the body. To directly cause this to happen from the outside would involve directing blood or redness into the face. (This could perhaps be done from within the body; if blushing facilitated some medical procedure, and a doctor could send blood into the face, we might speak of “blushing” people, transitively.)

Support for the importance of direction in the conceptualization of events comes from a study carried out by the Event Representation Group at the Max Planck Institute in Nijmegen, reported by Bohnemeyer (2003). In this study, speakers of typologically diverse languages were asked to describe short video clips of motion events. Speakers of Dutch-like languages were found to package more information about a motion event into a single clause than speakers of languages like Yucatec. For example, what Dutch speakers could describe with a direct translation of “X moved from A via B to C,” Yucatec speakers would describe with something like “X was at A, then passed by B, then went to C.” However, all speakers in the study used multiple clauses to describe events with changes of direction. For example, to describe a motion from A to C via B, in which B is north of A and C is east of B, multiple clauses are required (examples (21a) and (21b) are adapted from Bohnemeyer’s example 13; examples (21c) and (21d) are control sentences showing that it is not the way that *north* or *east* is used that is the problem in (21a)):

- (21) a. *X moved north via B east to C.
 b. X moved north via B and then east to C.
 c. X moved via B east to C.
 d. X moved north via B to C.

The same point is illustrated by the contrast between (22a) and (22b) (examples adapted from Bohnemeyer’s example 11).

- (22) a. The ball rolls up (the wall) ?(and) over the top.

- b. The ball rolls up (the wall) *(and) down the other side.

While *up* and *over* describe motion in the same (or similar) direction(s), *up* and *down* describe motion in opposite directions. When the sentence describes motion in opposite directions, multiple clauses are necessary (and this is provided by the inclusion of *and*).

Bohnmeyer (2003:101) adduces these data in support of the existence of a universal *Unique Vector Constraint*. According to this constraint, “all direction vectors denoted in a single simple clause referring to a single continuous motion event must be collinear and of the same polarity,” where the *direction vectors* denoted in a clause are determined by the motion of a moving *figure* either with respect to one or more static *grounds* (Talmy 1985; Jackendoff 1983) or the motion of a figure with respect to a frame of reference defined with terms such as *up*, *down*, *north*, or *left*.

The principle in (20) could be seen essentially as applying the same constraint to single events, rather than single clauses. However, it is important to keep in mind that the relevant movement is not carried out by what is normally thought of as a “figure,” and it certainly is not always carried out by a participant that is expressed in the sentence. In the case of glowing, for example, the emitted light is not what would normally be thought of as a “figure” – at least, it is not expressed in the sentence. The Direction of Force Principle applies to the motion of (possibly abstract) entities or substances that characterize the direction of movement for an event, but are not necessarily syntactically expressed. Otherwise, it has a great deal in common with Bohnmeyer’s Unique Vector Constraint.

2.2.3 Intransitive-only putative exceptions

2.2.3.1 Internally caused verbs

With this in mind, let us consider whether Bowerman and Croft's (2008) examples are arbitrary exceptions. *Cling* and *glow* are verbs whose inabilities to function as transitives (**to cling something (to something else); *to glow something*) are argued to be arbitrary gaps. If so, they would be counterexamples to the generalization that externally caused verbs are basically transitive, and they should be externally caused. I argue that *cling* and *glow* are, rather, internally caused. *Glow* is a prototypical verb of light emission; verbs of emission are internally caused because what is emitted comes from within the object. As for *cling*, an object clings to something by exerting a certain combination of forces on what it is clinging to, allowing continued attachment. These forces cannot be exerted from the outside; the attachment is therefore the result of forces internal to the object clinging.

Another critique of Pinker's (1989) narrow-range subclasses comes from Braine and Brooks (1995:364), who argue for the status of the following as arbitrary exceptions: "several verbs denoting extrinsic changes of physical state (e.g. *subside*, *wither*, *shrivel*, *fluctuate*) as well as manner of motion (e.g. *quiver*, *totter*, *ripple*, *revolve*, *waver*, *stumble*, *oscillate*, *vibrate*)." The inability of these verbs to alternate can be explained based on their status as internally caused.

The verb *stumble* can be argued to be internally caused on grounds of the range of subjects it takes: It is restricted to entities that are capable of walking-like motion, all of which are animate creatures with legs. The act of stumbling crucially involves taking steps; it is "to miss one's footing" (Oxford English Dictionary). Steps cannot be taken by any agent or force outside the legged creature that is stepping.

Some of Braine and Brooks's (1995) examples are "shake" verbs, whose semantic classification was addressed by Levin and Rappaport Hovav (1995) and in a corpus

study by Atkins and Levin (1995). Levin and Rappaport Hovav (1995:100–101), addressing the contrast in syntactic behavior between *shake* and *shudder* (*shake* has both transitive and intransitive uses and *shudder* has only an intransitive use), argue for a difference in semantic classification between these two verbs as follows:

Not only is the set of things that shudder to a large extent a subset of the set of things that shake, but it is a subset precisely in a way that is consistent with the classification of *shudder* as describing an internally caused eventuality. Things that shudder usually can be thought of as having a “self-controlled” body; they include people, animals, and, perhaps by forced extension, the earth, engines, machinery, and vehicles. In contrast, leaves, teacups, and furniture, none of which can be said to have a “self-controlled” body, can only shake. This distinction is relevant because the type of movement characteristic of shaking or shuddering can be internally caused only with those things that have self-controlled bodies.

This argument provides independent evidence for the analysis of *shudder* as internally caused; an eventuality that is internally caused should only be used with subjects that are capable of causing it. They also find that *quake* and *shiver* are restricted in the types of subjects they appear with.

Atkins and Levin (1995) study the distribution of seven “shake” verbs: *quake*, *quiver*, *shiver*, *shudder*, *tremble*, *shake*, and *vibrate*. *Quiver* – one of Braine and Brooks’s (1995) putative arbitrary exceptions – and *tremble* are also found with subjects that could be thought of as “self-controlled,” suggesting an internally caused classification. These verbs are also often found with subjects that describe body parts. Atkins and Levin (1995:102) argue that the use of these verbs with body parts as subjects is consistent with an internally caused classification of these verbs, on the basis that “the event is conceived of as initiated in that person’s body”; for example, “a hand does not tremble as a direct response to an external stimulus; rather, a hand trembling is a manifestation of a more-often-than-not involuntary emotional or physical reaction, which is itself a response to an external stimulus.”

Quiver and *tremble*, along with *fluctuate*, *totter*, *revolve*, *ripple*, and *oscillate* fall into a semantic class of verbs describing cyclical motion. Here a distinction is necessary: Not all verbs describing cyclical motion lack transitive forms; for example, *spin* and *rotate* have transitive uses as well as intransitive uses (e.g. *to spin/rotate a wheel*). What distinguishes the alternating verbs (*spin* and *rotate*) from non-alternating verbs like *totter* and *revolve* is that the former do not involve change in location, but only motion around an axis located at the center of the object. Since the location of the object does not (necessarily) change in a spinning or rotating event, there is a sense in which the object is not (necessarily) “moving.” This sense of movement can be referred to as *translation*. When there is no translation, there is no change in direction. By contrast, the motion of verbs like *totter* and *revolve* involves cyclical changes of location and direction. Verbs describing cyclical changes of location can be argued to be internally caused on the grounds that they involve eventualities in which the motion of an object in one direction causes it to move in a new direction. If an object is tottering back and forth, it must move “back” in order to move “forth.” In other words, motion in one direction is dependent on motion in the other. Thus, the eventualities described by these verbs involve self-caused motion.

This argument can be tightened using the Direction of Force Principle. The direction of force causing the motion changes along with the motion itself, so according to the Direction of Force Principle, an outside entity cannot directly cause the motion unless the outside entity changes the direction of the force it is exerting along with the motion of the object. With a *totter*-type verb, for an outside cause to constantly exert force in the direction of motion, it would have to alternately exert force in one direction, and then the opposite.¹¹

As for *vibrate*, Atkins and Levin (1995) find that it is listed in several dictionaries

¹¹Under such a scenario, *totter* is actually attested as a transitive verb: “I lifted the briefcase ostentatiously onto the tabletop, angled it on-end, and tottered it into his awaiting grasp” – from “A Different Kind of Careful” by M. Stanley Bubien, from *Story Bytes* Issue #59, March 2001, p. 7.

as an alternating verb, and they find it used as a transitive verb in corpora as well. This verb is a *spin*-type verb, because vibration involves motion around a potentially unmoving axis. For example, when a string vibrates, the position of the string at rest defines the axis around which motion of the string takes place, and this axis can remain in the same location throughout the vibrating event. The string itself, therefore, does not undergo translation and, in this sense, does not move. It is unlike verbs like *totter* in this crucial way, and is therefore not internally-caused, hence eligible for use as a transitive verb.

The verbs *subside*, *wither*, and *shrivel* can be conceived of as internally caused because the motion they describe involves a force pulling from within, rather than pushing from without. Any external force would push from the outside, so subsiding, withering, and shrivelling cannot be caused directly by an outside force, according to the Direction of Force Principle.

Although their critique is mainly directed at Pinker (1989), Bowerman and Croft (2008) also address the internal/external causation distinction directly, and argue that it does not fully capture the set of alternating vs. non-alternating verbs, and that there are certain arbitrary exceptions to be learned. They claim that the verb *overflow* constitutes an example of an externally caused, non-alternating verb. They illustrate the unacceptability of transitive *overflow* with the following example of an overgeneralization error from Bowerman's daughter Christy:

(23) You're gonna overflow the spoon with medicine (Christy 6;7).

I argue that *overflow* is internally caused (in general; but see below). When something overflows, there is a container and some substance, and the volume of the substance begins to exceed the capacity of the container. This eventuality can be seen as internally caused because the contents of objects that overflow can be construed as inseparable from the container. For example, one can think of the water in a toilet as

part of a toilet, or the liquid in a glass as part of the glass. The substance becomes part of the container (or the object as a whole), and they become cognitively inseparable. Thus, the outward motion of the substance originates within the overflowing entity. To cause overflowing as an outside entity would involve a change of direction of force: an outside entity would exert force from the outside in toward the overflowing entity, and then the overflowing substance would move out away from it. This chain of events could not be construed as direct causation by the Direction of Force Principle. *Overflow* therefore fits the characterization of internally caused eventualities.¹²

I agree with Bowerman's judgment that *overflow* cannot be used transitively, although there does seem to be a productive class of examples especially in relation to computer memory buffers, where the subject can be either an agent, as in (24a), a computer program, as in (24b), or data, as in (24c).¹³

- (24) a. The break-in occurred when the hacker overflowed the buffer of a system daemon running as root.
- b. A simple script overflowed the buffer on the IIS 4.0 Web server.
- c. Input larger than 512 bytes overflowed the buffer.

The computer security-related sense of *overflow* exhibited in (24) is metaphorical, so the forces involved are not literal, and they are not subject to the laws of physics. In comparison to liquid overflowing, this sense of *overflow* describes an event that can be much more directly controlled. A computer hacker executing a buffer overflow has greater control over the contents of a buffer, and the metaphorical substance with which it is filled. Agency is known to have an impact on the perception of causation

¹² *Overflow* is open to multiple construals; the meaning of *overflow* could be construed as externally caused if the contents are not conceived of as part of the container. There seem to be some speakers on the internet who allow transitive *overflow* even with participants like toilets; these speakers may conceive of this verb as externally caused.

¹³(a) www.securityfocus.com/infocus/1416; (b) books.google.com/books?isbn=0849320429; (c) www.theatlantic.com/issues/2002/09/mann.b.htm

as direct, as Wolff (2003) shows experimentally: Native English speaking participants were found to be more likely to describe a video scenario using a lexical causative (transitive verb) rather than periphrastic causative (*make* + intransitive verb) when the causer of the event was depicted in the scenario as sentient. A computer hacker has a particularly high degree of agency in a buffer overflow attack, and is therefore more construable as a direct causer.

2.2.3.2 Non-caused verbs

Some of the examples listed by Braine and Brooks (1995) that fail to show transitive uses are not internally caused, but rather fall into the non-caused class, along with verbs like *appear* and stative *stand*. These are *go*, *die*, and *disappear*. *Go* is a verb of inherently directed motion, a subclass of the non-caused class, and *die* and *disappear* are verbs of disappearance, which are also non-caused. The inability of these verbs to alternate falls under the generalization that verbs that are not externally caused do not undergo the alternation.

2.2.4 Transitive-only putative exceptions

Some of the putative arbitrary exceptions offered by Braine and Brooks (1995) are transitive verbs that fail to show intransitive variants. They bring up *knock down* and *lose* as examples of arbitrary restrictions on the use of verbs as intransitives:

- (25) a. I knocked my block tower down.
 b. *My block tower knocked down.

- (26) a. I lost my key.
 b. *My key lost.

In this section, I argue that neither one of these cases is idiosyncratic.

The phrase *knock down* differs in at least two ways from causative alternation verbs like *break*. First, *knock* falls into the class of *verbs of surface contact* (e.g. *strike, hit, kick, punch, slap, whack*), whereas *break* is a member of the class of *verbs of damaging* (also including *crack, shatter, splinter*, etc.). Verbs of surface contact differ in several ways from verbs of damaging, as Fillmore (1970) demonstrated. The *hit*-type verbs specify a means or manner of carrying out an action rather than the result of an action (Levin and Rappaport Hovav 1991; Rappaport Hovav and Levin 1998). Since they do not specify a result, they are not causative; hence, they are not externally-caused. Since *knock* falls into the *hit* class, one might expect *knock down* not to detransitivize, assuming that the particle has no impact on this ability.

To make a stronger argument, it is necessary to compare it to other uses of ‘surface contact’ verbs with particles like *down*. Here are several examples:

- (27) a. They struck the sign down.
 b. *The sign struck down.
- (28) a. He kicked the chair over.
 b. *The chair kicked over.
- (29) a. John punched his teeth out.
 b. *His teeth punched out.

The non-detransitivizability of *knock down* appears to fall under a quite regular pattern: Verbs of surface contact in combination with particles like *down* fail to detransitivize.

Why is *lose* unacceptable as an intransitive verb? Like *break*, this verb could be considered causative, because its meaning does entail a change of some kind: A sentence like *I lost my keys* could be paraphrased, *I caused myself not to know where my*

keys are. However, it specifies a change of state on the part of the subject, rather than the object. Losing a game also entails a change of state on the part of the subject rather than the game. *Lose* is unlike *break* and *open* in this respect. I argue that this is a crucial difference; in order to alternate, a verb must be not only a change of state, but a verb that specifies a change of state on the part of the object. Support for the relevance of such *affected agents* for argument realization comes from Saksena (1980), who shows that affected agents are realized with different case-markers than non-affected agents in Hindi causatives. In these terms, the inability of *lose* to de-transitivize falls under the generalization that verbs with affected agents such as *eat* and *drink* do not show intransitive forms: **The food ate*; **The drinks drank*. This generalization arguably follows from the characterization of the criteria for detransitivization, because if a verb specifies a change of state for the agent, it cannot come about spontaneously without the involvement of the agent.

2.3 Conclusion

I conclude that the verb class distinctions described in §2.1 are sufficient to explain the phenomena that have been adduced in favor of arbitrariness. These are the verb class distinctions that the learner must acquire, along with the classification of each verb into these classes. Nothing needs to be memorized about the participation or non-participation of a given verb in the causative alternation *per se*.

This argument depends on the correctness of the characterization of the criteria for undergoing the causative alternation; if the state of the art changes, then these arguments will have to be revisited. By the same logic, any argument for arbitrariness relying on an incorrect characterization of the criteria does not go through. A crucial part of the argument either for or against the status of a given item as an arbitrary exception is to establish that it does or does not meet the relevant criteria, as best we

understand them, using independent diagnostics. I have shown using such diagnostics that the argument for arbitrariness in the domain of the causative alternation is not empirically well-founded, and have illustrated what type of evidence would be necessary to establish the existence of arbitrary exceptions.

An additional outcome of the investigations in this chapter is a richer understanding of the criteria governing the productivity of the causative alternation, and in particular, the nature of the distinction between internal vs. external causation. Investigating these putative exceptions is useful not only for evaluating the “arbitrariness” premise of Baker’s Paradox, but for the sake of understanding the phenomena themselves.