

Deconstructing the Internal/External Causation Distinction

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I. THE DISTINCTION AND ITS MOTIVATION

Levin and Rappaport Hovav (1995; LRH) introduced a distinction between verbs which they called *internally caused* and those which they called *externally caused*, in order to account for the distribution of verbs in the causative alternation.

1. a. The vase broke.
b. My kids broke the vase. (My kids caused the vase to break.)
2. a. The soup cooled.
b. The chef cooled the soup. (The chef caused the soup to cool).
3. a. My kids played.
b. *The camp director played my kids.
4. a. The trees blossomed.
b. *The farmer blossomed the trees.
5. a. Trump trembled.
b. *Putin trembled Trump.
6. a. The soldiers' wounds glowed in the dark.
b. *The bacteria glowed the wounds in the dark.
7. **EXTERNAL CAUSATION:**
break, open, sink, cool, narrow, smooth, widen, lengthen, dry, loosen, sober...
8. **INTERNAL CAUSATION:**
*play, sing, smile, cry...tremble, shudder, hesitate... erode, wilt, wither, bloom, blossom, sprout...
gleam, glitter, glow, twinkle...gush, leak, drip...*

Verbs in (6) are termed *externally caused* and participate in the alternation, while those in (7) are termed *internally caused*, and are claimed not to participate in the alternation. The major classes of internally caused verbs on this analysis include: agentive activity verbs, change of state verbs, verbs of emission (e.g., light and substance), and a variety of other (aspectually) activity verbs, like *tremble*, *shudder* and *hesitate*, which are predicated of humans but are not agentive.

In order to connect the external/external causation distinction to the phenomenon it is meant to account for, we need an analysis which will answer the following questions.

- What is it exactly that we are classifying? (verbs? roots? eventualities? event descriptions?)
- What is the semantic explication of the distinction?
- How do we represent the distinction linguistically?
- How do the explication and the representation account for the data?
- How can we ground it in a viable theory of the linguistic representation of causation [Is it appropriate to lump all the verbs in (7) above into the same category?]

II. ELEMENTS OF PROPOSAL FOR ANALYSIS OF CAUSATIVE ALTERNATION IN L&RH (1995)

Classification: Classification of verbs as construals of events: "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." (LRH 1995: 99)

Explication: With an intransitive verb describing an internally caused eventuality, *some property inherent to the argument of the verb is 'responsible' for bringing about the eventuality*. For agentive verbs such as *play* and *speak*, this property is the will or volition of the agent who performs the activity. Thus the concept of internal causation subsumes agency." (LRH 1995:91)

"This ...reflects the nature of internal causation, which *involves causation initiated by, but also residing in, the single argument, and hence dependent on its properties*." (LRH 1995: 94)

"That is, the changes of state that they describe are *inherent to the natural course of development of the entities they are predicated of* and do not need to be brought about by an external cause (although occasionally they can be, and in such instances causative uses of these verbs are found)." (LRH 1995: 97)

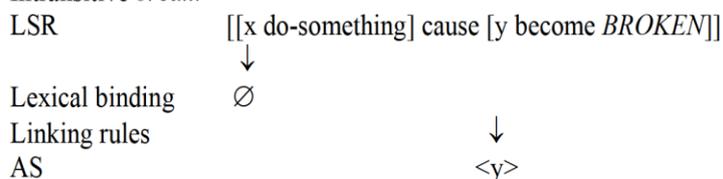
Representation and analysis

- a. internally caused COS verbs are monadic – only the argument undergoing change;
 "The adicity of a verb is then a direct reflection of a lexical semantic property of the verb, namely, the number of open positions in the lexical semantic representation." (LRH 1995: 95)
- b. Externally caused verbs are dyadic, lexically include cause argument;
- c. All alternating verbs are externally caused verbs;
- d. All externally caused verbs that do not specify anything about the causing event in a causative structure can undergo a process of lexical binding of the external argument.

9. The vandals/The rocks/The strong winds broke the windows.

10. The insurgents/*The poison/*The flood assassinated the president.

Intransitive *break*:



- d. Internally caused verbs do not participate in alternation because there is no rule in English which freely adds an argument.

III. WELL-KNOWN PROBLEMS FOR THIS ANALYSIS

Explication

The different and intuitively defined explications above do not allow us to test our hypotheses. No clear and independently criteria have been offered besides the phenomena meant to be accounted for by the distinction.

11. "B. Levin once heard her landlord say *The pine needles are deteriorating the roof*. Although to our ears this sentence is unacceptable, probably because we conceive of deterioration as always being internally caused, it appears that the landlord's conceptualization was different." (LRH 1995: 99)

Moreover, for many of these verbs, it is clearly possible to isolate causes, and they clearly reside *external* to the entity undergoing the change. For example, when seeds sprout, there are clearly many causes for the seeds sprouting: the conditions of the soil, the water, the light, etc. All these would be considered causes, for example, under a counterfactual analysis of causation (e.g., Lewis 1973, Dowty 1979).

12. If the seeds hadn't received any water, they would not have sprouted.

Empirical generalizations

Recent work has led to a refinement of the empirical picture which leads to a different delineation of verbs which need to receive a uniform analysis.

A variety of studies (McKoon and Macfarland 2000, Wright 2002) have shown that verbs which have been categorized as *internally caused change of state verbs* do in fact appear in transitive variants, although there are clear differences among verbs with regard to their tendency to appear in transitive or intransitive variants.

- 13.

INTERNAL CAUSATION VERBS			
	LOW		HIGHER
	PROB.		PROB.
VERB	TRANS.	VERB	TRANS.
bloom	.00	blister	.22
deteriorate	.01	corrode	.63
germinate	.06	erode	.67
rot	.08	ferment	.54
rust	.14	sprout	.26
stagnate	.02	swell	.37
wilt	.06		
wither	.12		
MEAN	.06	MEAN	.45

However, there is a very marked tendency for such verbs to appear with subjects which are not agents.

	ARTIFACT	NATURE	ANIMATE	ABSTRACT
INTERNAL CAUSE				
blister	6	4	1	
bloom				
corrode		23		3
deteriorate				
erode		7		
ferment		2	2	
germinate				
rot		5		
rust		5		
sprout				
stagnate				
swell		3		2
wilt		1		
wither		7		
TOTAL:	6	57	3	5

Subjects of transitive sentences with concrete objects

In fact, the subject we find with these verbs when they take concrete objects can be classified as what I call "ambient conditions."

14. *The farmer/*the new fertilizer blossomed the fruit trees.
15. a. Early summer heat blossomed fruit trees across the valley. (LN 1999)
b. The onset of temperatures of 100 degrees or more, on top of the drought, has withered crops. (NYT 1986) (Wright 2002:341)
16. Light will damage anything made of organic material. It rots curtains, it rots upholstery, and it bleaches wood furniture. (LN)
b. Salt air rusted the chain-link fences. (LN)
c. Bright sun wilted the roses. (LN) (Wright 2001:112)

But even this is just a marked tendency:

17. I used red onion rather than white and sliced shiitake mushrooms, and **I wilted my kale** just a bit. (web)

More specifically, these very same verbs with abstract objects (those that allow them) appear much more frequently in transitive variants and with a wider range of semantic types for subjects, as in the sentences below.

18. The system has eroded the morals of young people.
19. He had **eroded my self-confidence** so subtly that I hadn't even noticed that he had ...

CRUCIALLY, HOWEVER, THESE PATTERNS ARE NOT DISPLAYED BY AGENTIVE ACTIVITY VERBS OR BY VERBS OF EMISSION. These verbs much more consistently resist causativization, and varying the semantic type of subject does not change the picture significantly.

20. a. I cried/hesitated the interviewee.
b. The tense circumstances cried/hesitated the interviewee.
21. a. The bacteria caused the wounds to glow.
b. *The bacteria glowed the wounds.
c. *The wind glowed the embers (Alexiadou 2014)

MY CLAIM, THEN, IS THAT THE CLASS OF VERBS IN (7) ABOVE IS NOT A UNIFORM CLASS EITHER SYNTACTICALLY OR SEMANTICALLY.

Change of state verbs, whether traditionally classed as internally caused or externally caused, which participate in the alternation are all verbs which lexically select only one or two internal arguments and no external argument. These all receive a **uniform analysis** of the causative alternation without any need to distinguish between internal and external causation (see also AAS 2015; Rappaport Hovav 2014). The same conditions on the causative alternation hold for what have been terms internally caused change of state verbs and externally caused change of state verbs. But the causative alternation applies to other verbs not usually discussed in this context.

In contrast, verbs of emission, agentive and nonagentive activity verbs typically predicated of humans, select an external argument. As unergative verbs they do not participate in the causative alternation. **To the extent that these external arguments are considered a kind of cause, then these verbs are perhaps indeed internally caused in the sense that the cause is a selected argument.**

IV. AN ANALYSIS OF THE CAUSATIVE ALTERNATION WITHOUT THE INTERNAL/EXTERNAL CAUSATION DISTINCTION

Representation

There is a still lively debate in the linguistics literature as to whether intransitive change-of-state-verbs have a CAUSE predicate in their lexical semantic representation. Here I follow Rappaport Hovav (2014), Alexiadou, Anagnostopoulou and Schäfer (2015) and many others that verbs which participate in the causative alternation are all unaccusative: they all lexically lack an external argument, contra, e.g., Reinhart (2000), Siloni and Horvath, Beavers and Koontz-Garboden.

There is then, a syntactic characterization of the class of verbs which participates in the causative alternation: it is the class of verbs based on roots which do not select an external argument, i.e., verbs that appear in unaccusative syntax.

This generalization does not hold for unaccusative verbs of existence and appearance, i.e. those that regularly appear in *there* existential constructions (LRH 1995). I follow Alexiadou and Schäfer (2011) in assuming that the larger unaccusative class and *there*-insertion class have distinct unaccusative syntax:

22. a. [vP *there* [ResultP *theme*]]
- b. [vP *theme*/**there* [ResultP]]

The alternation arises from the addition of a cause argument in [spec, Voice].

The majority of causative alternation verbs are based on stative roots which do not select an external argument and hence do not impose any semantic restrictions on the subject argument. The external argument will always be some kind of cause, where is a wide range of semantic categories that can instantiate the cause: natural force, agent, event, instrument, ambient condition, fact etc. Which semantic types can function as the cause for which vP should follow from a theory of causation.

Building causative alternation verbs

23. UNACCUSATIVE VERBS BASED ON A STATIVE ROOT

- a. *cool, warm, smooth, narrow, loosen, flatten, widen, deepen...*
- b. *clear, empty*
- c. *melt, thaw,*
- d. *erode, wilt, rot, deteriorate...*
- e. *break, crack, split...*
- f. *obstruct, block, clog, fill, cover...*

The verbs in (a-c) and (e) are typically considered externally caused; the verbs in (d) internally caused; and the verbs in (f) are typically not included in the discussion of the causative alternation; see below.

The verbs in (a,c,d,e) have a single internal argument, while those in (b,f) have two. This fact does not affect the way these verbs participate in the causative alternation.

24. a. The soup cooled.
b. The tank emptied (of water)
c. The fabric deteriorated.
d. The vase broke.
25. a. The room is empty of students.
b. The trash is blocking the driveway.

The verbs in (a,b) are de-adjectival, and are based on gradable adjectives. When used as verbs they encode a change or comparison (conceptualized as a change) in the degree to which an individual exhibits a property over a contextually given ordered domain (Deo, Francez and Koontz-Garboden 2013). Most commonly the ordered domain is time and so they express change over time. But the change can be along a spatial axis or other ordered domains.

26. a. Her face narrows around her cheekbones.
b. The Hogup Mountains have a central section containing the three major peaks; the mountain range narrows both northerly and southerly into the Great Salt Lake Desert http://en.wikipedia.org/wiki/Hogup_Mountains
c. The skirt narrows at the bottom.
27. The plot thickens in chapter three. (DFKG)
28. Fish ears grow with increased CO₂ (DFKG)

When the ordered domain is time, then the second causal argument is an event, but in other cases the verb is stative. However, I will argue that these comparisons are always considered a kind of change.

The same analysis holds for verbs which are not de-adjectival but by well-known tests involve scalar changes.

There is no difference between so called internally and externally caused verbs in this regard.

29. The story disintegrates toward the end.

The class of verbs in (f) (*obstruct*-type verbs) deserves some attention.

In sentences like those in (30) the subject argument is often analyzed as a cause, often in force-dynamic terms. I argue that this is not the case that that these verbs take two internal arguments (Rappaport Hovav in press).

- 30. a. The bags blocked the doorway.
- b. The tumor obstructed his colon.
- c. Your furniture fills the truck.

There are three pieces of evidence that the subjects in (30) are not causes.

First, one can add an additional external argument – even an agent.

- 31. a. I blocked the doorway with the bags. = I caused the bags to block to doorway.
- b. The movers filled the truck with your furniture.

Second, these verbs form adjectival passives, and not verbal passives (Grimshaw 1990)

- 32. a. The bags are blocking the doorway.
- b. *The doorway is being blocked by the bags (ok *was blocked* by the bags – adjectival passive)

Third, these verbs never appear without the subject argument, or without the object argument, as would be expected if the subject argument were external and a cause:

- 33. a. *The doorway (gradually) blocked.
- b. *The colon (slowly) obstructed.
- 34. a. *The bags blocked.
- b. *The tumor blocked.

Another property worth noting about this class is that these verbs are not gradable and do not involve a degree difference – as verbs they are basically stative.

- 35. a. The road narrows between San Jose and San Francisco. (The road gets narrower.)
- b. Boulders block the road between SJ and SF. (Don't get more blocked)

Many stative verbs in English can be used as change of state verbs as well, without the addition of morphology.

- 36. a. I understand the problem.
- b. Suddenly, I understood the problem.
- 37. a. I remember my third grade teacher.
- b. Suddenly, I remembered my third grade teacher.

The same is true of *obstruct*-type verbs.

- 38. a. The tumor gradually obstructed the colon.
- b. ?The rock gradually obstructed the doorway.

Typically, the intransitive change of state interpretation for this class will be available if the change occurs in ***the natural course of events***.

For *obstruct*-type verbs, the stative variant, which never involves a notion of change, does not as far as I understand ever take a cause: that is, the verb is ALWAYS eventive with a cause argument.

39. a. I obstructed the driveway with my car (eventive ONLY)
 b. I clogged the drain with coffee grinds.

This is in marked contrast to verbs of change in stative uses: they CAN appear with cause subjects and still preserve their stative character. (examples from RH 2014)

40. a. I like how the band narrows the skirt a bit.
<http://artisanssquare.com/sg/index.php?topic=19714.140>
 b. The current proposed design widens the street for three blocks in the Pioneer Square area waterfrontseattle.org/. . ./2013_0723_alaskanwaystreetdesign_final
 c. But, in the new residential quarters, the houses are raised on pilotis, which widens the street space, and creates a pleasant living climate.
 www.ariesharon.org/TelAviv/Tel-Avivs.../1243297080_4W8rF3w

THERE ARE NO CAUSES WITHOUT CHANGE. CAUSES GO WITH CHANGES, BUT CHANGES CAN BE STATIVE.

Conditions on the content and (non)appearance of the external argument

All the verbs under discussion can freely add an external argument which will be interpreted as a cause (an external cause). For a complete account, we need to specify:

- the conditions under which an external cause argument can/must/may not be added
- the semantic constraints on the external argument, when expressed and what they follow from.

In Rappaport Hovav (2014) I presented an account of the causative alternation which attempted to answer these questions. I will try to build on aspects of that account and show how some well-known properties of what have been called internally caused COS verbs follow from what we know about causal statements.

41. In the description of a change of state, the cause of the change of state is relevant; therefore, since an utterance which specifies the cause of the change of state is more informative than one which expresses just the change of state, it is to be preferred, all things being equal. (Rappaport Hovav 2014: 23)

However, not all states are the same in this regard. Some states are such that they have a propensity to change in the natural course of events. Furthermore, this often depends not only on the state, but on the argument the state is predicated of. The cause of the COS is particularly relevant when the state does not have a propensity to change in the natural cause of events, given the argument it is predicated of. This is often, further contextually dependent.

As discussed in McKoon and Macfarland (2000), Wright (2002) and Alexiadou (2014) we can say the following about what have been called internally caused change of state verbs:

42. The intransitive variant is most frequent;
 They typically occur with a restricted range of subjects;
 Very often used with modification and modification improves grammaticality judgments.

I suggest that discussion of the distinction between causal factors and actual causes will give us some insight to this. The semantic characterization of internally caused change of state

verbs is that they describe changes which come about in the natural course of events. Changes which come about in the natural course of events, typically have a variety of causal factors. So, a tree grows and a cliff erodes from a variety of factors which are typically co-occurring and common. Given this, we can explain the properties in (39) by appeal to the distinction between causal factors and actual causes. For convenience, I use Dowty's (1979) explication:

43. [Φ CAUSE Ψ] is true iff (i) Φ is a causal factor for Ψ , and (ii) for all other Φ' such that Φ' is also a causal factor for Ψ , some $\neg\Phi$ -world is as similar, or more similar, to the actual world than any $\neg\Phi'$ -world is.

Since all of the factors are equally part of the world as we know them, it is difficult to choose any one of the causal factors as the actual cause. This, then, explains why these verbs are used intransitively most frequently.

Modification improves the picture:

44. a. The potatoes rotted.
b. The damp conditions rotted the potatoes.

Modification helps pick out the appropriate one of the causal factors.

But of course, the very same properties hold of verbs which have been called externally caused change of state verbs when they are predicated of certain kinds of objects.

45. a. The days lengthened/?The angle of the sun lengthened the days.
b. But Board of Education members said they lengthened the days to ensure students receive the equivalent of 180 days of instruction.
c. Using bright, fluorescent lights, researchers artificially lengthened the days for 12 people who agreed to spend 65 days living in individual rooms without windows, clocks or any other clues as to the time in the outside world.
d. The workmen broadened the street.
e. As she grew older, her face broadened.

What really characterizes internally caused change of state verbs is that they are, as Levin (1993) called them, entity specific, and describe changes that come about in the natural course of events. Verbs like *lengthen* and *broaden* place fewer restrictions on their internal argument and so can function like verbs of internal or external causation depending on the argument.

V. Verbs of Emission as Verbs of Internal Causation

According to my analysis, there are indeed verbs which can be termed verbs of internal causation – namely those verbs which actually select and modify the cause argument. These will all be transitive or unergative. I won't say anything about agentive verbs, but will make some comments about verbs of emission.

The *obstruct*-class needs to be distinguished from a class of substance emission which at first glance might appear to have a similar structure.

46. a. The faucet leaked/gushed water (external and internal)
b. Water dripped from the faucet. (two internal arguments)

Here, I take the faucet to be an emitter, or a source, a type of cause, and hence the verb takes an external and an internal argument¹. On this analysis (47b) is an unaccusative structure with two internal arguments. These verbs take an external and an internal argument. As with other verbs of emission, they do not allow an added cause argument.

47. a. The faucet leaked. (external only)
- b. Water leaked (from the faucet) (internal only)
- c. *I dripped water from the faucet
- d. *I dripped the faucet

Finally, the verbs *bloom*, *blossom* and *flower* are the internally caused COS verbs which resist causativization the most (see chart above; also noted by Alexiadou 2014). Note that these verbs are denominal, and do not show the semantic properties of scalar change verbs: *The tree gradually bloomed* means that it gradually produced more flowers. I suggest, then, that these verbs be considered types of verbs of emission, as supported by (48):

48. The bush blossomed white flowers.

VI. Rockin' and Rollin'

I suggested that most causative alternation verbs are based on stative roots. The exception is that class of verbs including *roll*, *rock*, *spin*, *bounce*... These verbs participate in the causative alternation when they have inanimate subjects or animates acting like inanimates. They do not participate in the alternation when they have animate subjects:

49. a. The ball rolled.
- b. I rolled the ball.
- c. John rolled.
- d. #I rolled John (under the relevant reading.)

One can say for these verbs that they are verbs of external causation when they take inanimate themes, but when the rocker or roller are volitional beings they are verbs of internal causation, where the verb describes the action of the external argument.

VII. Conclusion

The class of verbs of internal causation presented in Levin and Rappaport Hovav (1995) is neither syntactically nor semantically a coherent class. I have argued that there is no reason to posit a class of internally caused change of state verbs and that all change of state verbs can receive a unified account. The ICCSVs are those which normally describe a change in an entity which comes about in the normal course of events, but this is dependent on what entity the change is predicated of. These verbs tend to be entity specific. The conditions on the (non) appearance of the cause argument can be provided, a component of which is some notion relating to actual causes. I have not discussed the role of direct causation here, since this requires a paper all of its own. If one can make a coherent distinction between verbs of internal and external causation, it is not along the lines laid down in LRH (1995), but rather, we can say that verbs of internal causation select an external argument while verbs of external causation do not.

¹¹ One thing which my analysis does not account for is the fact that this transitive variant does not passivize. However this is true for all verbs of emission.

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