MIDDLES IN THE NEO-DAVIDSONIAN REALM

Pritha Chandra

Abstract

This paper explores the much-studied terrain of middles with the hope to find some evidence for neo-Davidsonian (internal and external) argument associations in the syntax. Research on middles have either adopted a 'transitivity-alternation' view – suggesting that middles involve intransitive predicates that map onto syntax solely with external arguments – or espoused a syntactic 'passive-like transformation' approach – hinting at the predicates' underlying transitive representations. My modest goals in this paper are – a) to study some of the most recent debates surrounding the argument structures of middle-verbs and b) to review some of the evidence for external argument-verb dissociation and c) to dispute against the Kratzerian/semi-Davidsonian analysis of the denotation of verbs as necessarily involving their internal arguments.

I. Introduction

The interplay between word/lexical information and structure has long been a contentious issue among generativists. Starting from the mid-60's, the lexicon – the repository of lexical idiosyncrasies – has been conferred an independent status of a component in the grammatical model, with its specificities (partially) determining the nature of its interface with the syntactic module. Each listeme or a lexical entry includes, apart from the arbitrary pairing of sound and meaning, some formal diacritics or instructions for the syntax. To illustrate with an example, the listeme *hit* contains the information concerning (i) its phonological-semantic association (/hit/ = HIT) and (ii) its verbal status and syntactic insertion frames/argument structures (i.e. whether it comes with an external or an internal argument or both, and their respective theta-roles).[1] Despite differences – concerning the extent of the influence of lexical semantics on structure, c-selection and s-selection, the nature (syntactic or semantic) of the mapping operations between the two components – all 'endocentric/endo-skeletal'[2] approaches, as termed by Borer (1995, 2005) share one common theoretical premise: "… they subscribe to some articulation of the scheme in (1), where L_k is some choice of a listeme, P is its lexical semantics, possibly as translated into some

[1] See especially Grimshaw (1979) and Pesetsky (1982) for elaborate discussions on the inter-relationship between lexical semantics and syntax.

[2] 'Endocentric' approaches, where syntactic representations 'project' from semantic representations/argument structures of predicates as opposed to 'exocentric' approaches where structural positions of listemes determine their semantics.

predicate-argument structure, C refers to a combinatorial system with some well-defined formal properties and R_k is a well-defined formal representation (ibid, chp. 1)".[3]

(1) $P(L_k) + C \rightarrow R_k$

By (1), argument structures of predicates provide substantial hints for their structural representations; transitive verbs project both external and internal arguments, whereas intransitives project just one of the two (depending on the unaccusative/unergative status of the specific verbs). Moreover, predicates are 'listed' only with their arguments; adjuncts like *in the room* (as in *Mary hit John in the room*) are not included in the verb's lexical entry. To rephrase in slightly different terms, arguments and not adjuncts are part of the predicate's lexical meaning or denotation.

The argument-adjunct asymmetry also finds its way into Davidson's (1967) semantic analysis of action sentences (2), as depicted in (3).

(2) Mary hit John in the room.

(3) ∃e [hit(John) (Mary) (e) & in (the room) (e)]

Davidson posits a third argument for action verbs like *hit,* the event argument. The 'ordered-argument' representation in (3) characterizes a triadic verb – with e representing the event, *Mary* the agent and *John* the patient. The locative argument *in the room* is introduced by a secondary predicate (*in*).[4]

[3] See Baker (1988), Levin and Rappaprot-Hovav (1986, 1995), Reinhart (1996, 2000), Williams (1981), among others.

[4] Drawing on Reichenbach (1947), Davidson introduces events as ontological primitives in the analysis of natural language, as arguments of verbal predicates, since natural language expressions can refer directly to events (i), events are countable by means of adverbial modifiers (ii) and can bind pronouns (iii), and finally quantifiers can range over them (iv).
(i) The fall of the Tsarist Empire.
(ii) Germany attacked Poland once.
(iii) The demise-i of the Soviet Era was inevitable. It-i didn't surprise any Marxist.
(iv) Every war-i leaves its-i victims traumatized.

Parsons (1990) extends Davidson's observations to agents and themes as well; these are argued to be two-place predicates denoting thematic relations. A neo-Davidsonian representation of (2) is given below.[5]

(4) ∃e [hitting (e) & Agent (Mary)(e) & Patient (John)(e) & in (the room)(e)]

Parsons declares that the classical Davidsonian analysis makes incorrect predictions for passive constructions (5), where one of the three obligatory arguments of the predicate is not expressed overtly. Classical Davidsonians allow the variable expressed by the absent external argument to be bound by existential closure (6); this however produces a contradiction in a context like (7), which does not have a *hitter*.

(5) John was hit.
(6) ∃e∃x [hit(x, John, e)]
(7) I had a dream last night. I was hit, although in fact nobody had hit me, and I was not hit with anything.

Note that both (3)-(4) are logical or conceptual level representations.[6] Neither Davidson nor Parsons are committed to any specific theory of argument-association in the syntax; the logical forms could be either 'ordered-argument' association or 'neo-Davidsonian' representations, without maneuvering or influencing the 'ordered-argument' association in syntax. The crucial difference between these two theories is that while a classical Davidsonian considers *hit* as a three-place predicate, the neo-Davidsonian analyzes it as a one-place predicate, with event as its sole argument. In either approach, syntax is absolutely free of neo-Davidsonian structures.

Kratzer (1996), following on the lines proposed by Marantz (1984) and Williams (1981) disputes this view of syntax, by suggesting "…that some neo-Davidsonian argument association is present in the syntax of verbs" (pp. 111), in the form of external arguments which are introduced by some head (voice) other than the verb. Her analysis radically affects the theory of argument structures, as predicates are now only 'inherently' associated with their internal arguments. *Hit* is now a two-

[5] Castaneda (1967) espouses a (somewhat) similar view.
[6] Logical Form for Davidson and Parson is not equivalent to the syntactician's Logical Form, a covert extension of the syntactic workspace.

place predicate with the event and the internal participant as its arguments. The sentence in (2) has (8) as its logical form in a Kratzerain framework.

(8) ∃e [hitting (e) & Agent (Mary)(e) & hit (John)(e) & in (the room)(e)]

By (8), the denotation of VP (containing the verb and its direct object) is achieved via function application, while the denotation of the TP is achieved via the operation of Event Identification, one of the several operations of conjunction. This paper takes this debate to English middles like (9).

(9) Boats sink easily.

Middles typically lack an (overt) external argument or agent, as is evident from (9). They also show aberrant behavior with regard to various diagnostics for an implicit external argument/agent; only a sub-group of middles (with predicates like *hang*, *read*, *translate*, among others) have agentive interpretations with prepositional clauses (*for-NP*) and instrumental phrases. What is more puzzling is that even this particular sub-group fails to comply by the standard diagnostics for external-argumenthood, such as control in rationale clauses and use of agent-oriented adverbs. These characteristics have led some researchers (see especially Fagan (1988, 1992); Zribi-Hertz (1993) and Ackema and Schoorlemmer (1994, 1995)) to conclude that middle formation is a pre-syntactic operation to derive intransitive verbs. Middle-verbs are unergative verbs without internal arguments or objects.

On the other side of the spectrum are studies done by Hoekstra and Roberts (1993) and Stroik (1992, 1995), among others, which argue that middle formation involves the twin syntactic operations of demotion of an external argument and the promotion of an internal argument. These studies hint that middle-predicates have the argument structures of their transitive counterparts. This claim finds its strongest justification in the analysis of Stroik (1999), wherein he extends Reinhart and Reuland's (1993) theory of the relationship between reflexivity and predication to middles with overt prepositional phrases as in *The clothes hang easily for Bill*. Given that these prepositional objects must be obligatorily reflexive-marked, they must also be arguments of the apparently 'intransitive' middle predicates, contrary to the claims made by the proponents of the pre-syntactic middle formation rule. If Stroik's line of reasoning is correct, then middles are transitive predicates - with external and internal arguments specified in their argument structures.

The issue before us then is to test if these arguments (assuming a Stroikian analysis) are 'syntactically' associated with their predicates via classical Davidsonian, Kratzerian or neo-Davidsonian structures; i.e. if middles really include both arguments as part of its argument structures. To answer this question, we review some of the arguments that have been presented in favor of severing either of the arguments from predicates and use them to make a similar case for middles.

For external arguments, I adopt Kratzer's observations about 'building external arguments' in the syntax, though with a few non-trivial modifications. The basic assumption is that certain verbs start off with non-active voice heads (unlike transitive action/stative predicates) and build their external arguments via an incorporation process that renders the voice head active. Middles, I argue, likewise start off with a non-active voice P and introduce both their arguments within VP – one as a direct object that later raises to spec, TP (via the outer specifier of vP) and the second as a prepositional object that either (covertly) incorporates into v or enters into long-distance agreement with it (thus receiving a theta-role).

Borer (2005) similarly presents some evidence for severing the internal arguments of predicates, in general suggesting that the denotations for predicates are devoid even of their internal arguments, contrary to the beliefs of Kratzerians. She argues that the presence of (overt) internal arguments correlate with telicity (as in *I ate the cake in five minutes* versus **I ate at the cake in five minutes*). Extending Borer's observations to middles, I illustrate that middles (with 'true' transitive predicates like *sink*, *hang*, *read*, *translate*) show a similar correlation between telicity and their surface subjects/D-structure objects. Telic interpretations are however only available in the absence of overt prepositional phrases – which bolsters the claim that internal arguments are projected via a syntactic node that is, in all probability, associated with a particular semantics (telicity/aktionsart).

Finally, I build on Harley's (1996) double-VP layered structure to claim that middles have (i) an (overtly) unrealized specifier of EventP/voiceP, explaining the 'peculiarities' of middle-causers/agents and (ii) the BaseP, which represents the culmination or resultant state of the event introduces the object, explaining the telicity effects associated with them.

II. Implicit Agents in Middles

The generative literature recognizes a number of non-overt arguments: PRO, pro, A/A-bar traces. One specific sub-class involves those that have been termed as 'implicit arguments', as found in the following types of constructions.

(a) Passives (implicit agent)

(10) The factory was burnt [PRO to collect the insurance].

(b) Adjectival Constructions (benefactors)

(11) It is necessary/*inevitable [PRO to decide on nuclear disarmament today].

(c) Modal Constructions (bearer of the obligation of a deontic modal)

(12) The cars can be painted [without PRO touching them].

(d) Noun Phrases (implicit agents)

(13) The decision [PRO to settle for global peace].

(e) Suffixes (implicit agent)

(14) Goods are exportable [PRO to starve the population of the home country]

(f) Null objects

(15) questo conduce (la gente) alla seguente conclusione.
This leads (the people) to-the following conclusion.
This leads (people) to the following conclusion. (Rizzi 1986)

The above structures involve PRO infinitival-subjects. If we assume that PRO must be controlled by (phonetically) overt arguments, we (incorrectly) predict six unacceptable sentences in (10)-(15). The obvious conclusion we therefore draw from their acceptability is that they have implicit arguments acting as the relevant controllers.

An important question to ask here concerns the realization of these implicit arguments. A plausible answer (borrowing ideas from Jackendoff 1987) is that implicit arguments are semantic

entities and do not have syntactic manifestations.[7] An alternative or a syntactic approach would be along the lines proposed by Epstein (1984), Rizzi (1986), Borer (1998), Roeper (1987), who suggest that implicit arguments as in (10)-(15) are essentially PRO/pro and have syntactic consequences. As correctly pointed out by Bhatt and Pancheva (2001), analyzing them as PRO/pro requires some non-trivial theoretical amendments since none of the stated examples here provide suitable environments for PRO or pro. It therefore follows that if the implicit arguments are indeed syntactically realized, they must be a separate genre of grammatical formatives.

As previously mentioned, the presence of implicit arguments/agents in middles is far from clear. In this section, we use some tests for external argument/agents on middles.

II.1. Evidence against Implicit Arguments

The standard diagnostics for implicit agents do not confirm their presence in these constructions. Consider:

(16) *The ship sinks [PRO to collect the insurance]

Infinitival PRO-subjects are not licensed in middles (16), contrary to what we witness in passives (10). This suggests that middles lack implicit arguments/agents. This claim is substantiated by the contrasts given in (17)-(22).

(17) *The ship sinks easily by Bill.
(18) The ship sinks all by itself.
(19) *The ship sinks deliberately.
(20) The ship was sunk by Bill.
(21) *The ship was sunk all by itself.
(22) The ship was sunk deliberately.

As the above examples illustrate, middles – in direct contrast to passives- are incompatible with *by NPs* and agent-oriented adverbs like *deliberately*. Furthermore, adverbs like *all by itself* /*all by themselves* (that impart non-volitional readings) can modify middles, but not passives, indicating that only the former lacks volitional agentive implicit arguments.

[7] Also see Partee and Bach (1980); Chierchia (1984); Klein and Sag (1985) and Alexiadou and Anagnostopoulou (1998).

III. 2. Evidence for Implicit Arguments

The facts however become murky as we extend our empirical investigation. Middles with predicates like *read*, *hang, translate* diverge from the non-agentive interpretations generally associated with middles.

(23) *Latin texts read easily all by themselves.
(24) *Silk sheets hang easily all by themselves.

The unacceptability of (23)-(24) results from the semantic mismatch between non-volitional adverbs like *all by themselves* and the implicit agentive interpretations associated with the events/states denoted by the predicates *read*, *hang* – the presence of volitional agents in the accomplishments of such tasks is imperative. Even in the absence of overt agents, middles like the following (25)-(26) imply an invisible/external doer(s); i.e. it is easy for someone/people to undertake the tasks of reading Latin texts and hanging silk sheets.

(25) Latin texts read easily.
(26) Silk sheets hang easily.

Middles may also optionally select prepositional phrases, such as *for Bill*. Structures in (27)-(28) can be paraphrased as *Bill reads Latin texts easily* and *Bill hangs silk sheets easily* respectively.

(26) Latin texts read easily for Bill.
(27) Silk sheets hang easily for Bill.

That middles simply do not imply states or properties of themes is evident from the following examples, where specific states/properties exist only with regard to particular individuals, giving them a volitional flavor.

(28) Latin texts read easily for Bill, but not for John.
(29) Silk sheets hang easily for Bill, but not for John.

Middles are also compatible with 'instrumental phrases'[8], just like passives.

(30) Latin texts read easily with a magnifying glass.
(31) Latin texts were read easily with a magnifying glass.

From this data, one might be led to believe that middles with predicates like *hang, read, translate* differ from their non-agentive counterparts, and that they indeed host implicit external arguments/agents. Or is it merely a 'sham', for they are nonetheless incompatible with *by NPs* (32)-(33), agent-oriented adverbs (34)-(35) and control (36)-(37).[9]

(32) *Latin texts read easily by Bill.
(33) *Silk sheets hang easily by Bill.
(34) *Latin texts read deliberately.
(35) *Silk sheets hang deliberately.
(36) *Latin texts read easily [PRO to impress the queen].
(37) *Silk sheets hang deliberately [PRO to impress the queen].

Moreover, *for NPs* (with agentive readings) are restricted to middles; passives are unsuitable hosts for such agents.

(38) Latin texts were read for the children. (* with an agentive reading)
(39) Silk sheets were hung for the elites (*with an agentive reading)

To summarize our main observations in this section, middles display aberrant behavior with respect to various tests on external arguments/agents. Moreover, even if there are middles with (implicit/overt) agentive nominals, they nonetheless cannot be categorized with passive constructions, neither on a syntactic level (recall that middles' 'external arguments' are unable to

[8] Reinhart and Siloni (2003) formally propose the 'Instrument Generalization": An instrument requires the explicit (syntactic) or implicit (semantic) presence of an Agent in order to be realized syntactically.

[9] If one assumes Chierchia's (1984) semantic account of control, the argument for syntactically active agents in passives is undermined. For the purposes of this paper, it is not necessary that we adhere to any particular theory – whether semantic or syntactic control, it still remains unresolved as to why middles (with agentive readings) fail to control PRO.

control PRO, for example) nor on a semantic level (as the 'intentionality' associated with the activities of passive agents is absent from middles).[10]

Middles' deviant demeanor, as presented above, has led some researches (Fagan 1988, 1992; Zribi-Hertz 1993; and Ackema and Schoorlemmer 1994, 1995) to suggest that middles predicates are essentially intransitives – derived via a pre-syntactic operation on an otherwise transitive predicate – that are projected onto syntax with external arguments. In such an approach, prepositional phrases in middles would count as adjuncts (and not true arguments) to the verbs. This view has come under criticism from some other researches (Hoekstra and Roberts 1992; and Stroik 1992, 1995, 1999) – we turn to their observations in the next section.

III. The Syntax of Middles

The first piece of evidence for the transitivity (and thus of the 'syntactic' existence of covert arguments) of middle predicates comes from structures like the following.

(40) Books about oneself never read easily.

A standard assumption in the literature is that anaphors are locally bound by c-commanding (syntactically active) antecedents. The anaphor *oneself* in (40) must be c-commanded by an implicit argument, failing which it would lead to a Condition A violation (cf. Hoekstra and Roberts; and Stroik).

Ackema and Schoorlemmer (1994, 1995), based on Reinhart and Reuland's (1991) theory of binding, however contend that (40) is not evidence enough for the syntactic approach. According

[10] Stroik (1999) provides a further piece of evidence for the presence of implicit arguments in middles on the basis of the following instances.
(i) French books read slowly for John.
(ii) Latin texts translate slowly for Sue.
Stroik adopts Roberts' (1987) observations about adverb classes – adverbs like *slowly* are compatible with predicates that require agents. Since middles in (i)-(ii) are acceptable with *slowly,* implicit arguments (or more precisely agents) are imperative in these constructions. I contend that this particular diagnostic is not entirely reliable as evidenced by its acceptability with unaccusatives (iii).
(iii) The ship sank slowly.
Moreover, class II adverbs are present in even those middles where an external argument/agent is completely ruled out. Consider (iv)-(v).
(iv) These plants die easily/all by themselves/ *for John.
(v) These plants die slowly.

to them, the *self*-anaphors inside adjuncts or in embedded positions are logophors that need not be A-bound. Consider the following examples from Reinhart and Reuland (1991).

(41) Bismark's impulsiveness had, as so often, rebounded against himself.
(42) A picture of myself would be nice on that wall.

Logophors need neither c-commanding antecedents (41) nor overt arguments (42). Ackema and Schoorlemmer contend that the *self*-anaphor in the middle-construction is similarly a logophor (also evidenced by the fact that it is not an argument to the nominal) that does not require an antecedent. This implies that binding effects in middles do not provide any solid proof for the syntactic existence of implicit arguments.

However note that if (40) does not provide any conclusive proof for the syntactic approach, it likewise does not argue against it either. The presence or absence of a logophor inside the subject of the middle does not affect the status of an implicit argument in the structure, just like the presence of the 'logophor' *himself* cannot negate the presence of a plausible (though non-commanding) antecedent *Bismark* in (41).

Furthermore, though it is true that *self*-reflexives may act as logophors in non-argumental positions and thus obviate binding requirements, it remains unexplained why they fail to pattern similarly in unaccusatives.

(43) *Pictures of oneself sold yesterday.
(44) *Picture of oneself broke yesterday.

If 'anaphors' in middles are in reality 'logophors', a similar pattern should be expected in unaccusatives. In the absence of any alternative account for this disparity between middles and unaccusatives, the only tenable answer is that while the former allows implicit arguments to act as antecedents, anaphor/logophor licensing is impossible given the absence of external arguments or agents in the latter.

An alternative way to show that middle verbs project their external arguments syntactically is to prove that they share the argument structures of their transitive counterparts. Stroik (1999).adopts

this strategy to argue that prepositional objects in examples like (45)-(46) are demoted external arguments/agents of middles.

(45) Bureaucrats bribe easily for Bill.
(46) Latin texts read quickly for Bill.

Stroik appeals to Reinhart and Reuland's theory of reflexivity, where reflexivity is considered a property of the predicate. The relevant definitions are given below.

(47)
a. A predicate P is reflexive iff (at least) two of its arguments are co-indexed.
b. A predicate P is reflexive-marked iff either:
(i) P is lexically reflexive; or
(ii) one of P's coindexed arguments is a SELF anaphor.

If a semantic predicate is reflexive, either it must have a morphologically complex SELF-anaphor (*himself*/*herself*), as one of its arguments or it must be a lexically (or inherent) reflexive predicate. Predicates like *criticize* and *see* (which are not lexically reflexive like *behave*), for instance are reflexivized by using SELF-anaphors (48)-(50).

(48) Bill-i criticized himself-i/*him-i.
(49) Bill-i saw himself-i/*him.
(50) Bill-i saw a snake near himself-i/him-i.

The co-indexed nominals in (48)-(49) are semantic arguments of the verbs; their co-indexing 'reflexivizes' the predicates. These predicates must therefore be reflexive-marked only if one of the arguments is a SELF-anaphor (and crucially not a pronoun). On the other hand, at least one of the co-indexed nominals in (50) is not a semantic argument of the predicate *see*. Co-indexing non-arguments neither reflexivizes nor reflexive-marks the predicate and hence does not obligate the presence of a SELF-anaphor.[11] At a first glance, Reinhart and Reuland's framework seems to

[11] Reinhart and Reuland however are quick to add that (47), working independently would make false predictions for structures like (i).
(i) *He-i assigned him-i to himself-i.
Since the semantic predicate in (i) has co-indexed arguments, it follows from (47) that they must be reflexive-marked, thus marking one of the co-arguments as a SELF-anaphor. To get the correct results,

fail for structures with conjoined DPs (51); i.e. since the DPs inside the complex object DP are individually not arguments of the predicate (though the complex DP is), it does not follow from (47) that the predicate be reflexive-marked with a SELF-anaphor. They therefore suggest an alternative way of analyzing (51) within the same framework without altering their core assumptions.

(51) *Bill-i criticized Mary and him-i.
(52) [$_{\text{conjunct-1}}$ Bill criticized Mary] and [$_{\text{conjunct-2}}$ Bill-i criticized him-i].

The alternative semantic representation is given in (52). Now consider the second conjunct - the predicate has two arguments, which are co-indexed. This in turn requires reflexive-marking one of the arguments as a SELF-anaphor. The unacceptability of (51) is then easily explained – the embedded DP-object is the argument of the verb *criticize* and must therefore be represented with a SELF-anaphor, and not with a pronoun *him.*

Stroik applies (47) to middles to evaluate the status of *prepositional objects* in middles.

(53) Bureaucrats-i bribe easily for each other-i/themselves-i/*them-i.

The presence of SELF-anaphors in (53), Stroik assumes, indicates that the surface subject and the prepositional object (*for-NP*) are semantic co-arguments of the middle-verb. Middles therefore must involve transitive predicates. This claim is further substantiated by the unacceptability of the following sentence.

(54) *Mary-i photographs well for Max and her-i.

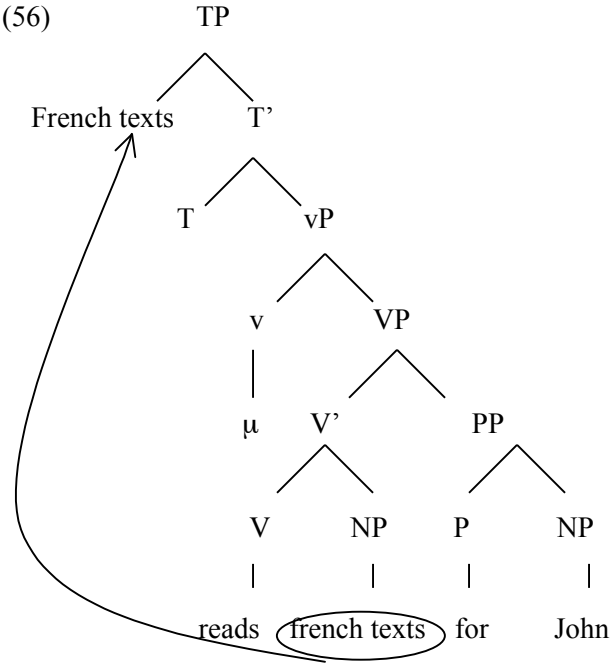
Following Reinhart and Reuland, Stroik considers (55) as the semantic representation of (54).

Reinhart and Reuland appeal to the Chain Condition as stated in (ii), that constrains the well-formedness of any sequence of co-indexed A-positions.
(ii) Chain Condition
A maximal A-chain (α-1….α-i, α-i+1…α–n) contains exactly one link - α-1 – that is both +R(eferentially independent) and Case-marked, where
(a) a DP is +R iff it carries full specification for +f and structural Case;
(b) a-i c-commands a-i+1; and
(c) there is no barrier, as defined in Chomsky 1986, between) a-i and a-i+1;
The condition in (ii) then correctly rules out structures like (i) for containing two +R markerd nominals.

(55) [$_{\text{conjunct-1}}$ Mary-i photographs well for Max] and [$_{\text{conjunct-2}}$ Mary-i photographs well for her-i.].

The second conjunct in (55) is unacceptable; the predicate must be reflexive marked with a SELF-anaphor, thus identifying the *for-NP* in the second conjunct as an argument of the middle verb. Stroik concludes "middles syntactically project their entire thematic grid …are like passives in that they demote the external arguments, which can emerge either as a non-overt DP or as an overt DP that occurs in an adjunct position and must be case-licensed within the PP" (pp. 130). His analysis therefore challenges 'intransitive' and pre-syntactic accounts of middles.[12] Middles must therefore be transitive verbs with argument structures denoting internal and external arguments. Adopting Stroik's observations about the argument structures of middles, I propose the following (tentative) structural representation (56) for middles like *French texts translate easily for John*.

(56)



[12] Also see Keyser and Roeper (1984), Roberts (1987), Carrier and Randall (1992), and Authier and Reed (1996) for more on syntactic approaches to middles.

The derived subject is base-generated as complement to V, where it receives the theme theta-role, while the PP argument occupies a VP-adjoined position. We will further assume that v is defective, in that it is unable to assign an accusative Case to the object, which is thus obliged to move over to the specifier of TP for case reasons. However, the v head does have a theta-role to assign to an external argument, which I will assume is assigned to the argument within the PP either by long-distance Agree (in the sense of Chomsky 2000 and subsequent works) or by covert/LF A-movement.[13, 14]

Note that this section has merely displayed that middle predicates have two arguments (other than the Davidsonian event argument), without making commitments to any specific theory on how these arguments associate with their verbs in syntax and LF. In the forthcoming sections, we will review, in some detail, the main arguments provided for neo-Davidsonian associations of both external and internal arguments, before returning to evaluate them in the case of middles.

IV. A neo-Davidsonian External Argument in Syntax

Most studies on argument structure acknowledge disparities between external and internal arguments. The notational variants of representing the former are therefore different, as for instance William's (1981) system of underlining them or Rappaport and Levin's (1986) system of using angled brackets. Marantz's (1984) analysis perhaps takes the strongest note of this distinction by contending that external 'arguments' are no arguments of the verb. To illustrate with an example, the argument structure for *kill* is represented as (57) in his analysis, where the bracketed element displays the sole argument of the verb.

(57) kill (theme)

For Marantz, a verb's denotation involves only its internal argument. The external argument is assumed to be an argument and semantic role assignee of the predicate VP (where predicates are understood in the sense of Williams 1981).

[13] This proposal is at odds with usual assumptions about defective v heads, stemming mainly from Burzio's Generalization and studies on passives. However see Chandra (2005) for empirical justification for the assumption that v may be a theta-assigner without necessarily being a case-checker. Also see Legate (2004) for data suggesting the phase-hood of passives and unaccusatives, two constructions which are standardly associated with defective v-heads and lack of phase-hood.

[14] We will also assume, along with Stroik, that middles, without overt prepositional objects, have a PRO/pro subject – which gets its theta-role from v.

Some data corroborating Marantz's claim is given below.

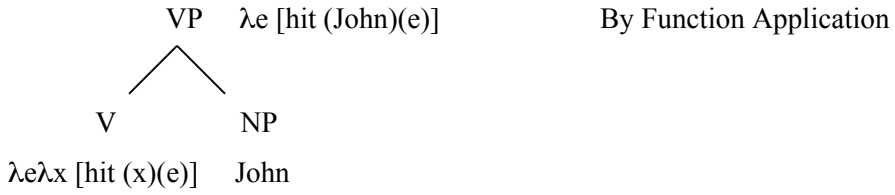
(58) kill a cockroach
(59) kill a conversation
(60) kill an evening watching TV
(61) kill a bottle (i.e. empty it)
(62) kill an audience (i.e. wow them)

Marantz observes that specific kinds of internal arguments trigger specific interpretations of the verb, which is uncommon or absent in the case of external arguments. This behavior is explained if external arguments are not true arguments of the predicates.[15, 16]

Kratzer (1996) adopts Marantz's basic intuitions to claim that external arguments do not form part of the verb's denotation and hence they are associated with the predicate via neo-Davidsonian structures in the syntax. Verb-object syntactic association is nonetheless via 'ordered-argument' association and the semantic denotation of VP is achieved through function-application, as illustrated below for the sentence in (63).

(63) Mary hit John.

(64)



If (64) is the denotation of VP and if external arguments were also to be associated with verbs/VPs via function-application, (63) would be semantically uninterpretable. Kratzer resolves the puzzle by suggesting the denotation of VP as λeλx [Agent (a)(e) & hit (John)(e)]. External arguments are introduced as arguments of some functional projection (voice), and are addition to

[15] See Bresnan (1982) and Grimshaw (1990) for plausible alternatives for the quaintness of external arguments.
[16] Also note that the data in (58)-(62) are not 'completely frozen' idiom chunks (also see Kratzer 1995). Consider:
(i) kill every opportunity (that way)
(ii) kill an evening (playing dominoes).

VP via Event Identification (65), where the letters ‘e’, ‘s’ and ‘t’ correspond to individuals, events and truth-values respectively.

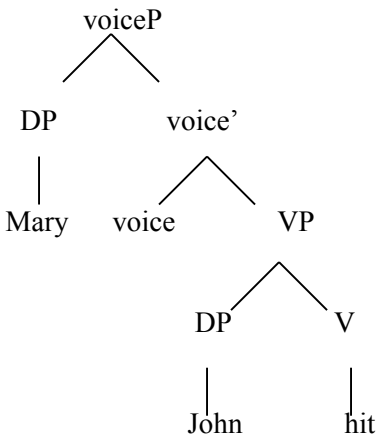
(65) Event Identification

f g → h

<e, <s, t>> <s,t> <e, <s,t>>

Kratzer posits the following structure for (63), where the voice head and the V syntactically realize the external and internal arguments respectively in their specifiers (at D-structure, in the sense of Bowers 1993).

(66)



The steps leading to the semantic denotation of voiceP are provided below.

(67)

(a) **[**hit**]** = λeλx [hit(x)(e)]

(b) **[**John**]** = John

(c) **[**hit John**]** = λe [hit(John)(e)]

By function Application from (a) and (b)

(d) **[**Agent**]** = λxλe [Agent (x)(e)]

(e) **[**Agent [hit John]**]** = λxλe [Agent (x)(e) & hit (John)(e)]

By Event Identification from (c) and (d).

(f) **[**Mary**]** = Mary

(g) **[**Agent [hit John]**]** (Mary) = λe [Agent (Mary)(e) & hit (John)(e)]
from (e) and (f).

The truth-value of the sentence in (63) is finally obtained by 'existential closure'. Furthermore, there is some connection between the *aktionsart* of a verb and the thematic role of the external argument. In the words of Kratzer, *aktionsarten* "…originate from selectional restrictions of the event argument" (pp. 122), which may represent actions, states, event proper etc. Event Indentification is defined only if the two predicates (the agent and VP, in our case) have compatible *aktionsart.* As for instance, an action predicate (as in *Mary hits John*) expresses a 'partial function' determined only for actions, and therefore event identification applies only when the conjoining predicate expresses an agent. On the other hand, if the VP expresses a state (as in *Mary owns Fido*), the conjoining predicate must be a 'holder'(or any other relevant thematic role).

Kratzer attempts to capture the connection between *aktionsart* and external arguments by assuming that there are two broad types of voice heads – active voice (which introduces external arguments as well as licenses accusative Case on the object) and a non-active voice, which neither introduces the external argument neither assigns accusative Case to the object. Action verbs have active voice heads, which are agentive or 'holder' theta-role assigners, depending on the *aktionsart* of the verb. All other verbs start with a non-active voice head without an external argument, though they are not required to remain so throughout the entire course of the derivation. Arguments introduced by PPs within (transitive) VPs may convert to external arguments by incorporation into the voice head, which in turn is activated in the process.[17]

If we adopt the Kratzerian analysis of external arguments, the v in (56) would be amended into a non-active voice head that would in turn necessitate the introduction of arguments (other than internal arguments or direct objects) via prepositional phrases. PP-incorporation (or long distance checking) into voice head results in the formation of an external argument, which would then be attributed with the correct 'type' of theta-role (more on that below).[18]

[17] Kratzer (1996) suggests preposition incorporation for predicates like *worry.*
[18] In the alternative definition of defective v-heads, we need not assume that PP-incorporation activizes an otherwise inactive voice head.

If our analysis is on the right track, external arguments of middles (introduced as prepositional objects) are associated with their predicates through neo-Davidsonian structures; i.e. they do not form part of the verb's argument structure or denotation.

Before we go on to discuss internal arguments and their mode of association with predicates, below are some more justifications for external argument-verb dissociation.

The second (and empirical) attestation comes from the difference between adjectival passives and verbal passives – only the former retains the properties of the external argument. If adjectival passives are formed syntactically (and not via a lexical transitivity alternation), disappearance of the external argument raises a puzzle. Kratzer's solution to this puzzle is simple – external arguments are introduced via specific functional heads (voice) and adjectival passives, (but not verbal passives), lack the relevant heads to license external arguments.

Note that a similar argument could also be made from the contrast between middles and passives too; the same predicates may or may not occur with their external arguments, as illustrated below.

(68) The ship was sunk by John.
(69) *The ship sinks easily for John.

Middles with *sink* do not external arguments (69) in direct contrast to passives (68). Thus if *sink* is a transitive predicate, whose external argument form part of the verb's argument structure/denotation, the unacceptability of the former is surprising. Similar arguments for external argument dissociation are also found in the contexts of causative-inchoative alternations and nominalizations.

(70) Bill opened the lid/The lid opened.
(71) Bill broke the TV/The TV broke.
(72) Bill grew the tomatoes/The tomatoes grew.
(73) *Bill growth of the tomatoes.
(74) The army's destruction of the city.

The causative-inchoative alternations (70)-(72) have been utilized much in recent literature to argue for isolating the external argument (and the head that introduces it) from the predicate itself

(see Marantz 1997; Harley and Noyer 1998). Facts like (73)-(74) were originally noted in Chomsky (1970), where it was observed that the nominalization of an alternating verb like *grow,* unlike *destroy* does not allow an agentive interpretation. Marantz argues this to be a natural consequence if nominalization is an operation on the simple V root, without the v head that selects for an external argument/agent. The root *grow* is completely devoid of any information regarding the agentive interpretation (due to its 'spontaneous meaning'), resulting in the unacceptable (73), whereas the non-spontaneous root *destroy* carries an agentive interpretation, deriving the acceptable (74).

As must be obvious, causative-middle alternation can also serve as evidence for severing the external argument from its verb, as illustrated below.

(75) John broke the cup/ Cups break easily.
(76) John sunk the ship yesterday/Ships sink easily.

In a nutshell, we have ample evidence to suggest that external argument assignment takes place outside the VP – the next issue is to diagnose if similar arguments can be extended for the internal arguments of predicates, or in other words, if they too are mapped onto syntax via neo-Davidsonian structures.

V. A neo-Davidsonian Internal Argument in Syntax

As noted in previous sections, classical and semi-Davidsonians consider internal arguments as part of the verbs' argument structures. This section is an overview of some evidence presented against such views, most of which I liberally borrow from Borer (2005).[19]

Borer's observation centers on the following sentences.

(77) I sprayed the wall with the paint (in two hours).
(78) I sprayed the paint on the wall (in two hours).
(79) I ate the cake (in ten minutes).
(80) I ate at the cake (*in ten minutes).

[19] Borer's analysis centers on variable-behavior verbs, a technical terms for intransitives that oscillate between unergative and unaccusative properties.

The sentence in (77) has an accomplishment/telic interpretation with *spray the wall,* but not with *spray with the paint*, while (78) has the accomplishment reading with *spray the paint*, but not with *spray on the wall.* Similarly, (79) is interpreted as an accomplishment and (80) as an activity. These examples, along with the structures in (81)-(83) suggest that "aktionsart and argument structure are indeed related…and there is little doubt that characteristics of the object contribute to determining event type (Borer, ibid, p 16) [20]

(81) Addition of direct object gives rise to telicity:
(a) Bill ran for five minutes/*in five minutes.
(b) Bill ran the mile *for five minutes/in five minutes.

(82) Cognate objects give rise to telicity:
(a) Terry sang for an hour/*in an hour.
(b) Terry sang a ballad ?for an hour/in an hour.

(83) Fake Reflexives give rise to telicity:
(a) Terry swam for an hour/*in an hour.
(b) Terry swam herself to sleep in an hour/*for an hour.

One can argue for two different argument structures for such predicates, as for instance, *sing* can be listed either as a transitive or an intransitive (see Levin and Rappaport 1992, 1995; and Reinhart 1991, 1996, 2001).[21] However as Borer points out, Dowty's observations (84) on this issue must be seriously considered before one decides on postulating two or more argument structures for the same predicate.

(84) "Hypothesizing that a large semantically coherent group of verbs have duplicate categorization in unaccusative and unergative syntactic classes (and with corresponding different semantics in the two frames) would be missing the point…"

---

[20] This corroborates with Dowty's (1991) Generalization (i), which essentially links telicity to the presence or absence of an (underlying) internal argument.
(i) agentive, atelic: definitely unergative
non-agentive, telic: definitely unaccusative
Dowty contends a semantic answer for this correlation. However see Borer (2005) for evidence suggesting that the unaccusative/unergative alternation also has structural/syntactic repercussions.

[21] Argument structure with +/-telic feature specification is also conceivable, though it remains a problem from the Borer/Dowty perspective.

If an answer in terms of multiple argument structures is untenable, an alternative must be sought – internal arguments are introduced by a 'semantically appropriate' node – a solution that heavily relies on the notion of *aktionsart* for defining objects. If such an alternative is even worth entertaining, the extension of neo-Davidsonian structures within the VP becomes an easier task than that claimed by Kratzerians.

The telicity-internal argument correlation is also available in middles. Consider:[22]

(85) The boat sinks easily in five minutes
(86) Latin texts read easily (*for Bill) in five minutes.
(87) Silk sheets hang easily (*for Bill) in five minutes.

Middles are compatible with a telic interpretation, as shown in (85). In the presence of prepositional objects, however, such readings are impossible – i.e. (86) and (87) may receive telic readings, but only in the absence of an agent/causer. These facts could be taken to suggest the telic adverbials must be adjacent (or in non-linear terms, immediately c-command) the theme argument or its trace. Since in (86)-(87), there is an overt PP-intervener, a telic interpretation is ruled out. Interestingly, even though middles with unergatives are acceptable, they can never appear with telic interpretations.

(88) Babies laugh easily.
(89) *Babies laugh easily in five minutes.
(90) Leopards jump easily.
(91) *Leopards jump easily in five minutes.

The contrast depicted in (88)-(91) suggests that telicity is not compatible with covert or implicit internal arguments (i.e. if we assume along with Hale and Keyser 1993 that unergatives are underlying transitives).

Based on the observations in this section, we conclude that internal arguments are also associated to their predicates via neo-Davidsonian structures. With these assumptions in the background, we return to describe the syntax and semantics of middles in the next section.

[22] Special thanks to Scott Fults for these examples.

VI. Revisiting the Syntax and Semantics of Middles

A core property of middles, as assumed in the literature, is the attribution of some property to the entities/objects. Take (92) as an example, which can be roughly paraphrased as *Silk sheets are washable.*

(92) Silk sheets wash easily.

Middles are therefore required to be aspectually stative – which explains why these constructions are incompatible with agent-oriented adverbs (93). Compare its similarities with statives (94)-(95).

(93) Silk sheets hang (for Bill) deliberately.
(94) *He loves her deliberately.
(95) *He hates her deliberately.

Middles also pattern alike with statives in imperatives and progressive constructions: both denote events that are "without activity and successive stages" (Bland 1988).[23]

(96) *Wash easily!
(97) *Love!
(98) *The silk sheets are washing easily.
(99) *He is loving her.

Middles are also not felicitous with specific time reference - they occur with generic reference time.

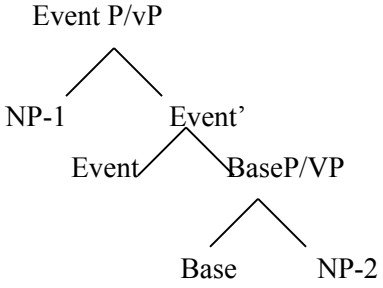
(100) *Silk sheets washed easily yesterday.

The presence of propositional objects – as possible agents – imparts an additional semantics, that of the property or state of an entity being accomplished through (or experienced by) a specific individual in a possible world.

[23] Middles, like statives may be compatible with progressives (i). See Sag (1973), Roberts (1985), Bland (1988) and Fagan (1992) for details.
(i) Bureaucrats are bribing more than ever in Reagan's second terms. (Roberts 1985).

I adopt Harley's (1996) structures for event/state predicates, for middles in English. Extending on Hale and Keyser's (1993) notion of L-syntax, she postulates a double-layered VP-shell, analogous to the vP/VP and VoiceP/VP proposals of Chomsky (1995) and Kratzer (1996) respectively. This double-layered structure involves projections by the event (EventP) and the resultant state (BaseP), as depicted in (101).

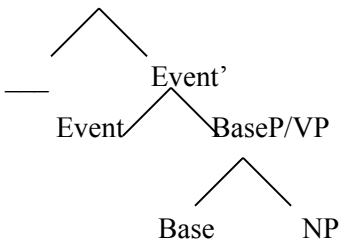
(101)



Eventive/action verbs have an NP in the specifier of EventP, which is consequently interpreted as the agent of the cause of the event denoted by the structure. Note that in lexical semantics, the decomposed forms are seen as two event structures where the action of causation affects the event of becoming of a state. To illustrate, consider the lexical semantics of the verb *open* (in *John sank the ship*) as *John* CAUSE *ship* BECOME *sink*. Harley's approach differs from the lexical semantic framework. Instead of considering the verb *open* as consisting of two events, she postulates a single event representation for it as in *John Cause ship become sink,* thereby stressing on just one aspect (the causation) of the action.

The absence of an external argument changes the semantics of the EventP – it receives a non-causative interpretation __ *Cause ship become sink,* as diagrammed below.

(102)

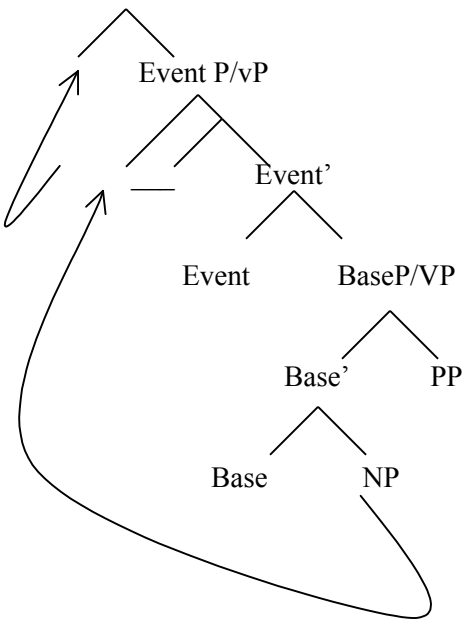


Such are the underlying representations (102) for inchoatives/anticausatives, which lack external (volitional) agents. The intransitive BaseP/VP in the sentence *The ship sank* describes events of causing *the ship to become sink*, where the 'prominent' cause for the event correlates with the inherent properties of the ship itself. The underlying assumption of this proposal, also worked out in Chierchia (2004) and Levin and Rappaport-Hovav (1995), is that intransitive alternates of such predicates are also causatives. The difference between their transitive and intransitive forms are relegated to the type of voice involved; only (active) transitives have an (active) voice feature (in voice/event head) that is able to theta-mark a nominal base generated in its specifier. Intransitives on the other hand, have a non-active voiceP that is unable to theta-mark an external argument and case-mark the object. The absence of agents in unaccusatives/inchoatives (103) is therefore explained.

(103) The ship sank (*for John)/(*by John).

Middles, on the other hand, though apparently intransitive, are compatible with agentive interpretations. Moreover, Stroik's arguments are a strong indication that these agents, which are introduced as prepositional objects, are arguments of the predicate. If these reflections are to be taken seriously, a representation like (102) cannot suffice for middles. I therefore suggest (104) as a modified (56).

(104)



The internal argument is base generated as sister to the base head (and later raises to TP, via the outer specifier of EventP for case/EPP reasons), while the second argument is introduced as a prepositional phrase, adjoined to BaseP. EventP lacks an active voice feature, which explains the inability of middles to base generate external arguments in the specifiers of the event head. Middles therefore pattern like unaccusatives/inchoatives in that they do not involve (real) 'agents'. The difference between them, I claim, arises from the fact that only the former allows the specifiers of eventP to be filled by the prepositional object at LF (which could be translated as preposition-incorporation into an inactive voice head, rendering it active in the process, in the sense of Kratzer). Assuming that covert prepositional incorporation is similar to Larson's (1988) Dative Shift transformation (though without necessary elimination of Case), the binding effects in middles can be explained easily – the DP at the specifier of EventP can c-command and A-bind the trace/copy of the raised object (105).[24]

(105) Books about himself-i/themselves-j translate easily for John-i and everyone in the class-j.

VII. Conclusion:

The above note on middles suggests that contra popular belief, arguments –both external and internal – are syntactically and semantically associated to their predicates through neo-Davidsonian representations. Middle-verbs come with a single argument – the event argument.

The conceptual (or Davidson's/Parson's LF) forms of middles will also relate these verbs to their arguments through neo-Davidsonian structures (106).

(106) ∃e [reading (e) & Agent (Bill)(e) & theme (Latin texts)(e) & easily (e)]

The representation in (106) is the conceptual form for *Latin texts read easily for Bill*, and reads " there exists an e such that e is the event of reading, the theme of reading is *latin texts* and the agent of reading is *Bill* and e is done *easily*.

[24] This is necessary if we assume that the 'reflexives' in middles are not logophors.

To end with a general note, the traditional notion of verbs as (one or two place) functions from arguments to truth-values cannot be accepted at face value and must be seriously considered vis-à-vis the neo-Davidsonian framework for a durable semantic theory.

Reference:

Ackema, P. and M. Schoorlemmer (1994). 'The middle construction and the syntax-semantics interface'. *Lingua* 93: 59-90

Ackema, P. and M. Schoorlemmer (1995). 'Middles and nonmovement' *Linguistic Inquiry* 26:173-197

Alexiadou and Anagnostopoulou (1998) "Parametrizing Agr: word order, verb- movement and EPP-checking". *Natural Language and Linguistic Theory* 16.3: 491-539.

Baker, M. (1988) *Incorporation: A Theory of Grammatical Function Changing,* University of Chicago Press, Chicago.

Bhatt, R. and R. Pancheva (2001). 'Implicit Arguments', ms. University of Texas, Austin and USC. (Last modified August 2004)

Bland, S. 1988. The present progressive in discourse: Grammar versus usage revisited. *TESOL Quarterly* 22: 53-68.

Borer, H. (1995). "The ups and downs of Hebrew verb movement". *Natural Language and Linguistic Theory* 13.3.

Borer, H. (1998). "The morphology-syntax interface". In Spencer, A. and A. Zwicky (Eds.) *Morphology.* London: Basil Blackwell.

Borer (2005) *In Name Only. Structuring Sense, Volume I.* Oxford: Oxford University Press.

Bresnan, J. 1982a. The Passive in Lexical Theory. In J. Bresnan (ed.), *The Mental Representation of Grammatical Relations*: 3-86 Cambridge, MA: MIT Press

Bresnan, J. 1982b. Polyadicity. In J. Bresnan (ed.), *The Mental Representation of Grammatical Relations*: 149-172 Cambridge, MA: MIT Press

Burzio, L. 1986. *Italian Syntax: A Government and Binding Approach.* Dordrecht: Reidel.

Castaneda, H. N. (1967). 'Comments on Donald Davidson's 'The Logical Form of Action Sentences'', in N. Rescher (ed.) *The Logic of Decision and Action,* University of Pittsburgh Press, Pittsburgh.

Chandra, P. (2005) 'Long Distance Agreement in Hindi-Urdu: Agree, AGREE or Spec-head?, ms. University of Maryland.

Chomsky, N. (1970). 'Remarks on nominalizations' In *Readings in English Transformational*

Grammar. (eds) R.A. Jacobs and P.S. Rosenbaum. Washington DC. Georgetown University Press.

Chierchia, G. (1984). 'Anaphoric Properties of Infinitives and Gerunds', in M. Cobler, S. MacKaye and M. T. Wescoat (eds.) *Proceedings of the West Coast Conference on Formal Linguistics* 3: 28-39

Chierchia (2004). Scalar implicatures, polarity phenomena, and the syntax/pragmatics interface. In Adriana Belletti, ed., *Structures and Beyond*. Oxford: Oxford University Press

Chomsky, N. 2000. 'Minimalist Inquiries: The Framework', in R. Martin, D. Michaels & J. Uriagereka (eds.), *Step by Step,* MIT Press, Massachusetts.

Chomsky, N. 2001a. 'Derivation by Phase', in M. Kenstowicz (ed), *Ken Hale: A Life in Language*, MIT Press, Massachussets.

Chomsky, N. 2001b. 'Beyond Explanatory Adequacy', A. Belletti (ed.), *Structure and Beyond*, Oxford University Press, Oxford.

Davidson, D. (1967) 'The Logical Form of Action Sentences' In (ed) Nicholas Rescher *The Logic of Decision and Action,* University of Pittsburgh Press, Pittsburgh.

Dowty, D. (1991) 'Thematic Proto-Roles and Argument Selection' *Language* 67:547-619

Epstein (1984) Epstein, S. (1984). Quantifier-pro and the LF representation of PROarb. *Linguistic Inquiry* 15, 499-505

Fagan, S. (1988) 'The English Middle' *Linguistic Inquiry* 19:181-203

Fagan, S. (1992) *The syntax and semantics of middle constructions.* Cambridge: Cambridge University Press.

Grimshaw, J. 1979. Complement selection and the lexicon. Linguistic *Inquiry* 10: 279-326.

Grimshaw, J. (1990) *Argument Structure,* MIT Press, Cambridge, MA.

Hale and Keyser (1993) Hale, K. and Keyser, S. J. (1993). "*On Argument Structure and Lexical Expression of Syntactic Relations*." In K. Hale and S. J. Keyser (eds). The View from Building 20, pp. 53-109. Cambridge, Mass.: MIT Press.

Harley (1996) *Events, Agents and the Interpretation of VP Shells*. UPenn

Harley, H. and R. Noyer (1998). 'Licensing in the non-lexicalist lexicon: Nominalizations, Vocabulary Items and the Encyclopedia' In *Papers from the Upenn/MIT Roundtable on Argument Structure and Aspect.* (ed) Heidi Harley, Cambridge, MA. MIT Working Papers in Linguistics, 32:119-138.

Hoekstra, T. and I. Roberts (1993) 'Middle constructions in Dutch and English. In *Knowledge and language.* Vol. 2. *Lexical and conceptual structure,* (eds) Eric Reuland and Werner Abraham. Dordrecht: Kluwer.

Jackendoff, R. 1987. The Status of Thematic Relations in Linguistic Theory. *Linguistic Inquiry* 18: 369-411.

Keyser, S.J. and T.Roeper. (1984).'On the middle and ergative constructions in English'. *Linguistic Inquiry* 15:381-416.

Kratzer, A (1996) 'Severing the External Argument from its verb', in (eds) J. Rooryck & L Zaring, *Phrase Structure and the Lexicon*, Kluwer, Dordrecht

Klein, E. and I. Sag (1985) 'Type Driven Translation' *Linguistics and Philosophy* 8:163-201.

Larson, R. (1988) 'On the double object construction. *Linguistic Inquiry* 19:335-391.

Legate, A.J. (2004). 'Some Interface Properties of the Phase', *Linguistic Inquiry* 35: 509-517

Levin and Rappaprot-Hovav (1986) The formation of adjectival passives. Linguistic Inquiry 17: 623-661

Levin, B. and M. Rappaport Hovav (1992) ``The Lexical Semantics of Verbs of Motion: The Perspective from Unaccusativity", in I.M. Roca, ed., *Thematic Structure: Its Role in Grammar,* Foris, Berlin, 247-269.

Levin, B. and M. Rappaprot-Hovav (1995) *Unaccusativity: At the Syntax/Lexical Semantics Interface,* Linguistic Inquiry Monographs 26, MIT Press, Cambridge, MA.

Marantz, A. (1984) *On the Nature of Grammatical Relations,* MIT Press, Cambridge, MA.

Marantz, A. (1997). 'No escape from syntax: don't try morphological analysis in the privacy of your own lexicon. *Proceedings of the 27th annual Penn Linguistics Colloquim.* (ed) A. Dimitriadis, Philadelphia, Pennsylvania Working Papers in Linguistics 4.

Parsons, T. (1990). *Events in the Semantics of English: A studying Subatomic Semantics.* MIT Press, Cambridge, MA.

Pesetsky, D (1982) *Paths and Categories*. MIT

Reichenbach H. (1947) Elements of Symbolic Logic. McMillan

Reinhart (1991) Elliptic conjunctions: Non quantificational LF', in A. Kasher, ed. *The Chomskyan Turn*, Blackwell.

Reinhart, T. 1996. Syntactic Effects of Lexical Operations: Reflexives and Unaccusatives. *UiL-OTS Working Papers*. Utrecht: University of Utrecht.

Reinhart, T. 2000. The Theta System: Syntactic Realization of Verbal Concepts.*UiL-OTS Working Papers*. Utrecht: University of Utrecht

Reinhart, T. and E. Reuland (1991) 'Anaphors and Logophors: An argument perspective. In *Long-distance anaphora,* (eds) Jan Koster and Eric Reuland, Cambridge: Cambridge University Press.

Reinhart, T. and E. Reuland (1993) 'Reflexivity' *Linguistic Inquiry* 24:657-720.

Reinhart, T. and T. Siloni. 2003. Thematic Arity Operations and Parametric Variations. Ms. University of Tel Aviv.

Rizzi L (1986) Null Object in Italian and the Theory of pro. *Linguistic Inquiry* 17:501-557.

Roberts, I. (1987). *The representation of implicit and dethematized subjects.* Dordretcht: Foris.

Roeper, T. (1987) *Implicit arguments and the head-complement relation,* Linguistic Inquiry 18, 267-310

Stroik, T. (1992) 'Middles and movement' *Linguistic Inquiry* 24: 127-137.

Stroik, T. (1995) 'On middle formation: A reply to Zribi-Hertz. *Linguistic Inquiry* 26: 165-171

Stroik, T. (1999) 'Middles and Reflexivity' *Linguistic Inquiry* 30: 119-131.

Williams E.S. (1981) Argument Structure and Morphology. *The Linguistic Review* 1:81-114.

Zribi-Hertz, A. (1993) 'On Stroik's analysis of English middle constructions. *Linguistic Inquiry* 24:583-589.