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Abstract

I provide new evidence that backward binding is not restricted to psych contexts, as commonly thought. Backward binding refers to a phenomenon in which an anaphor is bound by a DP below it, in apparent contravention of Principle A. Some popular previous accounts have explained backward binding in psych contexts as truly exceptional, in that anaphors are licensed by and corefer with animate perspective takers and are exempt from the usual Principle A requirements. I present new data that shows backward binding is possible for at least some speakers with stative uses of location verbs, which cannot be explained under such accounts. I outline two possible ways of deriving Principle A-obeying backward binding if Featural Relativized Minimality is assumed: featural differences between binder and bindee, and smuggling movement. I provide further new evidence from stative uses of location particle verbs that favor the featural differences approach. I close with a brief discussion of some possible implications for the structure of stative location verbs.

How to Derive Non-Logophoric Backward Binding for Stative Location Verbs

Michael Wilson*

1 Backward Binding

Typically, antecedents of anaphoric expressions must c-command them. This is (part of) the classical formulation of Principle A of the binding theory, demonstrated in (1):

- (1) a. Sally wanted John_i to kick himself_i.
- b. *Sally wanted himself_i to kick John_i.

Nevertheless, sometimes this requirement can apparently be flouted. Consider the examples below, based on examples from Pesetsky (1987, 1995) and Landau (2010):

- (2) a. Each other_i's constituents annoy the politicians_i.
- b. Each other_i's parents make every couple_i nervous.
- c. Those nasty pictures of himself_i shattered John_i's fragile ego.

These configurations display so-called “backward” binding, since the anaphoric expression in each case is bound by a DP below it, in contravention of Principle A. Backward binding has been previously noted to be restricted to a rather small set of environments; namely, stative uses of psych-verbs, periphrastic psych predicates, and other psych-related constructions (Belletti and Rizzi 1988, Landau 2010, Pesetsky 1987, 1995).

In this paper, I provide novel evidence from English that backward binding is not entirely restricted to psych-related constructions, as is commonly thought. In particular, it is also possible, for at least some speakers, with stative uses of location verbs. To my knowledge, these data have not been previously discussed in the literature. This is the paper’s primary empirical contribution.

The paper’s theoretical contribution hinges on the fact that some of the most successful existing accounts of backward binding fail to account for the new data, as they rely on backward binding only being possible with expressions involving perspective centers. Since stative location verbs allow backward binding even when they do not occur with possible perspective centers, these accounts fail to explain the new data. I outline two logically possible approaches to the new data within a minimalist framework, given common assumptions about Principle A and Featural Relativized Minimality: backward binding could be achieved by smuggling movement (Collins 2005), or by lexical Case assignment (cf. Belletti and Rizzi 1988). I provide additional evidence from particle verb uses of stative location verbs that the lexical Case assignment approach is more promising.

2 Previous Accounts

There presently exist two kinds of approaches that attempt to explain backward binding of the sort found in (2), which can be categorized as either structural or logophoric.

Structural approaches make use of the fact that binding can be licensed at intermediate steps in the derivation of a sentence:

- (3) a. [Which picture of itself_i]_j did the computer_i say *t_j* that the user had renamed *t_j*?
- b. *The computer_i said that the user had renamed the picture of itself_i.

*Many thanks to Kyle Johnson, Seth Cable, and Rajesh Bhatt for extensive discussion about these data and further work related to this general project on argument structure. Thanks also to members of the UMass Syntax Workshop and attendees of the 2020 Texas Linguistics Society meeting, who provided feedback on earlier work related to what is presented here. I would like to give special thanks to the PLC reviewers, who provided exceptionally helpful and useful feedback – I regret that I have not yet had the chance to explore their suggestions in the depth they merit. Finally, as always, thanks to Rong Yin, who does and is more for me than she’ll ever know. Any errors are my own, of course.

Note that when *the picture of itself* is in its base position as the object of *rename*, as in (3b), the anaphor is unlicensed. In contrast, if the object moves to Spec,CP as in a question, as in (3a), binding is possible. This is because *which picture of itself* moves successive cyclically through Spec of the embedded CP, where *the computer* is able to bind the anaphor, following which the DP moves to Spec of the matrix CP. Those who explain backward binding with a structural approach thus argue that an intermediate step in the derivation of sentences like those in (2) satisfies Principle A's c-command requirement, much like in (3a). Structural approaches have been taken by Belletti and Rizzi (1988), Pesetsky (1995), and Cheung and Larson (2015, 2018).

In contrast, logophoric approaches posit that certain contexts allow Principle A's c-command requirement to be relaxed. In particular, anaphoric expressions that refer to animate perspective takers –and only these– are exempt from being bound by a c-commanding expression. Landau (2010), Zlogar and Charnavel (2015), Charnavel and Zlogar (2016), and Charnavel and Sportiche (2016) advocate this kind of approach, which they support with the following sort of data:

- (4) a. Anonymous posts about herself_i on the Internet hurt Lucy_i's feelings.
(Charnavel and Zlogar (2016)'s (4b))
b. * Anonymous posts about itself_i on the Internet hurt the camera_i's sales.
(Charnavel and Zlogar (2016)'s (4a))

The minimal difference here is whether the anaphor refers to an animate perspective taker. When it does, as in (4a), backward binding of the anaphor is possible and the result is grammatical. When it instead refers to something that is inanimate, and thus not a possible perspective taker, as in (4b), the anaphor is disallowed and the result is ungrammaticality.

Backward binding in psych contexts is always amenable to a logophoric analysis. Psych contexts invoke experiencers by definition. In turn, experiencers are animate perspective takers by definition, and thus license exempt anaphors. This has led to the dominant theory of backward binding being the logophoric approach, since backward binding to this point has only been discussed in psych contexts.

The question I investigate is whether backward binding can occur outside psych contexts, and if so, how we can account for it.

3 New Data: Non-Logophoric Backward Binding

The logophoric approach requires antecedents of backward-bound anaphors to refer to animate perspective takers. If we can find cases where backward-bound anaphors refer to inanimates, these must be explained in a different way. With that in mind, consider the following novel data:

- (5) a. % A picture of itself_i blocked every monitor_i.
b. % Each other_i's lids completely covered the pans_i.
c. % At Mandelbrot's beach, miniature replicas of itself_i surround every sand castle_i.

Some (but not all) native English speakers have reported these cases of backward binding with stative uses of location verbs to be grammatical. What is notable about these examples is that the anaphors in them refer to inanimate, non-perspective taker arguments. Yet in contrast to (4b), these are (for some speakers) grammatical. Since the anaphors in these cases do not refer to animate perspective takers, they must be genuine cases of structural backward binding.¹

4 Two Ways to Derive Structural Backward Binding

My analysis relies on two standard assumptions: a version of Principle A that has a c-command requirement, and Featural Relativized Minimality.

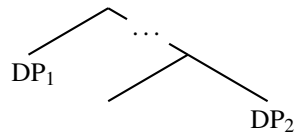
¹Though note that at least some cases of psych backward binding may be better explained under a logophoric approach. The key point is that the new data cannot be explained this way.

- (6) Principle A (Chomsky 1981):
(Non-exempt) anaphors are bound by a local c-commanding DP.
- (7) Featural Relativized Minimality (Rizzi 1990, 2004, Chomsky 1995, Starke 2001):
If X and Y share identical relevant features, Y cannot c-command X when X-commands the trace of Y (i.e., if F represents the relevant feature: $*[Y_{[F]} \dots X_{[F]} \dots t_Y]$).

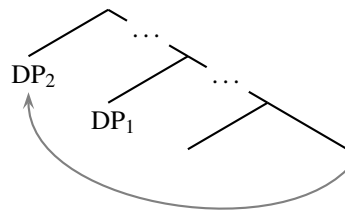
I will not re-justify these assumptions here, except to note that they are fairly widely accepted.

I will begin by laying out the two logically possible ways that backward binding could be derived, working in a minimalist-style framework, given the assumptions above. Call the binder DP_1 and the DP containing the anaphor DP_2 . Principle A will mean that at least one step in any licit derivation will involve DP_1 (asymmetrically and locally) c-commanding DP_2 . (Non-logophoric) backward binding is defined as when DP_2 moves to a position that c-commands DP_1 , as shown:

- (8) a. Initial configuration (Principle A satisfied):



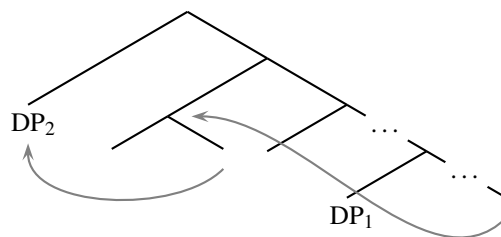
- b. Backward binding:



If DP_1 and DP_2 have the same set of features relevant to the probe that triggers movement, (8b) will violate Featural Relativized Minimality as previously defined. One way to avoid this is to simply suppose that DP_1 and DP_2 have different feature sets, so that DP_1 doesn't intervene.

The other way of avoiding this violation of Featural Relativized Minimality makes use of smuggling movement (Collins 2005). DP_2 can move past DP_1 as part of a larger phrase without violating Featural Relativized Minimality, and then move out of that phrase as the now-closest target for a higher movement operation, as shown:

- (9)



The upshot of this section is that Featural Relativized Minimality and Principle A conspire in such a way that any non-logophoric backward binding must be derived in one of these two ways: featural differences between binder and bindee, or smuggling movement.

5 Particle Verbs

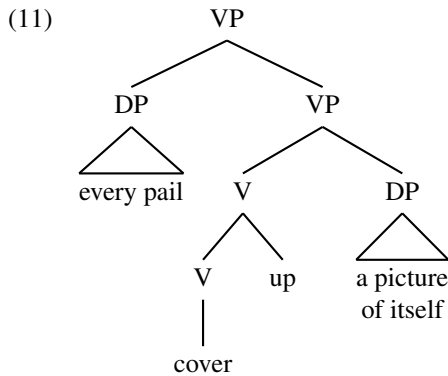
The crucial data distinguishing the featural differences approach from the smuggling approach comes from stative location particle verbs. In particular, what proves crucial is that a particle can appear either before or after the object when backward binding occurs:

- (10) a. A picture of itself_i **covered up** every pail_i.
b. A picture of itself_i **covered** every pail_i **up**.

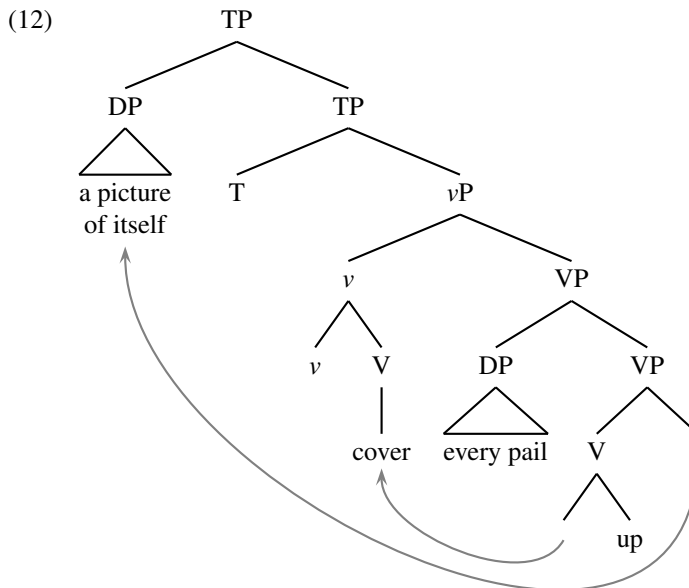
Let us add one more standard assumption to Principle A and Featural Relativized Minimality: particles occur within a phrase headed by the verb. For expository purposes, I make use of Johnson's (1991) analysis of particle verbs, in which particles originate in V, but my points here will extend to any analysis where particles are c-commanded (symmetrically or asymmetrically) by their verbal host.

5.1 Featural Differences: Lexical Case Assignment

Principle A will mean that a parse with the relevant properties of the structure in (11) will be a part of the derivation of a sentence like those in (10).² In particular, what is relevant here is that this is a stage where *every pail* locally c-commands (*a picture of*) *itself*, meaning Principle A is satisfied, such that binding of the non-exempt anaphor is possible.



Backward binding occurs when the DP containing the anaphor *itself* moves over its binder to Spec,TP:



We can derive pre- and post-object *up* in (12) by saying that either the V containing *cover* and *up* (not shown above), or else the V containing just *cover*, moves to *v* (as shown above).

²These structures are intentionally simplified for expository purposes, and are certainly abbreviations of some more complex structure whose details remain to be worked out. In particular, one should note that the semantics implied by the structure in (11) are almost certainly incorrect: *a picture of itself* is probably not the semantic object of *cover up* – though see Hale and Keyser (2002) for an approach where Themes may be projected in Spec,VP and Instruments in Comp,VP. I thank a reviewer for suggesting this connection. What is important for present purposes is that there is a stage in which the binder locally c-commands the bindee.

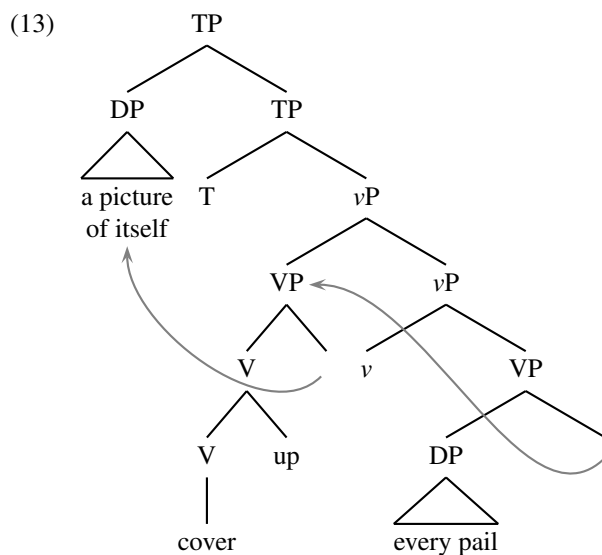
However, (12) will violate Featural Relativized Minimality if *every pail* and *a picture of itself* have the same relevant features. Given that the movement here is to Spec,TP, we might thus follow Belletti and Rizzi (1988)'s approach, and say that the reason Featural Relativized Minimality is not violated here is because the verb assigns lexical accusative Case to *every pail*, meaning that it is featurally distinct from *a picture of itself* in a way that is relevant to the motivation for this movement to satisfy the EPP and receive nominative Case.³ This would mean that *every pail* no longer intervenes, and that (12) does not violate Featural Relativized Minimality.

Thus, we can derive both pre- and post-object particles with backward binding using a featural differences approach, and tentatively propose that the relevant featural difference is a lexically assigned Case feature.

5.2 Smuggling

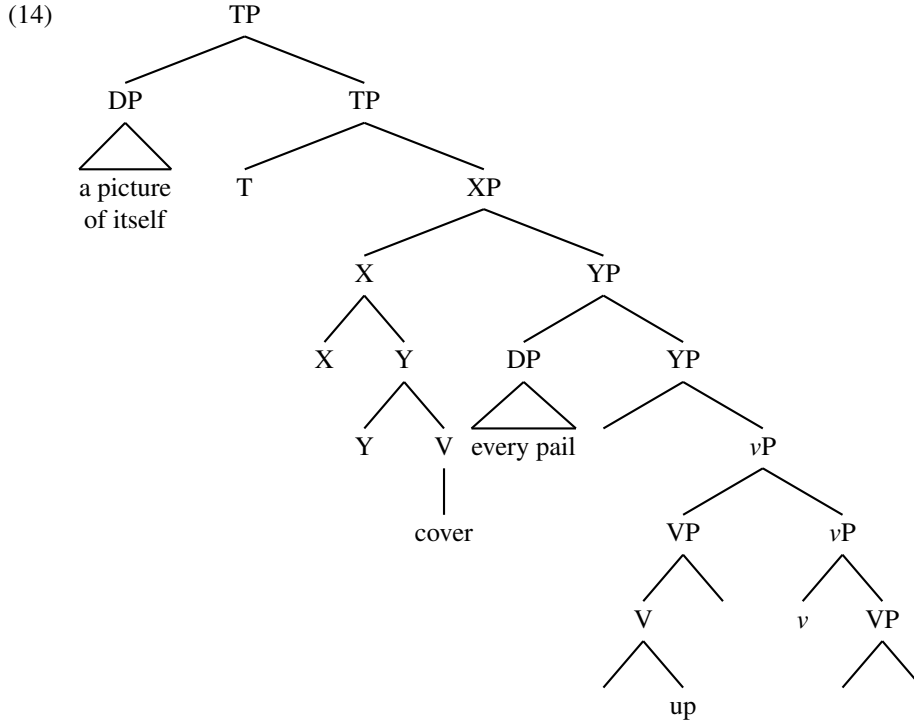
Now, let us consider the alternative approach. Can smuggling movement derive pre- and post-object *up*? If it cannot, we have evidence to favor the featural differences/lexical Case assignment approach.

To smuggle *a picture of itself* past *every pail*, we must minimally move the smallest VP to Spec,vP, as in (13). This is the most conservative way to satisfy our requirements for the smuggling approach: it moves the smallest phrase that contains *a picture of itself* that is not identical to it, and it moves it the shortest possible distance to allow for *a picture of itself* to be successfully smuggled out (i.e., it places *a picture of itself* higher than *every pail*, so even if both DPs have the same relevant features, *every pail* will not intervene).



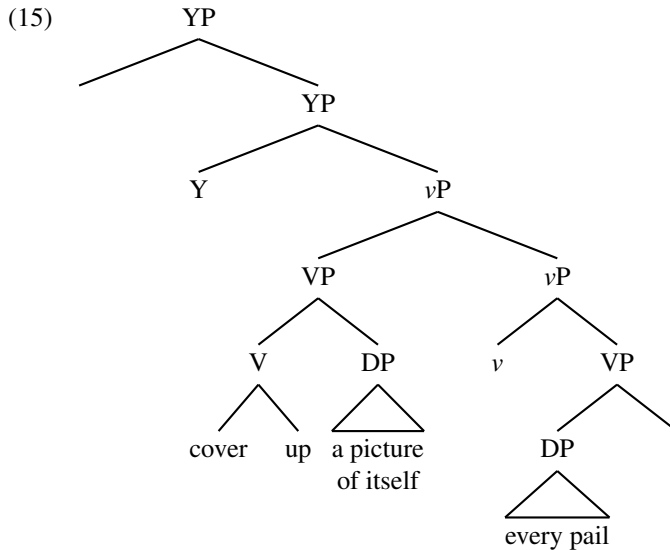
In this case, the particle moves with the VP, since it is inside it. Any approach to particle verbs where the particle is c-commanded by V will have this result. This means that we have derived pre-object *up* – but only pre-object *up* so far. Deriving post-object *up* would mean moving *every pail* higher than vP, and moving *cover* higher than that, as this would result in *up* remaining in the phrase in Spec,vP, *every pail* occurring above *up*, and *cover* occurring above *every pail*. Let's call whatever functional projections would constitute the landing sites for these movements XP and YP. Thus, we would have, following movement:

³We might also imagine that *every pail* could potentially move to Spec,TP instead of *a picture of itself*, but any such derivation would be doomed to failure – as this would leave *a picture of itself* Caseless.



First, the lower VP, which contains *a picture of itself*, moves to Spec,vP – the first step of smuggling. Then, Y is merged, and *cover* head-moves to Y. *Every pail* moves to Spec,YP. X is merged, and [Y *cover*] head-moves to X. Finally, T is merged, and *a picture of itself* moves to Spec,TP. This derives the correct post-object particle word order.

However, this derivation includes the problematic step in (15) below:



Here, VP has moved, and we have merged Y. The next step would extend the tree by moving a DP to Spec,YP. We already know that to derive the correct result, what moves to Spec,YP must be *every pail*, as *a picture of itself* surfaces in Spec,TP. However, this is where the problem lies: *a picture of itself*, having been smuggled higher than *every pail* by the movement of VP, is now a closer target for movement to Spec,YP than *every pail*. It doesn't matter where specifically we move VP – any such movement that results in *every pail* not intervening for movement to Spec,TP will mean that *a picture of itself* will be closer to any projection higher than *every pail* by definition. This means that

every pail cannot be a valid target for movement to a position above *cover up*, which is needed to derive post-object *up*, since moving it instead of *a picture of itself* would violate Featural Relativized Minimality. In order for movement of *every pail* to Spec,YP to not result in a violation of Featural Relativized Minimality, *a picture of itself* and *every pail* must have different feature sets – exactly as in the featural differences approach. The added complexity of the smuggling approach in terms of additional functional projections and movements purchases no advantage over the approach that simply posits a featural difference from the start.

In sum, the smuggling approach requires positing *ad hoc* functional projections to provide a landing site for the verb and the object in order to derive the post-object particle. But in doing so, it offers no advantage over the featural differences approach, since it still requires us to posit featural differences. Since the featural differences approach is thus strictly speaking simpler than the smuggling approach, it is to be favored.

6 Implications and Next Steps

Structural backward binding has also been noted before in passives (Collins 2005, Goodall 1997, Roberts 1987):

- (16) Each other_i's algorithms were copied by the programs_j.

However, both approaches presented here have been used to explain this (Bruening 2013, Collins 2005). We might try applying our diagnostic of particle verbs to passives to adjudicate between smuggling and non-smuggling approaches, given that passives allow structural backward binding:

- (17) a. John looked up the number.
 b. John looked the number up.
 c. The number was looked up by John.
 d. *The number was looked by John up.

It could be tempting to take the impossibility of post-*by*-phrase particles in passives as evidence in favor of the smuggling approach, following reasoning developed in the previous section. However, the particle verb diagnostic does not apply cleanly to passives, due to unresolved questions regarding whether the *by*-phrase appears initially to the left (Collins 2005) or right (Bruening 2013) of the verb. If the *by*-phrase initially appears to the left, then the impossibility of (17d) could be read as evidence for a smuggling approach to the passive, since it would show that the VP, which contains the particle, must move past the *by*-phrase in its entirety. However, if the *by*-phrase initially appears to the right, then the impossibility of (17d) is neither here nor there, since it would merely speak against the possibility of extraposing particles past *by*-phrases. The same concerns do not apply to the cases of backward binding with stative location verbs discussed here, where there is no *by*-phrase to concern ourselves with.

In passives, the presence of the overt preposition *by* achieves the same effect as what is here tentatively attributed to lexically assigned accusative Case for the object of stative location verbs. We might consider this similarity important. Suppose stative location verbs involve a hidden preposition responsible for assigning case (e.g., *cover* → *over*, *surround* → *around*, and so on), which would be pronounced as part of the verb. Exactly how to implement this idea remains to be worked out, but it seems initially plausible. An anonymous reviewer suggests that we might imagine that there is a covert *with* that introduces the Instrument in Comp,VP, which (being covert) must incorporate into V. This could lead to accusative Case assignment to the Theme in Spec,VP, à la Freeze's (1992 *et seq.*) approach to possessive *have* sentences. (A fuller explanation of the connections between the binding facts here and the complex binding facts of *have* and double object/applicative sentences is something which I must leave for future work, though I am grateful to a reviewer for suggesting this connection.) We could then posit an explanation for the fact that not all speakers accept backward binding with stative location verbs: speakers who don't accept backward binding in these sentences might not break down stative location verbs as V+P in their grammar, but instead analyze them just like standard transitive Vs.

More tentatively, we could extend this line of reasoning to some psych contexts, where backward binding has traditionally been investigated, as noted in Section 1. Landau (2010) argues that stative psych verbs involve covert prepositions. We thus might want to analyze stative psych backward binding not as logophoric, but in the same way as I have proposed for stative location verbs. This would potentially explain why agentive uses of psych and location verbs disallow backward binding –as has been previously noted– since under Landau’s approach, these do not involve covert prepositions in the same way as stative psych verbs. The fact that agentive uses of psych verbs (and location verbs) disallow backward binding remains a puzzle for logophoric approaches, since agentive uses of psych verbs still invoke animate perspective takers, and thus should license exempt anaphors, but they do not:

- (18) a. * Each other_i’s friends deliberately annoyed the men_i. (cf. Pesetsky 1987, 1995)
 b. * A replica of itself_i quickly covered every robot_i with a sheet.

However, it is perhaps unlikely that all cases of psych backward binding should be explained structurally. Examples like the periphrastic causatives in (2b) or other psych contexts like (2c) are not so easily explained by this approach. A logophoric approach might still prove best for those cases.

6.1 Deceptive Unaccusativity

The analysis presented here treats the subject of stative uses of location verbs as derived. This might predict that it should be impossible to form passives of stative location verbs, since verbs with derived subjects (like unaccusatives) cannot typically passivize. However, stative location verbs can passivize, which might point against any sort of derived subject analysis:

- (19) a. The blanket covered the screen.
 b. The screen was covered by the blanket.

Nevertheless, there is additional data that points to stative uses of location verbs as having derived subjects. In particular, they allow *there*-insertion, which is disallowed for typical transitive verbs:⁴

(20) *Typical transitive verbs:*

- a. * There kissed the girl a young boy from across town.
 b. * There attacked the ship a pirate vessel.
 c. * There built the house a well-known construction company.

(21) *Stative location verbs:*

- a. The adorns the wall of a much-traveled corridor a masterpiece entitled *Sickness and Health*.⁵
 b. ? There covered the computer screen a thick woolen blanket.
 c. There surrounds the centre of any selected molecule, therefore, a sphere of radius $2r$...⁶

(22) *Agentive location verbs:*

- a. * There adorned the walls of the old manor numerous decorators with impeccable taste.
 b. * There covered the computer screen a watchful secret agent.
 c. * There surrounded the city a general calling in orders from Washington.
 (cf. *A general calling in orders from Washington surrounded the city with tanks.*)

⁴Exceptions to this include progressive uses of transitives and so-called “outside verbals.” For the latter the definiteness restriction, whereby the associate of *there* must be indefinite, is relaxed. This is not the case for the present examples of stative location verbs, for which the associate must be indefinite. See Deal (2009) and Milsark (1974) for details. Also cf. the contrast between stative and agentive uses of location verbs in the examples above, which would not be explained if *there*-insertion for location verbs represented outside verbals.

⁵<https://tinyurl.com/w66k8xm>

⁶<https://tinyurl.com/tmzb5zn>

Insofar as *there*-insertion in English is diagnostic of derived subjecthood (Deal 2009, Hale and Keyser 2002), then, these sentences provide evidence that stative location verbs have derived subjects. We might refer to this as deceptive unaccusativity, since despite appearing to be normal transitive verbs on the surface, stative location verbs may actually have derived subjects according to this diagnostic. Reconciling this with their ability to form passives will require probing the difference between passivization and unaccusative-like A-movement in greater detail.

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