Subjectless Presuppositions and Severing the External Argument*

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AGENTS: GRAMMAR OR ROOTS?

1 Introduction

- Since Marantz (1984), it has been widely acknowledged that the external arguments of verbal predicates seem to have a different status from internal arguments, based on the observation that external arguments can condition the meaning of a verb while internal arguments do not.
- Kratzer (1996) provides an explicit formal account for this observation: external arguments bearing thematic roles like AGENT, EXPERIENCER, etc. are introduced by a functional head VOICE, which combines with the VP via the compositional rule of EVENT IDENTIFICATION.
- This implies that external arguments are not present within a verb root's compositional semantics; only internal arguments are specified by verbal roots (Harley, 2014).
- However, Kratzer's proposal, while widely accepted, makes incorrect predictions about the availability of *subjectless repetitive presuppositions* with *again* with specific classes of verbs, particularly stative transitive verbs (Bale, 2007).
- We argue here for a different understanding of this incorrect prediction. Specifically, we make the following claims:
  - Specific root classes are *inherently reflexive*: they make reference to an external argument semantically via an *index* on the root, even if they do not syntactically introduce the argument (e.g., Jackendoff 1992; Hale and Keyser 2002).
  - VOICE syntactically introduces the external argument and its thematic interpretation, but relates the external argument to the VP by *binding* the root's index (Kratzer, 2009).
    - This ensures that there is no constituent that modifiers like *again* can target that excludes some representation of the external argument (cf. Bale 2007).
  - The same analysis given to stative transitive verbs can be extended to other verb classes like verbs of ingestion (Jerro, 2019) and verbs of killing (Ausensi et al., 2021), which also resist subjectless presuppositions with *again*.

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– The observations with different verb classes and the analysis given here argue for a more nuanced understanding of how external arguments, whether AGENT or EXPERIENCER, are related to roots: both roots and argument-introducing functional heads play a role in the syntactic introduction and semantic interpretation of external arguments.

2 Subjectless Presuppositions

- One consequence of severing external arguments from the verb in the fashion of Kratzer (1996) is that there is a constituent which both syntactically and semantically excludes external arguments, such as AGENT, EXPERIENCER, etc.

- Consider Kratzer's rule of EVENT IDENTIFICATION. This rule takes a constituent of type $<e,<v,t>>$, (the type of VOICE), and a function of type $<v,t>$ (the type of VP), conjoins them, and abstracts over the individual and event arguments of the original functions.

  (1) EVENT IDENTIFICATION:
  $f_{e,vt} + g_{vt} \rightarrow \lambda x.\lambda e.f(x)(e) \wedge g(e)$

- This means that the verb itself syntactically and semantically encodes *only its internal argument*; we illustrate the composition with an eventive transitive verb like *hit*.

  (2) Mary hit the table.
  a. $[\![hit]\!]$: $\lambda x.\lambda e.\text{HIT}(e) \wedge \text{THEME}(e) = x$ (no agent argument)
  b. $[\![hit\ the\ table]\!]$: $\lambda e.\text{HIT}(e) \wedge \text{THEME}(e) = table$
  c. $[\![\text{VOICE}]\!]$: $\lambda x.\lambda e.\text{AGENT}(e) = x$
  d. $[\![\text{VOICE}\ hit\ the\ table]\!]$: $\lambda x.\lambda e.\text{AGENT}(e) = x \wedge \text{HIT}(e) \wedge \text{THEME}(e) = table$ (E.I.)
  e. $[\![Mary\ \text{VOICE}\ hit\ the\ table]\!]$: $\lambda e.\text{AGENT}(e) = mary \wedge \text{HIT}(e) \wedge \text{THEME}(e) = table$

- Given that the VP excluding the external argument is of type $<v,t>$, we expect it to be modifiable by expressions that compose with constituents of this type.

  – To truly show this, we need a modifier whose semantic contribution is dependent on the VP and whose contribution is non-truth conditional; otherwise we would not be able to detect the absence of the external argument in its scope.

- One such modifier is the sub-lexical presupposition trigger *again*, an event modifier that presupposes the existence of a prior event of the same kind as that denoted by the constituent it modifies.

  (3) $[\![again]\!]$P is defined if $\exists e^1 \exists e^2[e^1 \prec e^2 \prec E \wedge P(e^1) \wedge \neg P(e^2)]$
  When defined, $[\![again]\!]P = P$. $<<v,t>,<v,t>>$
  (Bale 2007)

- Bale (2007) shows that *again*'s presupposition is indeed satisfied when there is a previous event with a distinct agent argument from the asserted event when modifying verbs like *hit*, a *subjectless repetitive presupposition*, supporting Kratzer's proposal.

(4) CONTEXT: Seymour's dryer broke. He called **a repairwoman who simply hit the dryer until it started working**. The dryer broke down two days later. So...

a. **The repairwoman returned and she hit the dryer again.** (above VOICE)

b. **Seymour hit the dryer again.** (VP below VOICE)

((29) in Bale, 2007)

- We might expect the same thing to occur with stative transitive verbs, whose external arguments are interpreted as EXPERIENCERS. If their external arguments are severed in the same way as eventive transitive verbs, subjectless presuppositions of the sort observed with *hit* are also expected
- Bale (2007) shows, however, that this is not borne out.

(5) CONTEXT: **Seymour's mother loved Frank**, although she was the only one who did. After a while she no longer cared for Frank. Later...

a. Seymour's mother rediscovered her feelings and so **Seymour's mother loved Frank again**.

b. # Seymour grew attached to Frank and so **Seymour loved Frank again.**

((47) in Bale, 2007)

- Bale concludes that the external argument is not severed from all verbs: while eventive transitive verbs like *hit* do not lexically encode their agent arguments, verbs like *love* introduce all of their arguments directly, without the presence of mediating functional heads.
- This ensures that *again* can only modify a constituent headed by a stative transitive verb after all its arguments have been introduced, producing the observed repetitive presupposition that includes both the external and internal arguments.

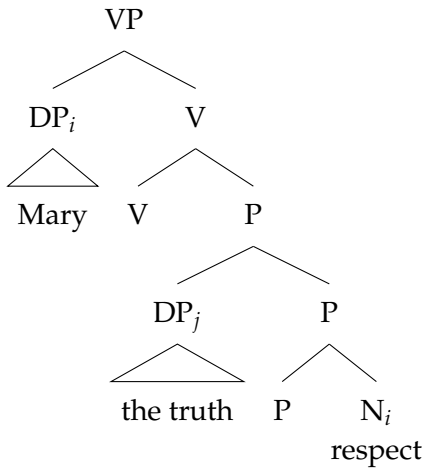
(6) $[\![love]\!]$: $\lambda y.\lambda x.\lambda e.\text{LOVE}(e) \wedge \text{THEME}(e) = y \wedge \text{EXPERIENCER}(e) = x$

(experiencer introduced directly)

3 Anaphoric Indices and Binding

- We propose a different understanding of the lack of subjectless presuppositions with stative verbs like *love*.
- We take our initial cue from a syntactic analysis of subject experiencer verbs due to Hale and Keyser (2002).
- On this analysis, subject experiencer verbs like *love*, *hate*, and *respect* are underlyingly nominal roots serving as the complement of a relational head.
- These roots incorporate into a higher verbal head to form a verb. Importantly, these roots contain an index that must be bound **obviatively**.
- That is, the index cannot be bound by the closest argument, but must be bound by a further argument.

(7) Mary respects the truth.



(adapted from Hale & Keyser 2002)

- Evidence for this comes from productive alternations involving the root of *love* surfacing as a nominal with the possessive verb *have* and with ditransitive *give*, with either overt DPs or genitive pronouns indicating the 'possessor' of the love.
- In particular, genitive pronouns referencing the possessor of the emotion are *always bound obviatively by the external experiencer argument*; the presence of an intervening potential binder cannot bind the verb root's index referencing the possessor.

(8) a. Mary has John's love.
b. Mary$_i$ has her$_{*i/j}$ love.
c. John$_i$ gives Mary his$_i$ love.
d. Mary$_i$ gives her daughter$_j$ her$_{i/*j}$ love.

- Though Hale & Keyser's analysis was purely syntactic, we can translate its insights into a semantic analysis that sheds some light on the issues noted above.
- We propose the roots of stative verbs are *indexed*, represented as *g(n)*, where *n* is a natural number.
- *g* is an *assignment function* that maps *n* to a particular individual in the model.
- The content of the root $\sqrt{\text{LOVE}}$ is represented by the logical language relation LOVE-OF with a THEME argument.
- Intuitively, this means that the root denotes a function from an individual, the target of the emotion, to a state of being in love with that individual (see Rothmayr 2009 for diagnostics indicating *love* denotes a state).
  - Importantly, this emotion is relativized to the individual *g* maps to *n*, i.e., paraphrasable as *love of g(n) for x*.

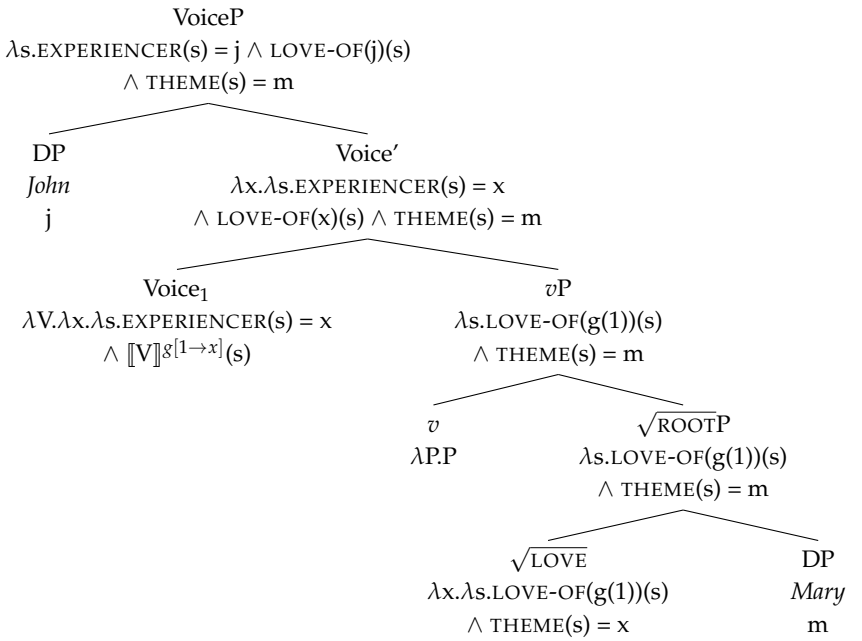
(9) $[\![\sqrt{\text{LOVE}}_n]\!]^g$: $\lambda x.\lambda s.\text{LOVE-OF}(g(n))(s) \wedge \text{THEME}(s) = x$

- We now address how the index comes to be bound by the external experiencer argument. Based on Hale & Keyser's observation that the experiencer argument binds the index of the root, we follow Kratzer (2009) and have functional heads in the extended verbal projection carry out this function.
- In particular, the external argument-introducing head VOICE enforces binding by shifting any matching index in its complement to the individual introduced in its specifier.
- This is effected by shifting the assignment VOICE's complement is evaluated at to an assignment just like g except that it maps the index n to the individual x, notated $g[n \rightarrow x]$.
- As x is the individual abstracted over by the function denoted by VOICE, this results in the index being mapped to the EXPERIENCER of the state itself.

(10) $[\![\text{VOICE}]\!]^g$: $\lambda V.\lambda x.\lambda s.\text{EXPERIENCER}(s) = x \wedge [\![V]\!]^{g[n \rightarrow x]}(s)$

- A full derivation is illustrated below, assuming a semantically empty little v head categorizes the root, in line with frameworks like DISTRIBUTED MORPHOLOGY, and that VOICE takes this categorized vP as complement.

(11) John loves Mary.



- As a result of this binding process, we capture the observation regarding subjectless repetitive presuppositions.
- Even if vP is of the right type for *again* to take as an argument, the resulting presupposition produced nonetheless contains the index *g(1)*, which is mapped to the external argument once VOICE is introduced. A context containing a different experiencer argument in a previous state of being in love will not satisfy this presupposition.

(12) a. Presupposition produced when attaching to vP in (11):
$\exists s^1 \exists s^2 [s^1 \prec s^2 \prec E \wedge [\text{LOVE-OF}(\mathbf{g(1)})(s^1) \wedge \text{THEME}(s^1) = x] \wedge \neg [\text{LOVE-OF}(\mathbf{g(1)})(s^2) \wedge \text{THEME}(s^2) = x]]$

b. Presupposition after VOICE is introduced in (11):
$\exists s^1 \exists s^2 [s^1 \prec s^2 \prec E \wedge [\text{LOVE-OF}(\mathbf{j})(s^1) \wedge \text{THEME}(s^2) = m] \wedge \neg [\text{LOVE-OF}(\mathbf{j})(s^2) \wedge \text{THEME}(s^2) = m]]$

- The analysis also makes an additional prediction: any other construction which involves binding of an index in the VP by the argument VOICE introduces should resist subjectless presuppositions.
- This is, in fact, precisely what we observe. Recall that *hit* usually permits subjectless presuppositions illustrated in (4).
- However, when its internal argument is a reflexive pronoun, a context containing a different agent argument like in (4) no longer satisfies *again*'s presupposition.

(13) CONTEXT: **Seymour** messed up on his exam and was so angry with himself that **he hit himself** repeatedly. Later on, he calmed down and sat down next to his father. After learning that Seymour messed up on his exam and feeling guilty that he did not help Seymour with his schoolwork, Seymour's father got so angry with himself and...
a. # **Seymour's father hit himself again**.
b. **Seymour hit himself again**.

- The intuition here is that the reflexive pronoun *himself* is bound by the external argument. Importantly, this binding persists in *again*'s presupposition, meaning that *again* will necessarily include different themes. This has the consequence that the presupposed event must be related to the same agent as the asserted one.
- This is naturally understood if we follow Kratzer (2009) in analyzing reflexive pronouns as indices bound by the arguments introduced by functional heads, exactly as in the analysis of stative verbs here.

(14) $[\![\textit{hit himself}_n]\!]$: $\lambda e.\text{HIT}(e) \wedge \text{THEME}(e) = g(n)$

(15) a. Presupposition produced attaching to vP in (14):
$\exists e^1 \exists e^2 [e^1 \prec e^2 \prec E \wedge [\text{HIT}(e^1) \wedge \text{THEME}(e^1) = \mathbf{g(n)}] \wedge \neg [\text{HIT}(e^2) \wedge \text{THEME}(e^2) = \mathbf{g(n)}]]$
b. Presupposition after (14) combines with VOICE to produce (13-b):
$\exists e^1 \exists e^2 [e^1 \prec e^2 \prec E \wedge [\text{HIT}(e^1) \wedge \text{THEME}(e^1) = \mathbf{s\text{-}f}] \wedge \neg [\text{HIT}(e^2) \wedge \text{THEME}(e^2) = \mathbf{s\text{-}f}]]$

- Overall then, we see that binding of indices not only accounts for the systematic lack of subjectless presuppositions with stative transitive verbs, but makes additional correct predictions regarding the lack of such presuppositions even with eventive transitive verbs.

4 Extensions: Verb Classes with Causes and Agents

- We have so far motivated an analysis of external arguments interpreted as EXPERIENCERS as being referenced by an index in the lexical semantics of roots of certain classes.
- Do we see such index-bearing roots associated with other verb classes, namely ones usually associated with AGENTS or CAUSERS?

- If the lack of subjectless presuppositions suggest that external arguments cannot be completely severed from the verb root because the roots must themselves make reference to their external arguments in some way, then one place to look would be with eventive transitive verbs that do not allow subjectless presuppositions at all (cf. *hit* which does not allow it only in some contexts like with reflexive themes).

- There are in fact classes of roots forming eventive transitive verbs that systematically disallow subjectless presuppositions, contra Bale's original proposal that eventive transitive verbs as always allow such presuppositions.

- Consider *verbs of ingestion* like *eat* and *drink*; if Bale and Kratzer are right, we expect subjectless presuppositions with *again* to be possible here. This is not borne out; any event satisfying *again*'s presupposition must have the same agent.

  (16) CONTEXT: **John drank the red wine**. He accidentally bumped his belly hard against the table, causing him to spit the wine back into his cup. Then ...
  a. # Bill grabbed the cup and **Bill drank the wine again.**
  b. John grabbed the cup and **John drank the wine again.**

- Nonetheless, there might be a principled reason for this fact, and does not necessarily mean that the agent argument of *eat* is not introduced externally.

- In particular, there is cross-linguistic motivation for decomposing ingestive verbs into bi-eventive, *inherently reflexive event structures* (Jackendoff 1992; Krejci 2012; Jerro 2019, *a.m.o*).

- The event structure of verbs like *drink* contains a causing event involving an agent and a final result state representing either a state in which the theme is being digested by the agent (Jerro, 2019) or a state in which the theme is located inside the agent (Jackendoff, 1992).

- Crucially, the agent is represented twice, hence the analysis as inherently reflexive events.

- Without going into the details of the empirical evidence for such analyses, which we take to be well-motivated, we can immediately appreciate the parallel between ingestive verbs and stative transitive verbs in regard to subjectless presuppositions.

- Take, for example, Jackendoff's analysis of *drink*, which involves a conceptual semantic structure decomposed into a caused motion event whereby the theme moves along a path to a location inside an individual's mouth.

- Most relevant is the referent of the individual whose mouth the theme ends up being represented twice in the semantic representation: once as the causer of the event, and one as the inalienable possessor of the location the theme ends up in, as indicated by Jackendoff through co-indexing.

  (17) $[_{Event}$ CAUSE **(**$[_{Thing}\ ]_i$, $[_{Event}$ GO ($[_{Thing}$ LIQUID$]_j$ $[_{Path}$ TO ($[_{Place}$ IN ($[_{thing}$ MOUTH OF **(**$[_{Thing}\ ]_i$**)**$]$)])])])]

- Translated into the Kratzerian (2009) approach to binding adopted here, we can capture this referencing of the agent via an index present in the root.

- In prose, the root denotes a function from individuals to events, in which the theme ends up inside *g(n)* because of a drinking event.

(18) $[\![\sqrt{\text{DRINK}_n}]\!]^g$: $\lambda x.\lambda e.\text{DRINK}(e) \wedge \text{THEME}(e) = x \wedge \exists s[\text{CAUSE}(e,s) \wedge \text{IN}(x, \mathbf{g(n)})(s)]$

- As with our analysis of stative transitive verbs, we take the locus of binding to be the external argument-introducing VOICE head; VOICE shifts the assignment function such that the index in the verb root is mapped to the agent argument VOICE introduces.

- We therefore expect completely parallel behavior with stative transitive verbs; even if *again* can attach to a constituent excluding VOICE, its presupposition would still contain an index that is bound by VOICE, ruling out subjectless presuppositions.

- Consider now another class of verbs, namely verbs of killing like *murder*, *assassinate*, *massacre*, etc. Ausensi et al. (2021) show that this class of killing verbs resists subjectless presuppositions, contrasting with the canonical killing verb *kill*.

(19) CONTEXT: In a Hollywood monster movie, **Seymour's father killed the zombie**. But, being a Hollywood movie, of course they came back to life. But in the end ...
Seymour killed the zombie again.

(20) CONTEXT: In a Hollywood slasher movie, **Mike Myers murdered Bill**. Bill was revived by a sorcerer, but after chasing the revived Bill down, ...

a. **# Freddy murdered Bill again.**
b. **Mike Meyers murdered Bill again.**

- One well-known difference between a verb like *murder* and one like *kill* is *intentionality*; the former class requires intentional action on the part of the agent while the latter does not. This is diagnosable with the (im)possibility of inanimate subjects like natural causes and instruments.

(21) a. # Cancer murdered every man in that hospital.
b. # Floods murdered five US citizens.
c. # That weapon murdered my brother.

(22) a. Floods killed thousands.
b. Cancer killed two million people last year.
c. That weapon killed thousands.

- Based on the fact that intentionality entailments and the agent argument of these verbs cannot be stranded outside of *again*'s presupposition within a tripartite VP system consisting of a root, verbalizing *v* head, and external argument introducing VOICE (e.g., Pylkkänen 2008; Harley 2013), Ausensi et al. (2021) argue that *these entailments and the agent argument must be introduced internally to the root of these verbs*.

(23) CONTEXT: **John killed Frank when he accidentally fired his gun at him**. A sorcerer brought Frank back to life. Afraid of retribution, John **fired at Frank with his gun** and he immediately died.

a. **# John murdered Frank again.**
b. **John killed Frank again.**

- Our analysis allows for a different perspective, however: we can analyze these roots as indexed, like the other two classes of roots discussed above.
- The basic intuition is that intentionality makes reference to possible worlds compatible with an agent's intentions, and if this requirement is encoded in the root of verbs like *murder*, then the root itself necessarily references an agent even if it does not syntactically introduce it.
- With *murder*, this index delimits the possible worlds accessible for evaluation of the truth conditions of the relation denoted by the root, namely those compatible with the individual denoted by *g(n)*, which is eventually mapped to the external agent argument.

(24) $[\![\sqrt{\text{MURDER}}_n]\!]^g$: $\lambda x.\lambda e.\lambda w.[\text{MURDER}(e)(\mathbf{g(n)})(w) \wedge \text{THEME}(e)(w) = x]$
where $\text{MURDER}(e)(\mathbf{g(n)})(w) = 1$ iff $\exists s[\text{CAUSE}(e,s)(w) \wedge \text{DEAD}(s)(w) \wedge \text{HOLDER}(s)(w) = x] \wedge \forall w'[\text{INTENTION}_{w'}^{\boldsymbol{g(n)}}(w) \rightarrow \exists e',s'[\text{AGENT}(e')(w') = \mathbf{g(n)} \wedge \text{CAUSE}(e',s')(w') \wedge \text{DEAD}(s')(w') \wedge \text{HOLDER}(s')(w') = x]]$

- The analysis here again completely parallels stative transitive verbs; VOICE binds the index by mapping it to the AGENT argument it introduces, and therefore subjectless presuppositions are impossible even if *again* attaches to the VP below VOICE.

5 Conclusion and Implications

- We used a particular diagnostic, subjectless repetitive presuppositions with *again*, to probe the precise position of external arguments with various thematic interpretations like EXPERIENCER and AGENT.
- Contra Bale (2007) and Ausensi et al. (2021), we showed that the (un)availability of subjectless presuppositions is not necessarily a reflex of where the external argument is introduced.
- In particular, some root classes can be understood as *inherently reflexive* in an important sense: such roots disallow subjectless presuppositions because they bear an index that is bound to the external argument by a binding mechanism effected by VOICE itself.
- This straightforwardly accounts for the lack of subjectless presuppositions without unsevering the external argument from the verb, and makes correct predictions about the availability of such presuppositions with other sorts of binding dependencies, e.g., eventive transitive verbs with overtly reflexive themes.
- This has important implications for theories of how external arguments are introduced. In particular, on our analysis, external arguments of particular root classes are *neither completely severed from the root* (e.g., Kratzer, 1996; Borer, 2005), *nor necessarily introduced directly as arguments of the root both syntactically and semantically* (e.g., Bale, 2007; Ausensi et al., 2021).
- Rather, the lexical semantics of root classes plays an important role; while they neither syntactically introduce nor assign thematic role denotations to their external arguments, particular root classes

can make reference to them in a variety of ways based on their specific lexical entailments (as already argued for by e.g., Wechsler 2020).

- In line with Kratzer (2009), we also endow VOICE with a crucial role of syntactically introducing arguments and effecting binding of indices on roots.
- Such binding by functional heads has been independently argued for in other domains: with applied arguments also interpreted as POSSESSOR (Hole, 2005), in A'-dependencies like relatives clauses and *wh*-questions (Adger and Ramchand, 2005), and even over ontologically different kinds of variables like degrees in comparison constructions (e.g., Rett, 2013, *a.m.o.*).
- Therefore, our answer to the question of *whether external arguments are introduced by roots or functional structure*: **depending on root classes and root-specific lexical entailments, both can play crucial roles in their syntactic introduction and semantic interpretation**, with consequent grammatical effects like the availability and distribution of subjectless repetitive presuppositions.

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