

**The Theta-Criterion, UTAH and  
the Projection of External Arguments in the Passive**  
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December 2018

**Abstract:** In this paper, I discuss the projection of external arguments with active and passive verbs in English. I show that the options for projecting external arguments are severely limited by the Theta-Criterion.

**Keywords:** passive, external argument, *by*-phrase, Theta-Criterion, implicit arguments, UTAH

## 1. Introduction

External arguments can be realized in at least three different ways:

- (1) a. The lobbyist bribed the senator. (active)  
b. The lobbyist was bribed by the senator. (passive with *by*-phrase)  
c. The lobbyist was bribed. (short passive)

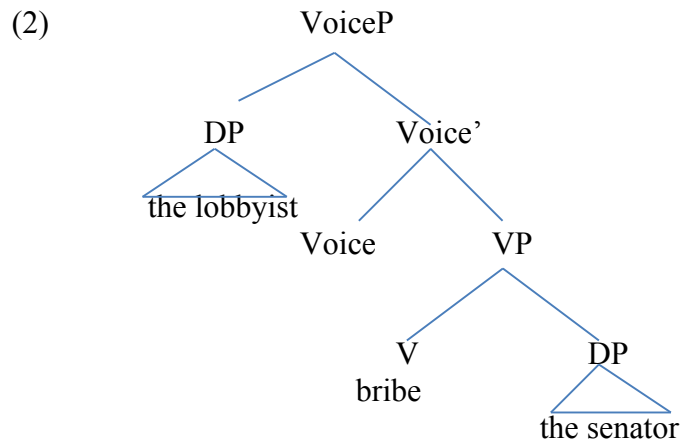
In (1a), the external argument is the subject. In (1b), the external argument appears within a *by*-phrase and in (1c) the external argument is an implicit argument.

According to Bruening 2013, the external argument in these three sentences is projected into the syntax in completely different ways. In (1a), the external argument is in Spec VoiceP. In (1b), the external argument is projected in a *by*-phrase adjunct. In (1c), the external argument is not projected into the syntax at all. See also Legate 2014 and Alexiadou et. al. 2015 for similar analyses.

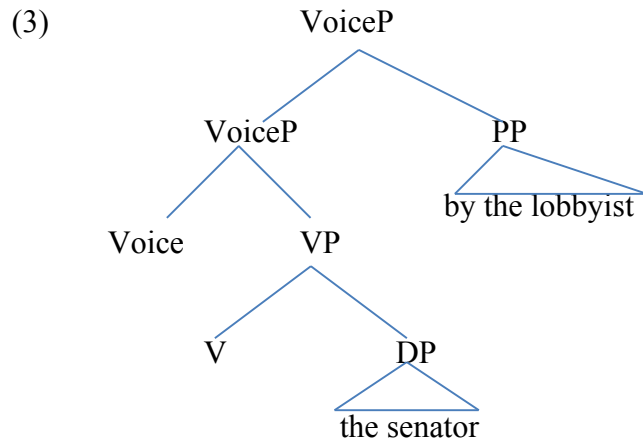
In this paper, I will summarize evidence against Bruening's analysis (from Collins 2005, Collins 2018a,b and Angelopoulos, Collins and Terzi 2018). Then I will address the question of what theoretical principles block the structures that Bruening proposes. I conclude that the options for projecting external arguments are severely limited by the Theta-Criterion.

## 2. The *by*-Phrase of the Passive

According to Bruening, the external argument in the active is projected in Spec VoiceP, as follows (based on Bruening 2013: 21):



Bruening argues that in the passive when there is a *by*-phrase, it is adjoined to VoiceP:



In this case, Bruening (2013: 24) claims that “Semantically, *by* takes a function with an open individual argument and supplies its own argument to saturate that function....” Crucially, under Bruening’s analysis the denotation of the *by*-phrase is not a semantic argument of the denotation of Voice. The semantic value of *by* is the following (see Bruening 2013: 25):

(4)  $[[by]] = \lambda x \lambda f_{\langle e, st \rangle} \lambda e. f(e, x)$

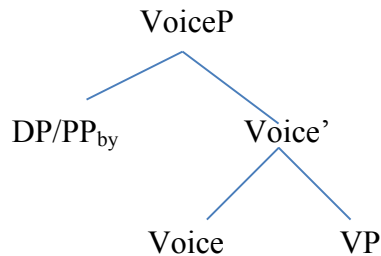
Collins (2018a) and Angelopoulos, Collins and Terzi (2018) argue against an analysis like (3) since it does not allow an account of how a *by*-phrase can bind a reciprocal or a reflexive:

- (5)
- a. The packages were sent by the children to each other.
  - b. The pictures were painted by the children for each other.
  - c. The packages were sent by the children to themselves.
  - d. The pictures were painted by the children for themselves.

As Collins 2018a shows, DPs in other kinds of adjuncts (e.g., locative adjuncts) do not have the ability to bind a reflexive. Rather, Collins (2018a) and Angelopoulos, Collins and Terzi (2018) argue that the *by*-phrase is in the position of the external argument (Spec VoiceP in Bruening’s framework). In this, they follow earlier work by Hasegawa (1988), Goodall (1997, 1999), Mahajan (1994) (see also Collins 2005 for a related analysis). Since the *by*-phrase occupies an A-position, it is able to bind an anaphor, as shown in (5).

Assuming that the external argument in the active is projected in Spec VoiceP (see Kratzer 1996), then the reflexive data show that external argument is projected in the same position in the active and the passive:

(6)



In (6), cases (1a,b) are represented: (a) the active case where *the lobbyist* is in Spec VoiceP, and (b) the passive case where the *by*-phrase is in Spec VoiceP. This kind of theory will easily account for the binding facts, unlike the theories in Bruening 2013, Legate 2015 and Alexiadou et. al. 2015. See Collins 2018a for discussion. In (6), the semantics of *by* itself is trivial (the identify function), unlike in Bruening’s theory in (4).

Now, the question is why Bruening’s structure in (3) is impossible, and only the simplified structure in (6) is possible? This looks like the kind of restrictiveness imposed by UTAH. In the next section, I will evaluate UTAH with respect to the projection of the external argument in the passive.

### 3. UTAH

Baker (1988: 47) proposed UTAH as a generalization mapping thematic relations into syntactic structures (see also Baker 1997: 74):

- (7) The Uniformity of Theta Assignment Hypothesis (UTAH):  
Identical thematic relationships between items are represented by identical structural relationships between those items at the level of D-structure.

As Baker (1988) discusses, UTAH has far ranging consequences for the analysis of the projection of arguments. For example, “it supports the so-called Unaccusative Hypothesis...according to which the sole argument of certain nonagentive intransitive verbs is a structural object at D-structure.” (pg. 47)

Consider again UTAH in light of the structures in (2) and (3). Clearly UTAH does not allow both (2) and (3). In these examples, the Agent DP is projected in two completely different ways. In (2) the Agent DP is in Spec VoiceP. In (3), the Agent DP is internal to a *by*-phrase, adjoined to VoiceP. These are completely different structural configurations.

However, UTAH is too weak here. UTAH only says that there is some unique structure, but does not tell us which is the right structure. UTAH says that it is not possible to have both (2) and (3), but UTAH does not tell us which structure is the right structure. It would be compatible with UTAH if the only structure possible were the adjunction structure in (3).

Of course, such considerations do not argue against UTAH, but they do suggest that some other principle is at play in blocking (3) as a possible structure. I return to the status of UTAH in section 7.

### 4. The Theta-Criterion

Consider then the Theta-Criterion (Chomsky 1986: 97):

- (8) Theta-Criterion

Each argument  $\alpha$  appears in a chain containing a unique visible theta-position P, and each theta-position P is visible in a chain containing a unique argument  $\alpha$ .

An implicit assumption of (8) is that theta-role assignment is local. I state it in this way (see Larson 1988: 382 amongst others):

- (9) Locality of Theta-Role Assignment  
If X assigns a theta-role to Y, X and Y are sisters.

On the assumption that the sister position of Voice' is a theta-position in (2), the second-half of the Theta-Criterion requires that it be filled by an argument. Note that in the case of (2), the argumental DP *the lobbyist* is a sister of Voice'.

The Theta-Criterion successfully excludes Bruening's structure in (3), on the assumption that the sister of VoiceP in this structure is a theta-position (just like the sister of Voice' in (2) is theta-position), but is not filled by an argument. The only possible argument is the DP internal to the *by*-phrase, but that DP is not a sister of VoiceP.

The structure in (6) with a *by*-phrase in Spec VoiceP conforms to the Theta-Criterion. The sister of Voice' is a theta-position, and the *by*-phrase itself is the argument (not the DP buried in the *by*-phrase). On the theory in (6), the preposition *by* is basically a case marker, adding nothing semantically to the DP that it takes as a complement.

The issue of the Theta-Criterion in syntactic theory was discussed in Heim and Kratzer (1998: 51). I give the extended quote below:

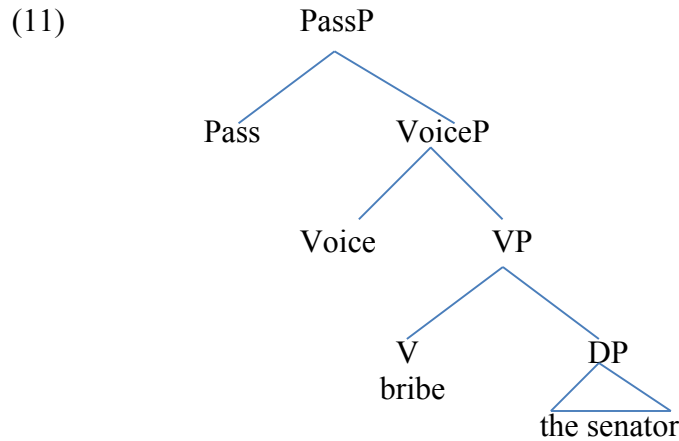
- (10) Suppose we have a predicate  $\alpha$  with one  $\theta$ -role to assign. In our terms, suppose that  $\llbracket \alpha \rrbracket$  is of the type  $\langle e, t \rangle$ . According to the  $\theta$ -Criterion,  $\alpha$  must appear in the vicinity of something that receives its  $\theta$ -role. That means  $\alpha$  has to have a sister node with a meaning of type  $e$ . According to our Interpretability principle, on the other hand, a sister node of type  $e$  is not strictly required. It would provide one suitable environment for  $\alpha$ , but not the only kind. Imagine instead that  $\alpha$  has a sister node whose meaning is a *function with domain*  $D_{\langle e, t \rangle}$ . (For instance, it might be of type  $\langle \langle e, t \rangle, e \rangle$ .) In that case, the next higher node could be interpreted as applying this sister's meaning to  $\llbracket \alpha \rrbracket$ . So we could have an interpretable structure which does not contain an argument for  $\alpha$ !  $\alpha$  would not be assigning its  $\theta$ -role to any phrase, in violation of the  $\theta$ -Criterion. Yet Interpretability would be fulfilled, in virtue of  $\alpha$  being a suitable argument for its sister node."

In this paragraph, they are explicitly arguing against the Theta-Criterion in favor a weaker principle (of Interpretability). Crucially, Heim and Kratzer (1998: 53) note that it is an empirical issue whether or not the Theta-Criterion exists: "These two arguments against the  $\theta$ -criterion are not beyond question, of course. They are only as good as the syntactic and semantic analyses we have sketched."

Indeed, as seen above the binding facts in the passive support the more rigid requirements imposed by the Theta-Criterion. See section 8 on Heim and Kratzer's two arguments against the Theta-Criterion.

## 5. The Implicit Argument of the Passive

According to Bruening (2013: 23), in the short passive, no external argument is projected at all, as illustrated in



Bruening (2013: 23) elaborates that in (11) the “..if the external argument of Voice has not been saturated, Pass will have to saturate it. It does this by existentially binding it.”

Collins 2018b shows that (11) is not a tenable analysis of the short passive because it does not allow for binding of a reflexive by an external argument:

- (12) a. Such privileges should be kept to oneself.  
(Baker, Johnson and Roberts 1989: 228, Roberts 1987: 162))
- b. Damaging testimony is always given about oneself in secret trials.  
(Roberts 1987: 162)

Bruening’s analysis in (11) predicts that (12a,b) should be ungrammatical, because there would be no antecedents for the reflexives. Rather, it appears that the implicit argument in the short passive must be a syntactically present empty category, null *pro*. In the case of (11), *pro* is interpreted as a generic pronoun similar to the overt pronoun *one*.

The structure in (11) also violates the second half of the theta-criterion. Once again assume that the sister of VoiceP in (11) is a theta-position. Since there is no argumental DP in this position, nor in any other part of the tree, (8) is violated.

So we see that (13) is a consequence of (8):

- (13) All implicit arguments are syntactically realized.

This principle covers the implicit argument in the short passive, but other cases of implicit arguments as well (see Elbourne forthcoming and Bhatt and Pancheva 2006 for surveys). For example, consider the following cases of implicit arguments discussed in the literature:

- (14) a. Libertarian doctrine never advocates the promotion of oneself at the expense of others.  
([https://www.goodreads.com/review/show/164373804?book\\_show\\_action=true](https://www.goodreads.com/review/show/164373804?book_show_action=true))
- b. Letters to oneself compose quickly.  
(Stroik 1992: 129)

- c. It was upsetting (to Mary) to see herself in the newspaper.

In (14a), the implicit agent of the nominalization binds the reflexive *oneself*. In (14b), the implicit agent of the middle binds the pronoun *oneself*. And in (14c), the implicit experiencer of *upsetting* controls PRO which binds the reflexive *herself* (see Landau 2010 and Epstein 1984 on control by experiencers). In all three cases, by the principle in (13), there must be a syntactically present implicit argument. This result follows directly from the Theta-Criterion.

Now consider the case of the verb *eat*:

- (15) a. John ate.  
 b. John ate something.  
 c. John ate \*(it) raw

It seems like (15a) entails (15b), in the sense that whenever (15a) is true, then so is (15b). Therefore, on the basis of this entailment, one may want to say that (15a) has an implicit theme argument. However, the ungrammaticality of (15c) without the pronoun casts doubt on that conclusion. If there were a syntactically present implicit argument in (15a), then it should be able to be syntactically related to the object oriented secondary predicate. But (15c) is ungrammatical without the pronoun, suggesting that there is no implicit argument in (15a).

I suggest rather that (15a) has no implicit argument. And furthermore, the truth conditions of (15a,b) are as in (16a,b):

- (16) a.  $\llbracket(15a)\rrbracket = \exists e[\text{eat}(e) \wedge \text{Agent}(e, \text{John})]$   
 b.  $\llbracket(15b)\rrbracket = \exists e \exists x[\text{eat}(e) \wedge \text{Agent}(e, \text{John}) \wedge \text{Theme}(e, x)]$

In other words, in (15a) there is neither a syntactic nor semantic implicit theme. But then how can one account for the entailment in relation between (15a) and (15b). I suggest that it is a matter of real world knowledge that when one eats, something needs to be eaten. But that this information is not reflected in anyway in the syntactic representation.

## 6. Semantic Composition and the Theta-Criterion

In this section, I consider various ways of restating the Theta-Criterion in order to draw out the implications about semantic composition. Consider the following first attempt:

- (17) Revised Theta-Criterion (first version)  
 At the LF-interface, if  $SO_1$  denotes a function, then  $SO_1$  has a sister  $SO_2$ , and  $SO_2$  denotes an argument of that function.

One problem with (17) is that it may be too rigid. There do seem to be expressions of type  $\langle e, t \rangle$  that are never saturated by an expression of type  $\langle e \rangle$ . For example, if one adopts generalized quantifier theory, generalized quantifier phrases such as *every man* have a type  $\langle \langle e, t \rangle, t \rangle$ , and combine directly with clausal expressions of type  $\langle e, t \rangle$ . While (17) may ultimately be workable, it would require a much more systematic analysis of generalized quantifiers and other cases than I am able to provide here. Therefore, I will formulate a principle that is less restrictive (excluding fewer cases).

Consider the following restatement:

- (18) Revised Theta-Criterion (second and final)  
At the LF-interface, if  $SO_1$  denotes a theta-function, then  $SO_1$  has a sister  $SO_2$ , and  $SO_2$  denotes an argument of that function.

I will not define theta-function here, but it includes the denotations of elements like V, Appl, v and Voice: any word or phrase that takes an argumental DP (or PP or CP) as a specifier or complement. A speculation would be that a theta-function is defined as: (a) the semantic value of a lexical item that (b) is of the form  $\langle e, y \rangle$  where  $e$  is the type of individuals and  $y$  is any type. This definition would exclude functions that are formed by Predicate Abstraction (see Heim and Kratzer 1998: 114).

The principle in (18) blocks the cases in (3) and (10). In (3), the sister of VoiceP does not denote an argument of the function that VoiceP denotes. Similarly, for (10).

But (18) goes way beyond the weak principle of Interpretability given in Heim and Kratzer (1998: 49):

- (19) Principle of Interpretability  
All nodes in a phrase structure tree must be in the domain of the interpretation function  $\llbracket \cdot \rrbracket$ .

The interpretation function  $\llbracket \cdot \rrbracket$  is defined as the smallest function meeting the conditions of Terminal Nodes, Non-branching Nodes and Function Application. In effect, the principle in (18) severely limits Function Application.

## 7. Whither UTAH

In the above discussion, no reference was made to UTAH in constraining the possibilities of projecting the external argument in the passive. Rather, all the work was done by the Theta-Criterion. This suggests the possibility that UTAH could be eliminated all together. UTAH is repeated below (from (7)):

- (20) The Uniformity of Theta Assignment Hypothesis (UTAH):  
Identical thematic relationships between items are represented by identical structural relationships between those items at the level of D-structure.

In fact, UTAH has some strange properties for a principle of UG. For example, in order to check if a given structure satisfies the principle, one must compare it to other structures. That is, the thematic relationship and structural relationship between two syntactic objects must be compared across trees. Principles of UG do not seem to have this property. For example, the Theta-Criterion in (8) does not compare trees. This fact suggests that UTAH is not a principle of UG, but it is rather a theorem of other principles of UG.

What are those other principles? I speculate that UTAH like effects are the result of: (a) breaking down verbs into various light verb projections that are projected in a universal order, and (b) limiting the power of formal semantics in interpreting syntactic structures (e.g., the Theta-Criterion).

Part (a) has already been proposed in Baker (1997: 125-126): “The basic function of the original UTAH was to regulate where the various arguments of a predicate are expressed. This is a nontrivial task if predicates have multiple arguments of the same type, because one must keep

track of which NP is associated with which argument position. If, however, syntactic structure is built from the lexical decomposition of a verb, such that each predicate in the decomposition takes a single NP argument, the UTAH becomes trivial. All that remains is a simple convention that an argument must be in a local configuration with its argument-taker; the rest follows from compositional semantics.”

One problem with this deconstruction of UTAH is that there must be some way to restrict the structural relations between the heads in the verbal extended projection. For example, assuming *v*, *Appl* and *V* as the relevant heads, what determines that (a) is projected and not (b) (the same issue arises if one substitutes *VoiceP* in for *vP*):

- (21) a.  $[_{VP} DP [_{v'} v [_{AppIP} DP [_{Appl'} Appl VP ]]]]$   
 b.  $[_{AppIP} DP [_{Appl'} Appl [_{vP} DP [_{v'} v VP ]]]]$

Of course, one can stipulate that *v* takes *AppIP* as a complement, instead of vice versa, but such a stipulation lacks restrictiveness. What would prevent another language from having the opposite stipulation where *Appl* selects *vP*. It is for this reason that

Another tricky issue is the phrase “simple convention that an argument must be in a local configuration with its argument taker”. I take it that such a condition is the result of the Theta-Criterion and its auxiliary locality assumption in (9).

The function composition and type shifting mechanisms of Jacobson (2014: 229) also allow violations of the Theta-Criterion: “The Direct Compositional version sketched here – which makes no use of traces and no use of indices or assignments – ends up with the same result. Notice that the function composing the lifted (GQ)  $[[Martha]]$  with  $[[refinish]]$  directly results in an expression *Marth refinished* which denotes the set of things that Martha refinished... There is no need to assume *refinish* combines in the syntax with an actual NP (such as a trace) and no reason to assume  $[[refinish]]$  – of type  $\langle e, \langle e, t \rangle \rangle$  – needs to actually find an argument of type *e* to combine with. Indeed, it does not find such an argument, but is composed with the GQ subject.”

But note that the claim that “There is no need to assume *refinish* combines in the syntax with an actual NP (such as a trace)...” contradicts the Theta-Criterion, which imposes exactly such a requirement.

## 8. Two Arguments Against the Theta-Criterion

Heim and Kratzer (1998: 51-53) present two empirical arguments against the Theta-Criterion. I discuss these examples at length to bring out the relevant issues:

- (22) “In the following chapter, we will propose that common nouns like ‘barn’ are 1-place predicates (type  $\langle e, t \rangle$ ). In other words, they have a  $\theta$ -role to assign, and thus the  $\theta$ -Criterion requires the presence of an argument. In certain examples (predicative uses), this is unproblematic:

- (6) This is a barn.

The required argument here is the subject NP ‘this’. (6) is true if and only if the object referred to by ‘this’ has the property of being a barn. But consider the following sentence:

- (7) The barn burned down.



(7) contains no phrase that receives the  $\theta$ -role of ‘barn’. It thus seems to violate the  $\theta$ -Criterion. Yet it is perfectly fine, and we will see below how it can be interpreted by assigning ‘the’ a meaning of type  $\langle\langle e,t\rangle, e\rangle$  suitable to take  $[[barn]]$  as an argument. So this is the sort of case that we have been looking for. The Interpretability Principle and the  $\theta$ -Criterion make different predictions here, and if the analysis we will give for (7) is on the right track, then the empirical facts favor the former.”

From the point of view of the Theta-Criterion we have three choices here: (a) The Theta-Criterion is wrong, and should be abandoned in favor of weaker principles like the Interpretability Principle. (b) The Theta-Criterion is right, but somehow it does not apply to *barn*. That is, somehow *barn* does not require a syntactically present argument as its sister. (c) The analysis of the *barn* in (22) is wrong and there is a syntactically represented implicit argument of *barn*.

Curiously, Heim and Kratzer choose option (c) later on in their book. Based on issues having to do with the interpretation of quantifier phrases internal to DPs, they state (pg. 229): “Once we entertain a subject position not only in VP but also in PP, it is natural to do the same for the remaining categories that were traditionally analyzed as 1-place predicates: namely, APs and NPs.”

Consider the following example:

(23) No owner of an espresso machine drinks tea.

The question is how to interpret the quantifier phrase *an espresso machine*, which takes scope internal to the subject DP. They propose the following structure:

(24)  $[_{NP} PRO [_{N'} owner [_{PP} of\ an\ espresso\ machine]]]$

In this structure, the whole NP is of type  $t$ , and so the DP *an espresso machine* can undergo QR and adjoin to it.

But once one allows this kind of structure for *owner of an espresso machine* it is unclear what would block it for *barn* in (22).

Their second argument is based on VP coordination, which they represent as follows (I number the VPs for exposition purposes):

(25) 
(=(8) in Heim and Kratzer 1998: 52)

Heim and Kratzer (1998: 52) state the following: “What interests us here is that this is another interpretable structure which seems to violate the  $\theta$ -Criterion, in that there are not enough

arguments to go around for all the  $\theta$ -roles that need to be assigned in (8). ‘Sing’ and ‘dance’ each have a  $\theta$ -role to assign, but only one potential argument (the NP ‘Ann’) is present. Once more, we tentatively conclude that the weaker requirements imposed by our Interpretability Principle make the better empirical predictions.”

But clearly (8) is not a well-formed syntactic structure, since it does not comply with the VP-Internal Subject Hypothesis (discussed in Heim and Kratzer, section 8.4). Suppose that the subject *Ann* raises by ATB (Across-the-Board) movement from Spec VP<sub>1</sub> and Spec VP<sub>2</sub> to Spec TP. The structure is illustrated below:

(26) [S Ann [VP [VP <Ann> sings] and [VP <Ann> dances]]]

Consider the resulting structure from the stand-point of the Theta-Criterion, repeated below:

(27) Theta-Criterion

Each argument  $\alpha$  appears in a chain containing a unique visible theta-position P, and each theta-position P is visible in a chain containing a unique argument  $\alpha$ .

An important issue is how to interpret the notion of chain formed by ATB movement. Is there one chain or two chains? Let us assume for the sake of argument that there are two chains (understood as a sequence of positions):

(28) a. <Spec TP, Spec VP<sub>1</sub>>  
b. <Spec TP, SpecVP<sub>2</sub>>

As for the first half of the Theta-Criterion, *Ann* is in a chain containing a unique theta-position (e.g., chain (28a)). As for the second half of the Theta-Criterion, each theta-position P (Spec VP<sub>1</sub> and Spec VP<sub>2</sub>) is visible in a chain containing a unique argument  $\alpha$ , that is, *Ann*.

In summary, neither of Heim and Kratzer’s arguments against the Theta-Criterion is particularly compelling. For the argument based on nouns like *barn*, they change their analysis later in the book. For the argument based on VP coordination, they propose an erroneous syntax for VPs (without the VP Internal Subject Hypothesis) to make their point.

## 9. Conclusion

I have argued that the external argument of the passive and active are projected (externally merged) in exactly the same position (summarizing evidence from Collins 2018a,b and Angelopoulos, Collins and Terzi 2018). I have shown that this generalization follows from the Theta-Criterion. I have defended the Theta-Criterion against the criticisms presented in Heim and Kratzer 1998 and have shown how adopting the Theta-Criterion with its auxiliary locality principle in (9) allows one to make progress in eliminating UTAH as a principle of UG.

**Acknowledgements:** I thank Richard Kayne for comments on a draft, and the students in my Fall 2018 syntax seminar for feedback on earlier presentations of these ideas.

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