# Agency and the Semantic Foundations of Case

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# Plan

1. Semantic Uses of Case
2. The Lattice of Case and Agency
3. Typological Application: Transitivity and Core Case Marking Systems
4. Interactions with Different Parameters:
   - Definiteness and the Accusative/Genitive Alternation in Russian
   - Inanimate Subjects
5. Conclusion

# Case Alternations : A semantic phenomenon

Case alternations demonstrate systematic semantic contributions above the level of the lexicon.

(1) HINDI ((Tuite et al., 1985) found in (Butt and King, 2005))

a. ram k$^h$as-a
Ram.M.Sg.NOM cough-Perf.M.Sg

Ram coughed.

b. ram-ne k$^h$as-a
Ram.M.Sg.ERG cough-Perf.M.Sg

Ram coughed (purposefully).

# General Meanings of Cases

- A case can have dozens of distinct uses, e.g., the dative in Ancient Greek has at least the following uses:
  - Indirect Object
  - Instrumental
  - Dative of Possession
  - Dative of Agent
- How does one assign a general meaning to a case?
- How would this general meaning connect with particular uses?
- How to make this connection precise?
- How does this connect with other parameters?

# Agency

- Case languages use case at least to mark syntactic function
- Syntactic function is described in terms of *argument structure*:
  - An argument structure representation of a predicate states that a predicate requires certain types of participants as its subject, object, etc.
  - Example: *hit* := subject is an agent (one that performs the hitting) and object is a patient (one who submits to the effects of the hitting)

# Decomposing Thematic Roles

Proposal of (Dowty, 1991)

- Thematic roles emerge from a set of “proto-properties”
- Proto-Agent properties include:
  - Causally affecting another entity
  - Motion (relative to another participant)
- Proto-Patient properties include:
  - Causally affected by another entity
  - Stationary (relative to another participant)
- Problems:
  - Only valid for transitive clauses
  - Takes complex notions (causation, affectedness) as primitive

# Agency Properties

Inspired by, but modified from, (Dowty, 1991)

- Agency properties:
  - Event-based entailments of the verb
  - *Motion*, *Instigation*, *Sentience*, *Volition*

# Agency Properties

- **Motion:** Motion is entailed just in case the argument is required to be in motion, which is most obviously the case with verbs of motion, such as ‘come’, ‘go’ and so forth, but also verbs such as ‘throw’ or ‘scrub’.
- **Instigation:** Instigation is entailed for an argument if prior, independent action which effects the event designated by the predicate can be attributed to that argument.

# Agency Properties

- **Sentience:** Sentience is adopted following the description found in (Rozwadowska, 1988): “conscious involvement in the action or state.” Clearly, *sentient* is entailed by, among others, emotional, psychological and cognition predicates.
- **Volition:** Volition is assigned to any argument wherein the participant intends, i.e., consciously plans, to bring about the event designated by the predicate.

# Agency Properties

**Agents:** Typically possess one or more of these properties

Example:

(2) Jim sees Penelope.

'see' entails *sentience* for its subject.

(3) The man pushed the table.

'push' entails *instigation* for its subject.

# Persistence Properties

- Persistence Properties:
  - *Existential Persistence(Beginning)*
  - *Existential Persistence(End)*
  - *Qualitative Persistence (Beginning)*
  - *Qualitative Persistence(End)*

(4) The bomb exploded.

$+$*Existential Persistence(Beginning)*, $-$*Existential Persistence(End)*

(5) Jim cut the mango.

$+$*Existential Persistence(Beginning)*, $+$*Existential Persistence(End)*, $-$*Qualitative Persistence(End)*

# Persistence Properties (2)

**Patients:** Typically affected by the event, which, presupposes existence prior to the event, thus they minimally entail *Existential Persistence(Beginning)*

# Privative Opposition

| Agentive | Non-Agentive ('Patient') |
|---|---|
| volitional | –volition |
| sentience | –sentience |
| instigation | –instigation |
| motion | –motion |
| existential persistence(beginning) | – existential persistence(beginning) |
| existential persistence(end) | – existential persistence(end) |
| qualitative persistence(beginning) | – qualitative persistence(beginning) |
| qualitative persistence(end) | – qualitative persistence(end) |

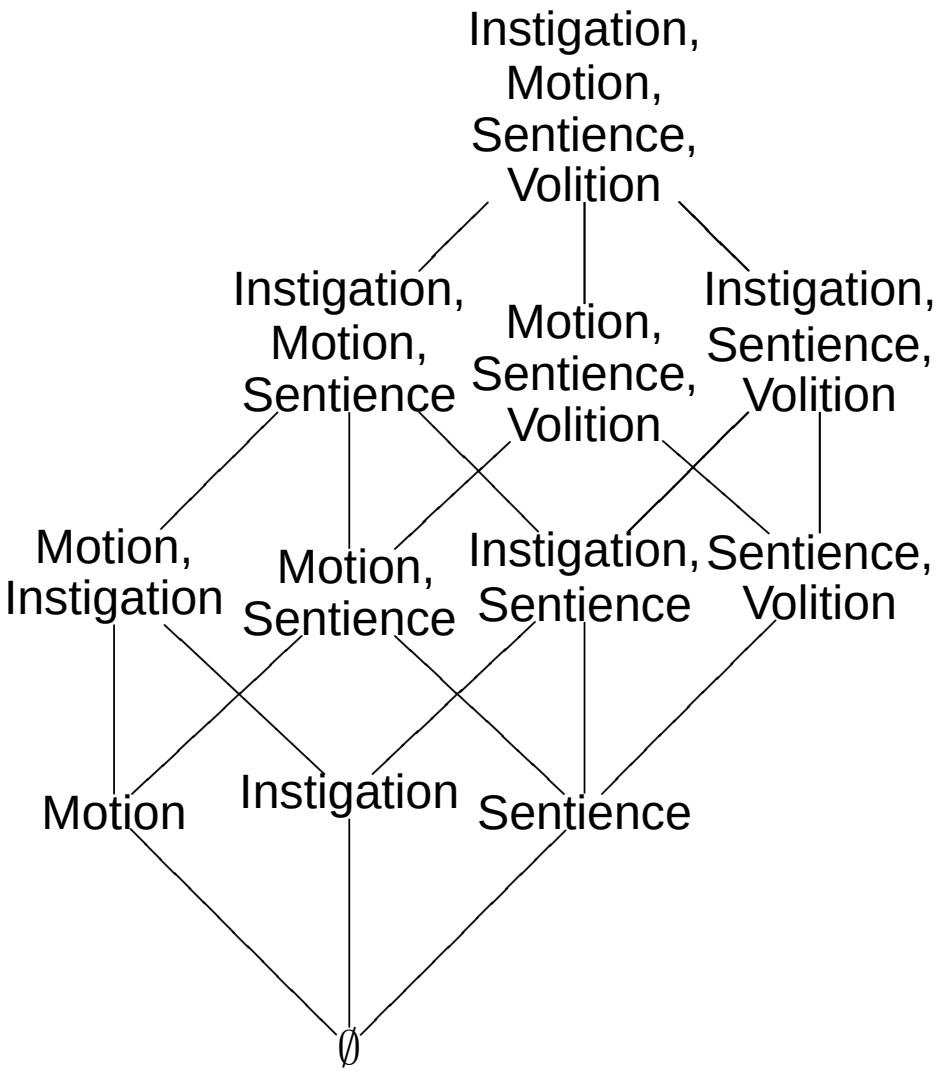
# Agency Lattice

- Take agency properties as primitive, i.e., atomic
- Regard these properties as atoms from which "proto-roles" are composed
- These atoms and their combinations can be ordered in terms of inclusion, i.e., both *motion* and *instigation* are included in the composite term *motion*$\wedge$*instigation*
- This set of atomic elements, ordered by inclusion (i.e., a partial order), can then yield a mathematical structure, a lattice (inspired by Aissen 2003)
- A partially ordered set is a lattice if every finite subset has a least upper bound and a greatest lower bound
- This lattice then provides a structure upon which argument structures can be mapped.

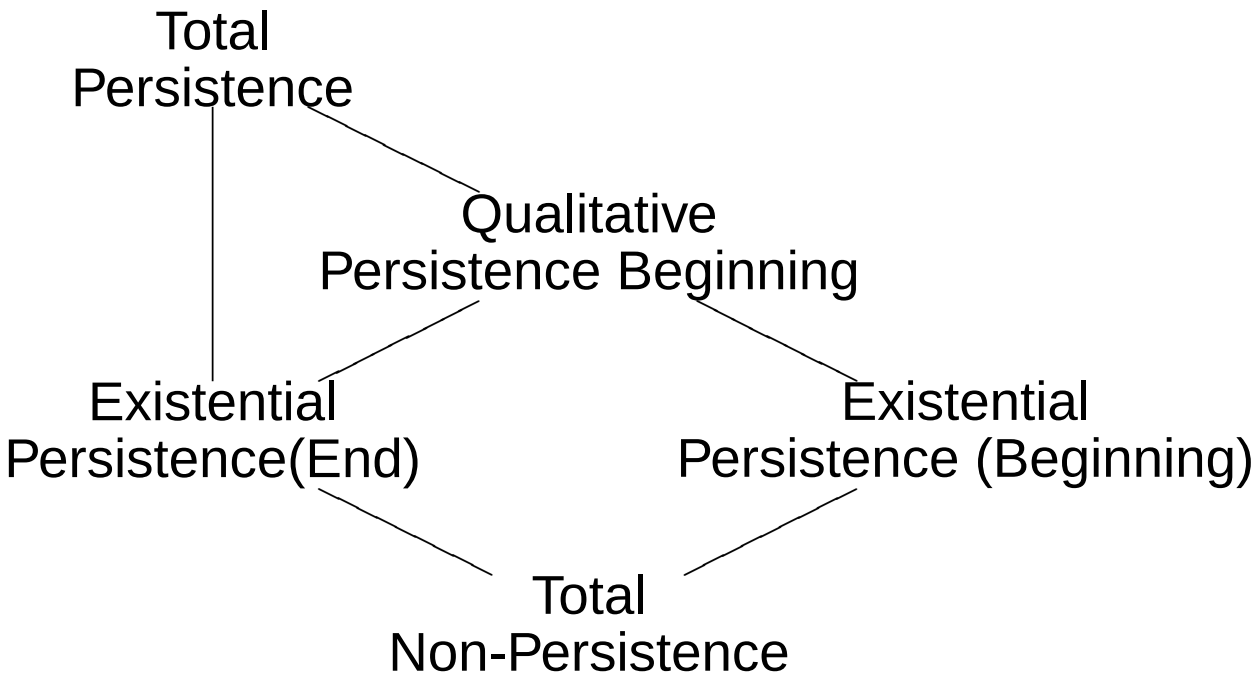
# Constraints on Combinations

- Total number of combinations theoretically possible is $2^8 = 256$
- Combinations are constrained by logical and conceptual impossibilities
  - Cannot have *Volition* without *Sentience*
  - If an entity exists in the beginning of the event, it has certain qualities
    $\Rightarrow$ cannot have *Existential Persistence (Beginning)* without *Qualitative Persistence (Beginning)*
  - If an entity does not exist at the beginning (end) of an event, its qualities will not exist at the beginning (end) of the event either
    $\Rightarrow$ cannot have *Qualitative Persistence* without *Existential Persistence*

# Agency Lattice



# Persistence Lattice



# Persistence Properties

**Total Persistence**
The entity persists existentially and qualitatively at the beginning and end of the event.

- Prototypical transitive subjects—subject unaffected by the action.
- Objects of perception and psychological verbs
- Object involved in the conative alternation, e.g., of *cut at*.

**Qualitative Persistence (Beginning)**
The entity exists before and after the event, but has undergone a qualitative change.

- Patientive arguments, such the objects of *hit* or *move*.

# Persistence Properties

**Existential Persistence (Beginning)**
The entity exists prior the event's happening, but ceases to after the event

- Objects of verbs of destruction (*ruin*, *destroy*), or dying.

**Existential Persistence (End)** :
The entity does not exist at the beginning of the event but does at the end

- Verbs of creation, (*bake*, *invent*)

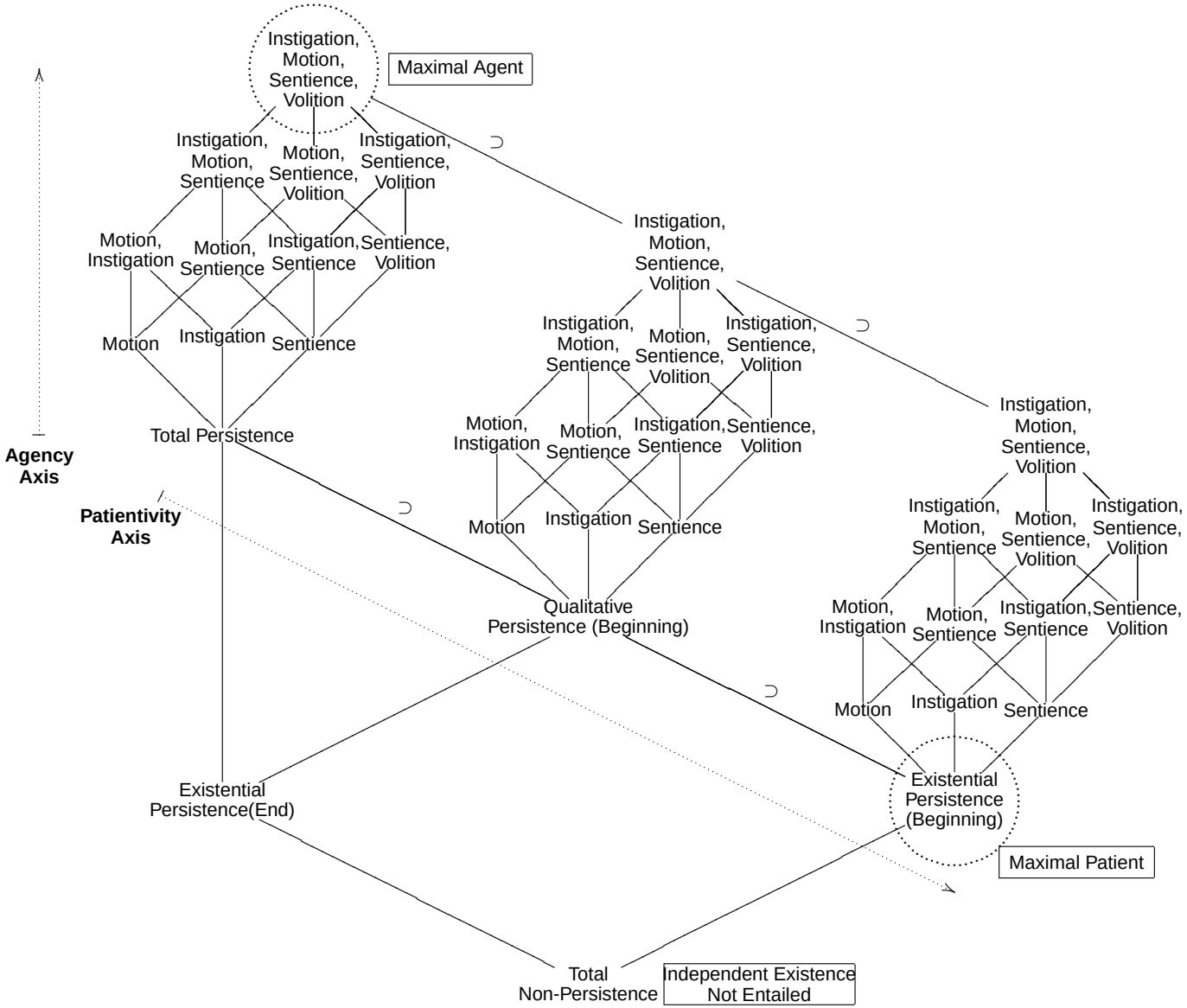
**Total Non-Persistence** :
The entity does not persist existentially either at the beginning or the end of the event.

- Statements of non-existence ("There are no unicorns")
- Impersonal semelfactives ("A light flashed")
- Cognate object constructions ("sing a song")

# Cartesian Product

- Yields the possible space of argument structure w.r.t. agency properties
- The set of all pairs with componentwise relations, inherited from the original lattices
- Again, constrained by the conceptual impossibilities: arguments lacking *Existential Persistence (Beginning)* cannot combine with *motion* or *sentience*
- 38 combinations remain

# Agency Lattice



# Properties of the Lattice

- Subject selection is accomplished merely by selecting the argument which has more entailments
  - if argument A lives on a node which dominates argument B, then argument A is selected as subject
- Agents are upwards closed in the lattice; patients are downward closed
  (If some node $x$ of the agency lattice is considered an agent w.r.t. a given verb, then all the nodes higher than $x$ are as well, and conversely for patients)

# Predictions for Core Case-Marking

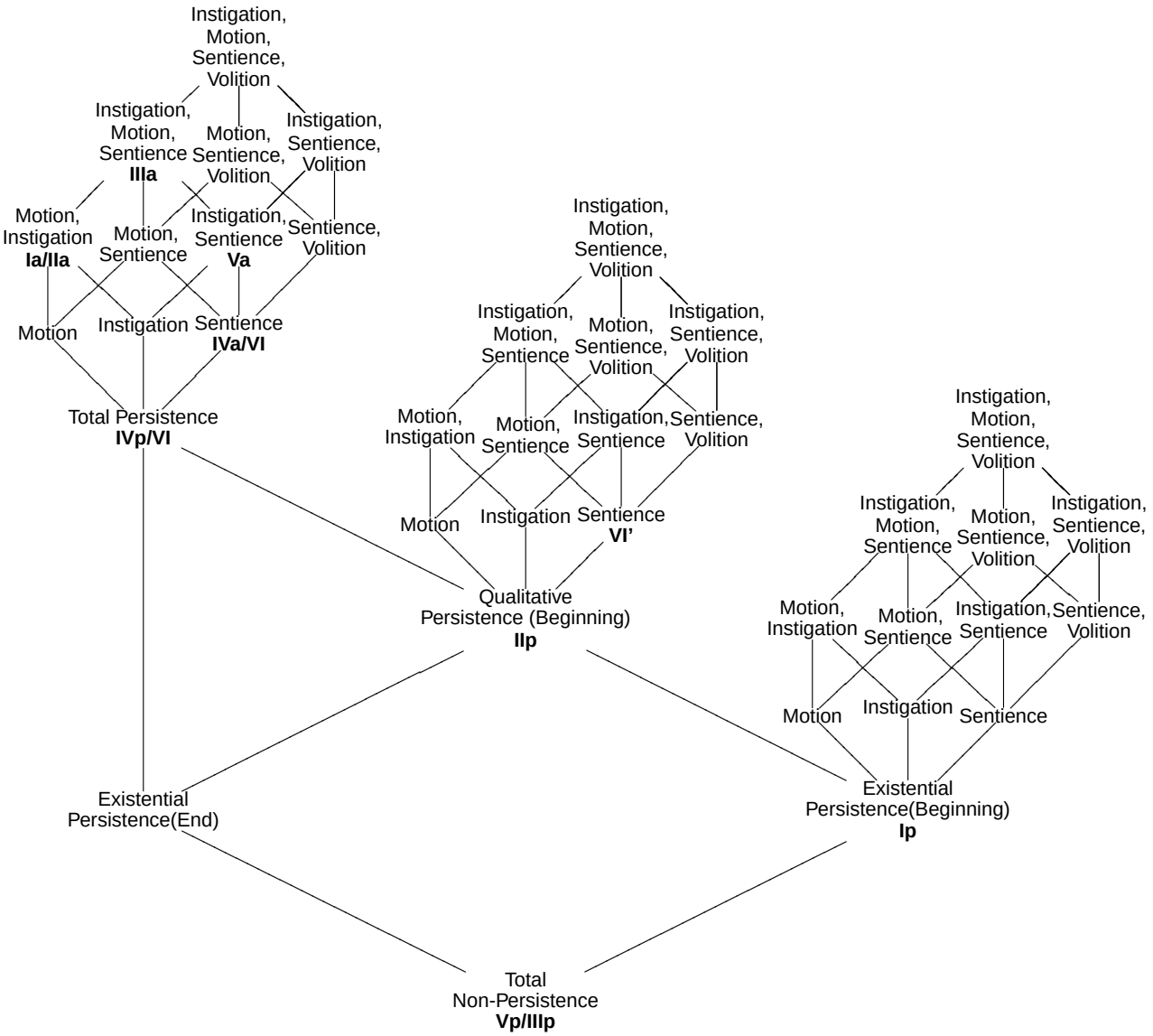
- Predictions:
  - Pairs of arguments which are maximally distanced from each other on opposite corners of the transitive region of the lattice are most likely to be marked by core case-markers
  - Deviations from this pattern will correspond to non-canonical subject and/or object marking
  - Corresponds to principle of semantic distinctiveness discussed by Naess (2004)

# Typological Application: Transitivity

- Can test prediction with (Tsunoda, 1985)'s generalization (reformulated in (Malchukov, 2005)):
  - Effective Action (Resultative) (I) $<<$ Contact (II) $<<$ Pursuit (III)
  - Effective Action (Resultative) (I) $<<$ Perception (IV, V)$<<$ Emotion (VI)

  where $<<$ indicates more likely to be marked by a core-case marker (more "transitive")

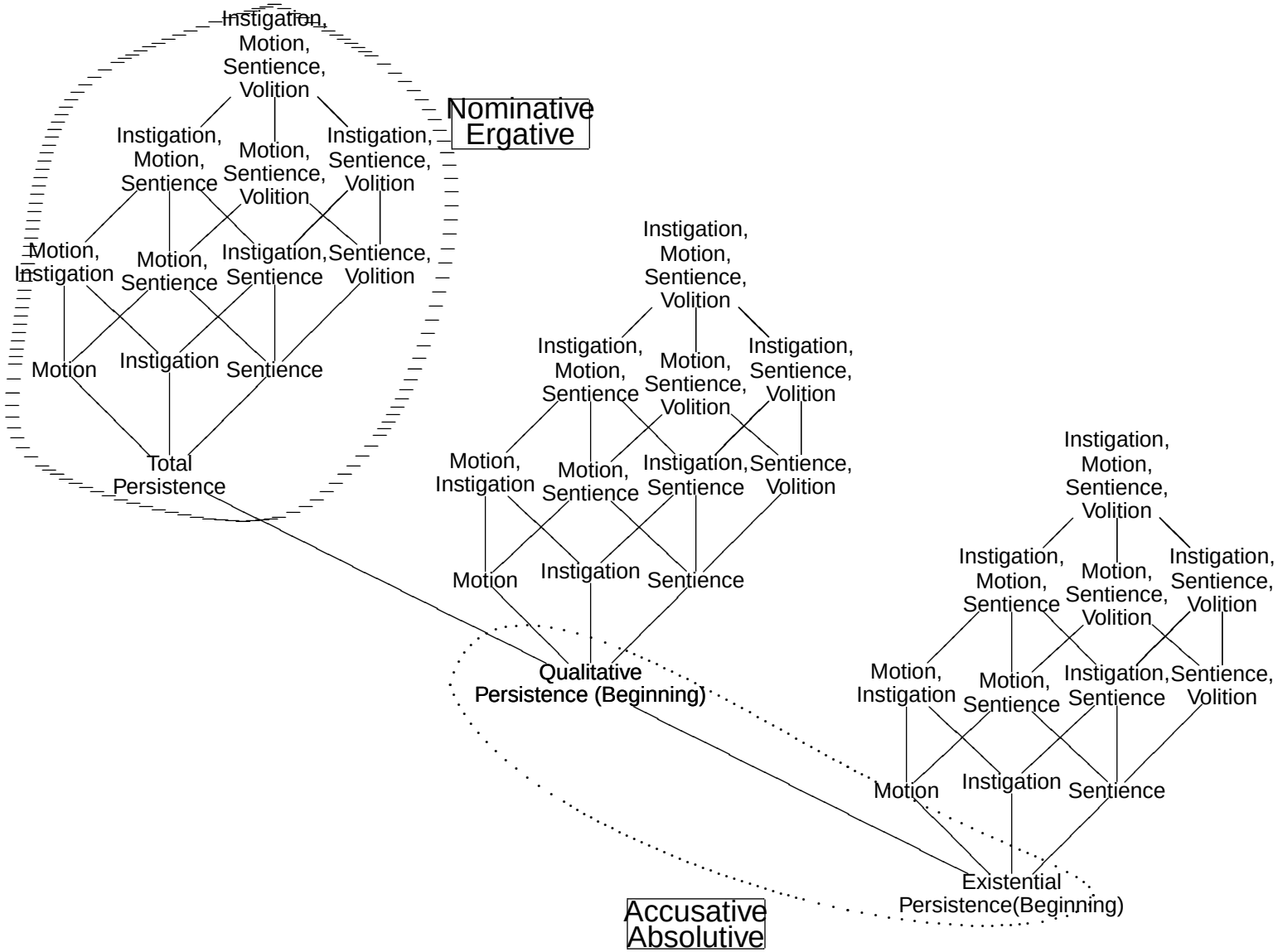
# Mapping of Tsunoda's Generalization



# Core Case: Accusative and Ergative Marking

- Accusative and Ergative case marking systems under this view don't differ particularly in the general regions they mark, but which regions are formally marked
  - For Ergative/Absolutive, the agentive area is formally constrained
  - For the Nominative/Accusative, the non-agentive area is formally constrained

# Accusative and Ergative Marking



# Agentive Case Systems: Guaraní

- The following examples of the Guaraní language show how these systems function.
- In Guaraní the selection of agentive or patientive case is made on whether the predicate is episodic

(6) GUARANÍ (Mithun, 1991)

a. **a**-gwerú aína
**I**.AGENT am bringing them now

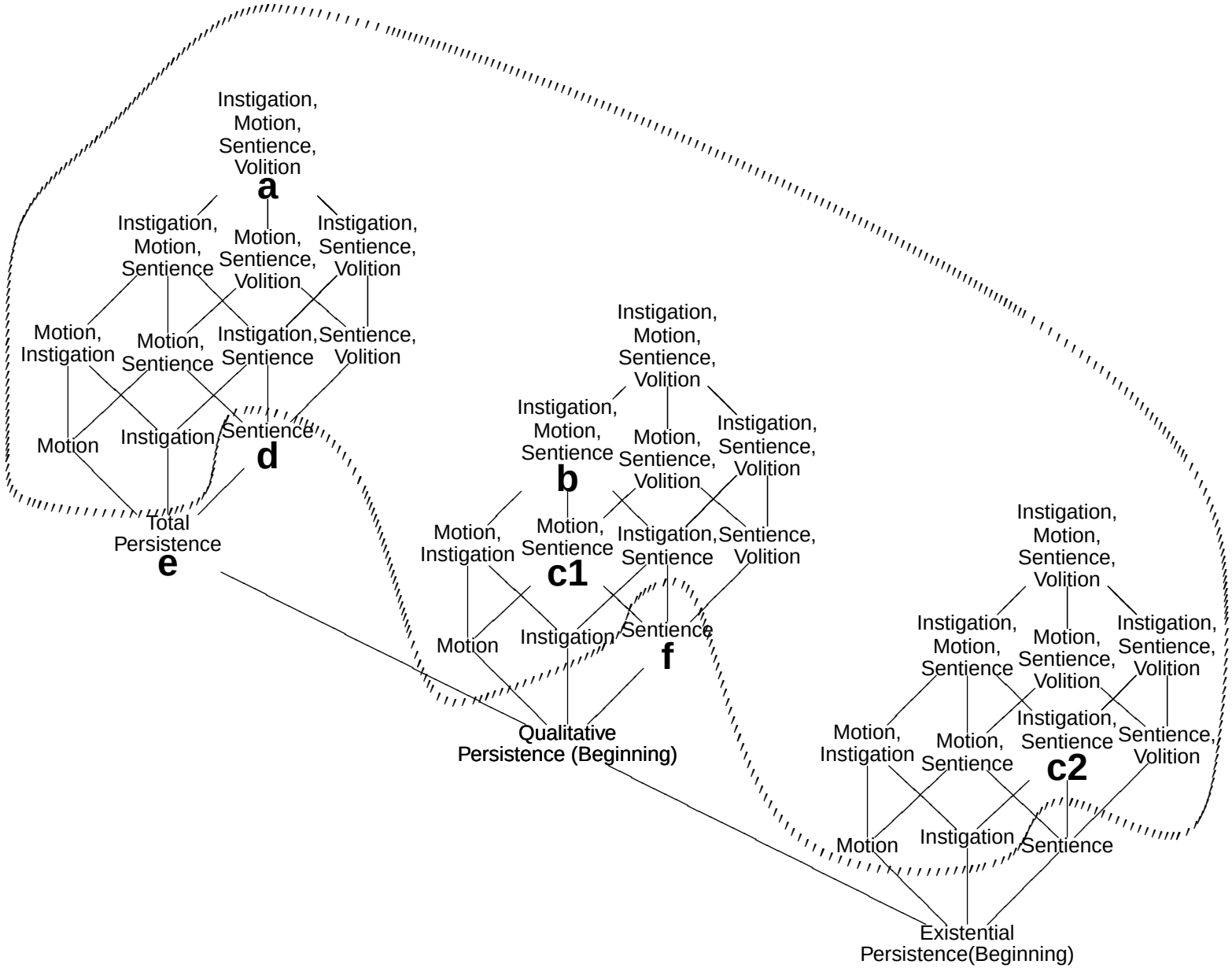
b. **a**-xá
**I**.AGENT go

c. **šé**-rasí
**I**.PAT am sick.

# Agentive Case Systems: Guaraní

| | | |
|---|---|---|
| a. | +**event** ‘jump’, ‘go’, ‘run’<br>+Perform/Effect/Instigate<br>+Control | AGENT |
| b. | +**event** ‘hiccough’, ‘sneeze’,‘vomit’<br>+Perform/Effect/Instigate<br>-Control | AGENT |
| c. | +**event** ‘fall’, ‘die’,‘slip’<br>-Perform/Effect/Instigate<br>-Control | AGENT |
| d. | -event ‘reside’, ‘be prudent’,‘be patient’<br>+Perform/Effect/Instigate<br>+Control | patient |
| e. | -event ‘be tall’, ‘be strong’ [INDIVIDUAL LEVEL]<br>-Perform/Effect/Instigate<br>-Control<br>-Affected | patient |
| f. | -event ‘be sick’, ‘be cold’ [STAGE LEVEL]<br>-Perform/Effect/Instigate<br>-Control<br>+Affected | patient |

# Agentive Case Systems: Guaraní



# Agentive Case Systems: Lakhota

- In Lakhota the selection of agentive or patientive case is made on instigation
- If an argument performs an action, even an uncontrolled one, like *cough*, it receives the *agent* marker
- For 2-argument predicates where neither argument performs, both are marked *patient*

(7) LAKHOTA (Mithun, 1991)

a. iyé**nima**č$^h$ eča
**I**.PAT look like **you**.PAT.

b. iyó**nima**kip$^h$ i
**I**.PAT find **you**.PAT congenial.

# Agentive Case Systems: Lakhota

| | | |
|---|---|---|
| a. | +event ‘jump’, ‘go’, ‘run’<br>+**Perform/Effect/Instigate**<br>+Control | AGENT |
| b. | +event ‘hiccough’, ‘sneeze’,‘vomit’<br>+**Perform/Effect/Instigate**<br>-Control | AGENT |
| c. | +event ‘fall’, ‘die’,‘slip’<br>-Perform/Effect/Instigate<br>-Control | patient |
| d. | -event ‘reside’, ‘be prudent’,‘be patient’<br>+**Perform/Effect/Instigate**<br>+Control | AGENT |
| e. | -event ‘be tall’, ‘be strong’ [INDIVIDUAL LEVEL]<br>-Perform/Effect/Instigate<br>-Control<br>-Affected | patient |
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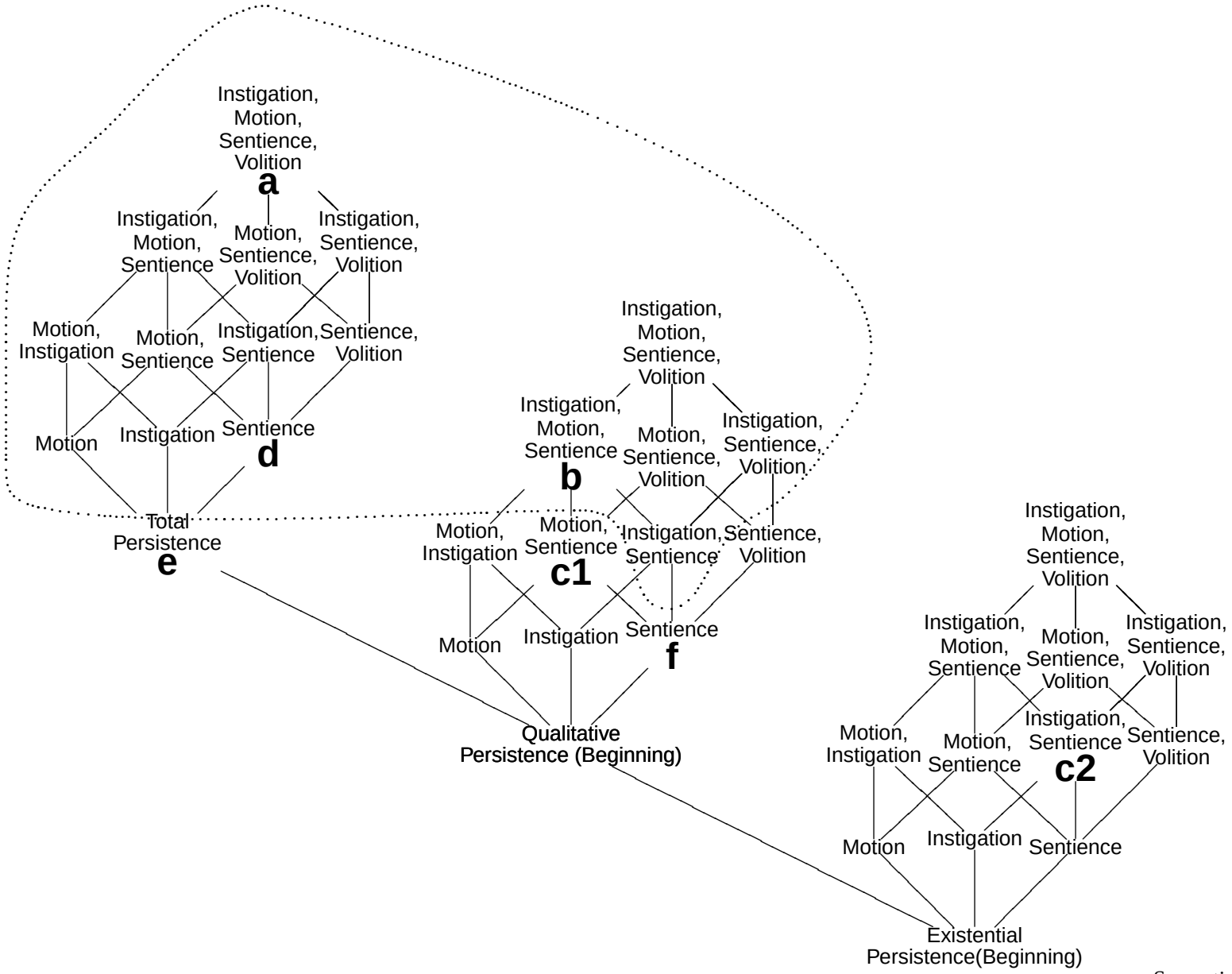
# Agentive Case Systems: Lakhota



# Agentive Case Systems: Central Pomo

- In Central Pomo the selection is made based on control and affectedness
- Uncontrolled actions such as *cough*, the argument receives the *patient* marker
- Displays an alternation between controlled and uncontrolled action

(8) CENTRAL POMO (Mithun, 1991)

a. **ʔa** čʰ ném
**I**.AGENT ran into it.

b. **to̲** čʰ ném
**I**.PAT bumped into it (not watching).

# Agentive Case Systems: Central Pomo

- Control in the system of primitives given here is composite property: *volition, sentient*, and *instigation*

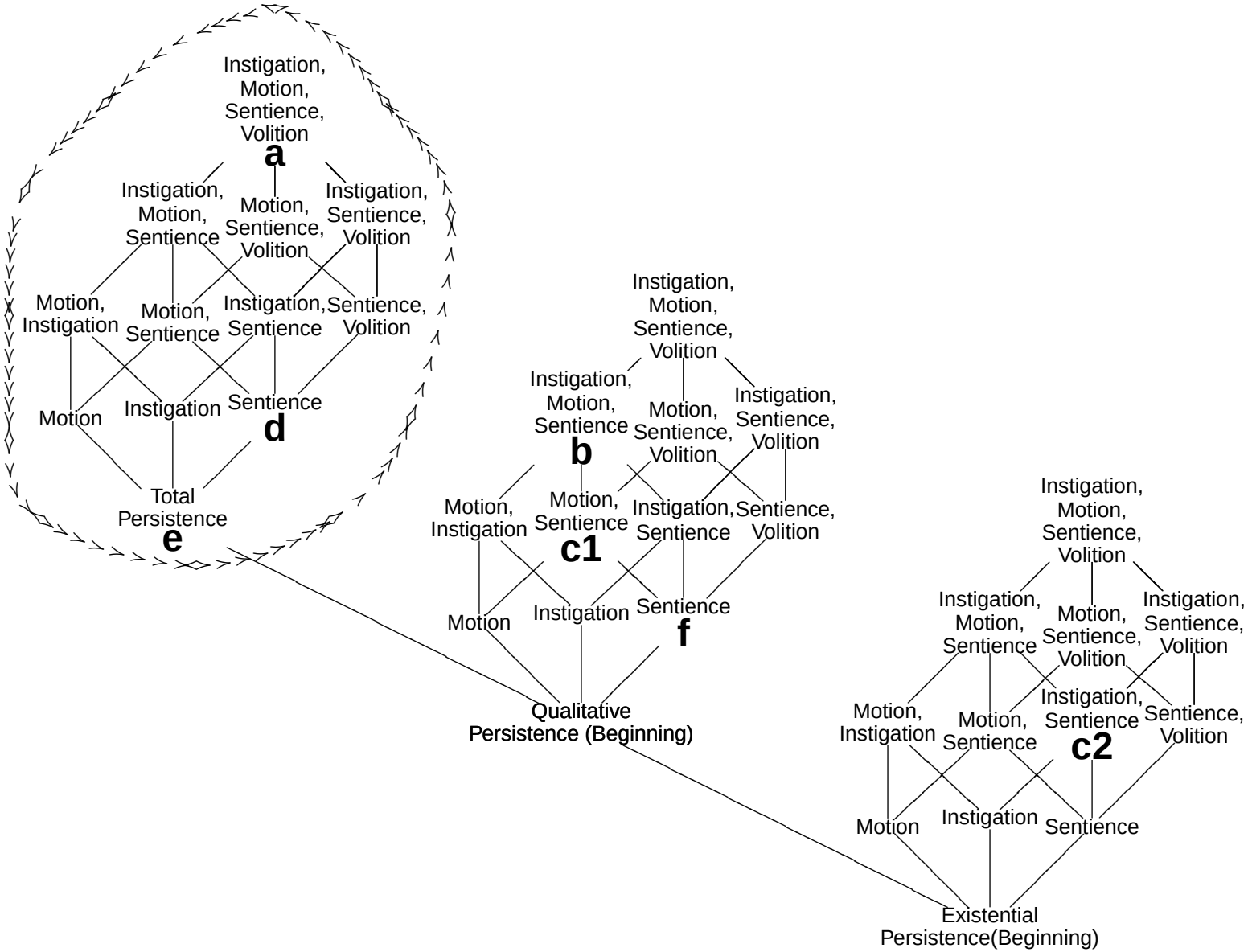
Affectedness:

- Individual Level predicates (*be tall*) are “agentive” while Stage Level predicates *be sick* are “patientive”
- Individual Level predicates correlate with *Total Persistence* while Stage Level predicates, implicating a change, correlate with *Qualitative Persistence (Beginning)*

# Agentive Case Systems: Central Pomo

| | | |
|---|---|---|
| a. | +event ‘jump’, ‘go’, ‘run’<br>+Perform/Effect/Instigate<br>+**Control** | AGENT |
| b. | +event ‘hiccough’, ‘sneeze’,‘vomit’<br>+Perform/Effect/Instigate<br>-Control | patient |
| c. | +event ‘fall’, ‘die’,‘slip’<br>-Perform/Effect/Instigate<br>-Control | patient |
| d. | -event ‘reside’, ‘be prudent’,‘be patient’<br>+Perform/Effect/Instigate<br>+**Control** | AGENT |
| e. | -event ‘be tall’, ‘be strong’ [INDIVIDUAL LEVEL]<br>-Perform/Effect/Instigate<br>-Control<br>-Affected | AGENT |
| f. | -event ‘be sick’, ‘be cold’ [STAGE LEVEL]<br>-Perform/Effect/Instigate<br>-Control<br>+**Affected** | patient |

# Agentive Case Systems: Central Pomo



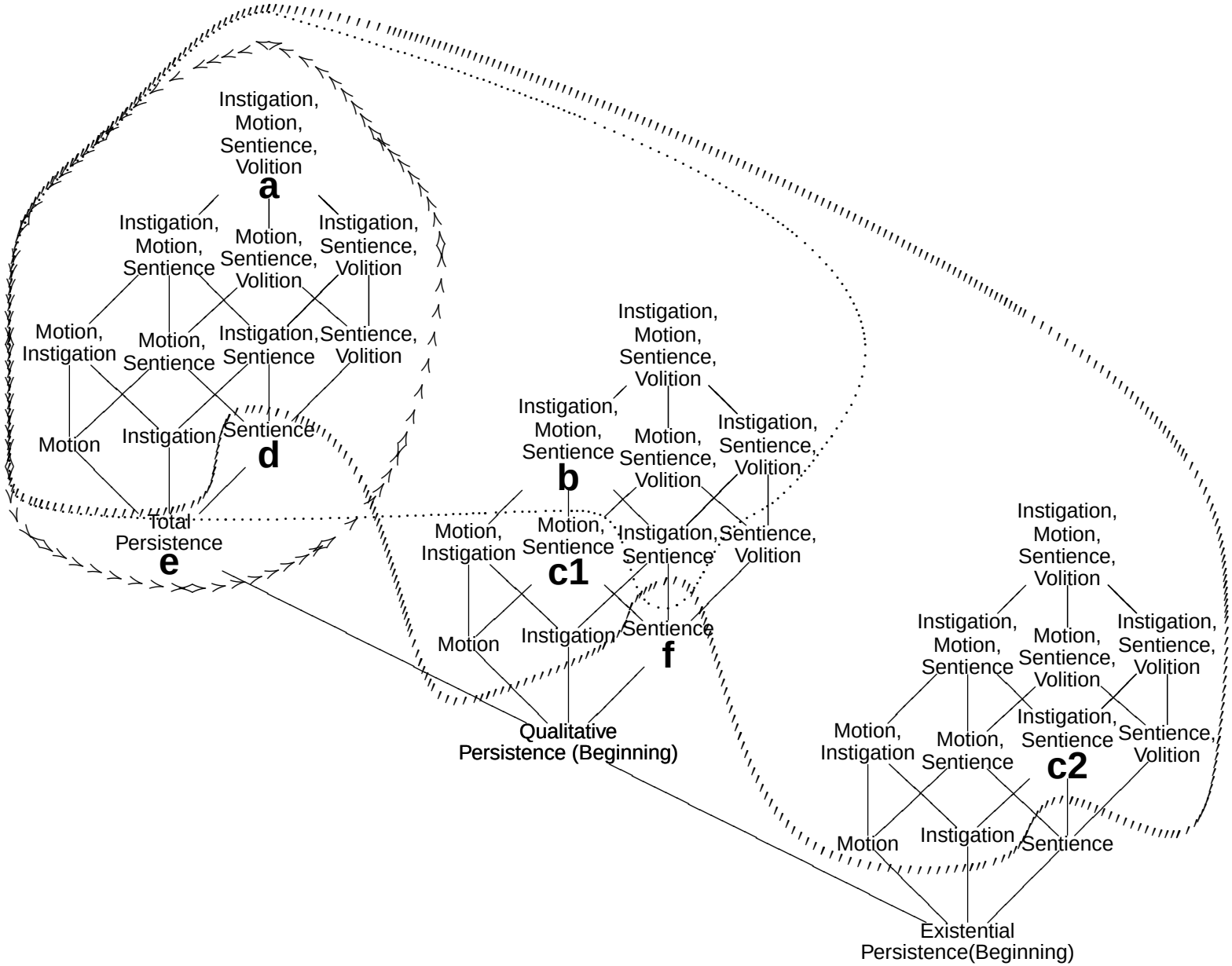
# Comparison of Agentive Systems

| | | Guaraní | Lakhota | C. Pomo |
|---|---|---|---|---|
| a. | +event ‘jump’, ‘go’, ‘run’<br>+Perform/Effect/Instigate<br>+Control | AGENT | AGENT | AGENT |
| b. | +event ‘hiccough’, ‘sneeze’,‘vomit’<br>+Perform/Effect/Instigate<br>-Control | AGENT | AGENT | patient |
| c. | +event ‘fall’, ‘die’,‘slip’<br>-Perform/Effect/Instigate<br>-Control | AGENT | patient | patient |
| d. | -event ‘reside’, ‘be prudent’,‘be patient’<br>+Perform/Effect/Instigate<br>+Control | patient | AGENT | AGENT |
| e. | -event ‘be tall’, ‘be strong’,‘be righthanded’<br>-Perform/Effect/Instigate<br>-Control<br>-Affected | patient | patient | AGENT |
| f. | -event ‘be sick’, ‘be tired’,‘be cold’<br>-Perform/Effect/Instigate<br>-Control<br>+Affected | patient | patient | patient |

# Comparison of Agentive Systems

- There are different notions of agent and patient at work
- While the languages agree on controlled motions and stage-level predicates, there is no total agreement elsewhere.
- This corresponds with the predictions made above about maximal agents and patients
- Agent and Patient markers can be represented as continuous regions on the agentivity lattice
- These continuous regions of the agentivity lattice give a cohesive representation of what it means to be an agent or a patient in each of these languages

# Comparison of Agentive Systems



# Interaction with Other Parameters

- The preceding gave instances where case assignment was due to relatively clear agency factors
- As we know, many other factors can contribute to case assignment and subject selection

# Case and Agency Revisited

- Application in Russian: Accusative/ Genitive Alternation
- *Methodology*:
  - Associate core uses of a case with those uses' position on the agency lattice
  - A case is then represented as a region of the lattice
  - The region of a case's primary use will provide the semantic content of its extended uses

# Accusative/ Genitive Alternation

(9) RUSSIAN (Wierzbicka (1981))

a. Ivan ždet tramvaj-a
Ivan-NOM waits-for tram-GEN

Ivan is waiting for a tram.

b. Ivan ždet tramvaj
Ivan-NOM waits-for tram-ACC

Ivan is waiting for the/a certain tram.

- Appears to mark (in)definiteness, and has been claimed as a form of differential object marking based on definiteness (Naess (2004))
- **Claim**: this is only true indirectly—it is a result of the interaction between the degree of definiteness of the NP and agency entailments on the verb

# Distribution of Alternation

- Limited to a small set of verbs:
  ‘seek’, ‘await’, ‘want’, ‘fear’, ‘avoid’, ‘demand’, ‘expect’ ‘request’
- Such verbs are ambiguous between narrow- or wide-scope readings
  - Narrow-scope reading: Ivan waits for a train (any train)
  - Wide-scope reading: There is a train such that Ivan waits for it
- These verbs entail various agency properties in their subjects, they have no entailments for their objects
- The genitive marks the narrow-scope reading

# Mapping the Genitive and Accusative

- The more frequent use of the genitive as a verbal argument is to express lack of existence:

  ‘when an existential predicate is negated, the entity whose presence is denied is expressed in the genitive” (Timberlake (2004))

- This is demonstrated with use of the genitive of negation

(10) RUSSIAN (Partee (2004))

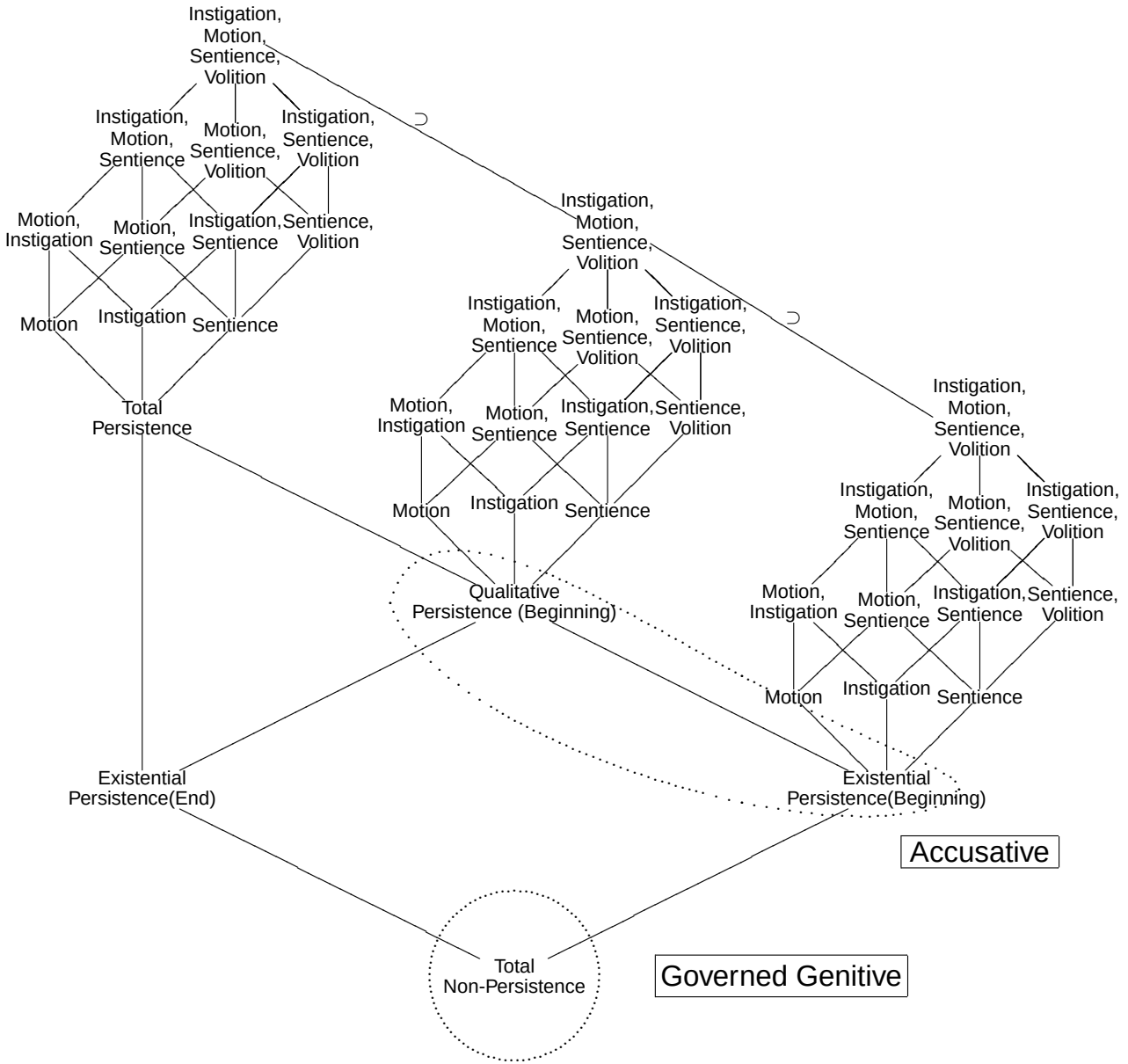
On ne polučil pis’ma
he NEG recieved letter-GEN.N.SG

He didn’t receive any letter.

# Mapping the Genitive and Accusative

- The governed genitive is used when existence of the object is not entailed, i.e., *Total Non-Persistence*
- The accusative case marks objects of transitive clauses—they must be in existence before the onset of the event so as to be affected
- Therefore, the region of the accusative covers at least the node *Existential Persistence (Beginning)*

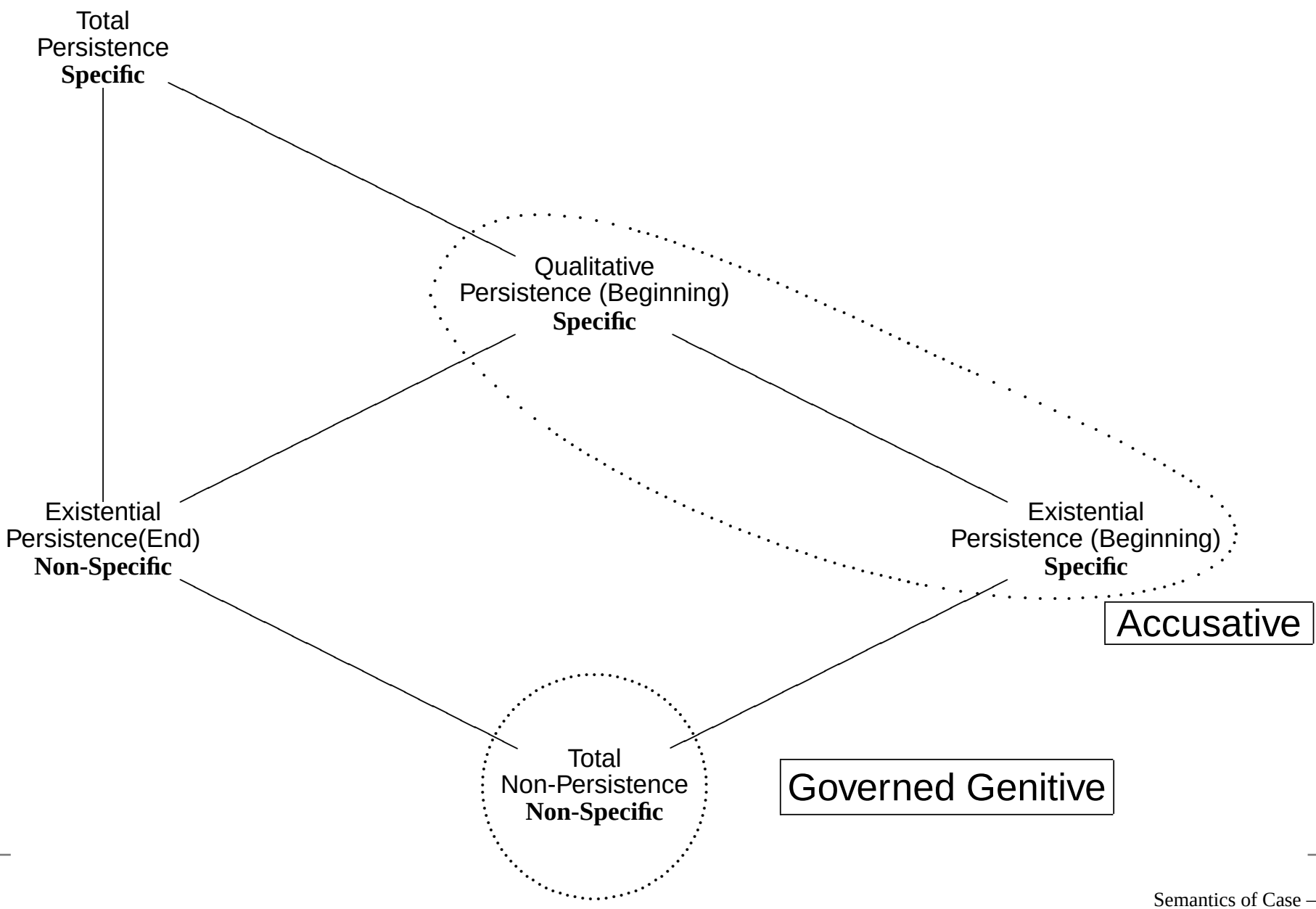
# Maps of the Genitive and Accusative



# Definiteness

- Can represent definiteness hierarchy as features
  - NonSpecific $<$ Indefinite Specific $<$ Definite $<$ . . .
  - $\emptyset$ $<$ Referring $<$ Referring, Given $<$ . . .
- Ioup (1977) showed that referring arguments only have wide-scope readings
- An individuated (referring) object is not consistent with the semantics of the genitive
- Forces a wide-scope reading, which *is* consistent with the semantics of the accusative

# Product of Agency and Definiteness



# Analysis

- NPs which are specific or higher on the definiteness hierarchy (+*referring*) entail that the entity exists, i.e., minimally possesses the feature *existential (beginning)*
- This locates the object in the region of the accusative case
- If the NP is non-specific (non-referring), independent existence is not entailed, and it can remain on the lowest node of the lattice
- But then this locates the object in the region of the genitive case
- Definiteness is the crucial factor underlying this alternation, *yet* it is mediated by agency properties
- This in turn explains the alternation's limited distribution

# Agency and Animacy

- Similar to the interaction between definiteness and agency, the framework can make sense of interactions between agency and animacy
- This can be demonstrated with Inanimate Subjects, also known as “Instrumental Subjects”

# Delimiting Instrumental Subjects

- Inanimate entities which can serve as instruments or subjects:

  (11) a. Marvin hit the horse with a stick.

  b. The stick hit the horse.

- Assumptions from early work on semantic roles led to positing that these sentences were related in that the inanimate entity has the same “case” in both, ‘instrument’
- Inanimate subjects stand as counter-examples to canonical subjects which are generally considered to be agentive and animate.

# Nominal Restrictions

- Not all instrumental subjects are created equal:

  (12) (modified from Levin (1993))

  a. The worker moved the dirt with the crane.

  b. The crane moved the dirt.

  (13) a. The worker moved the dirt with the shovel.

  b. *The shovel moved the dirt.

- Acceptability of the subject is somehow dependent on the nominal

# Verbal Restrictions

- Some predicates simply refuse to take instrumental subjects:

(14) (Levin (1993))

a. Carl ate spaghetti with a fork.

b. *The fork ate spaghetti.

# Towards an Analysis

- The status of both the nominal and the predicate influence the possibility of realizing an instrumental subject
- Develop a unified structure which models the interaction between these two parameters
- The restrictions on instrumental subjects will fall directly out of this model

# Nominal Properties

- A compatible structure can be constructed for nominal properties:
  - *movable* : capable of moving or being moved
  - *potent* : an entity which “has, or is conceived to have, its own internal power” (Chafe (1970))
  - *sentient* : capable of being consciously involved
  - *human*

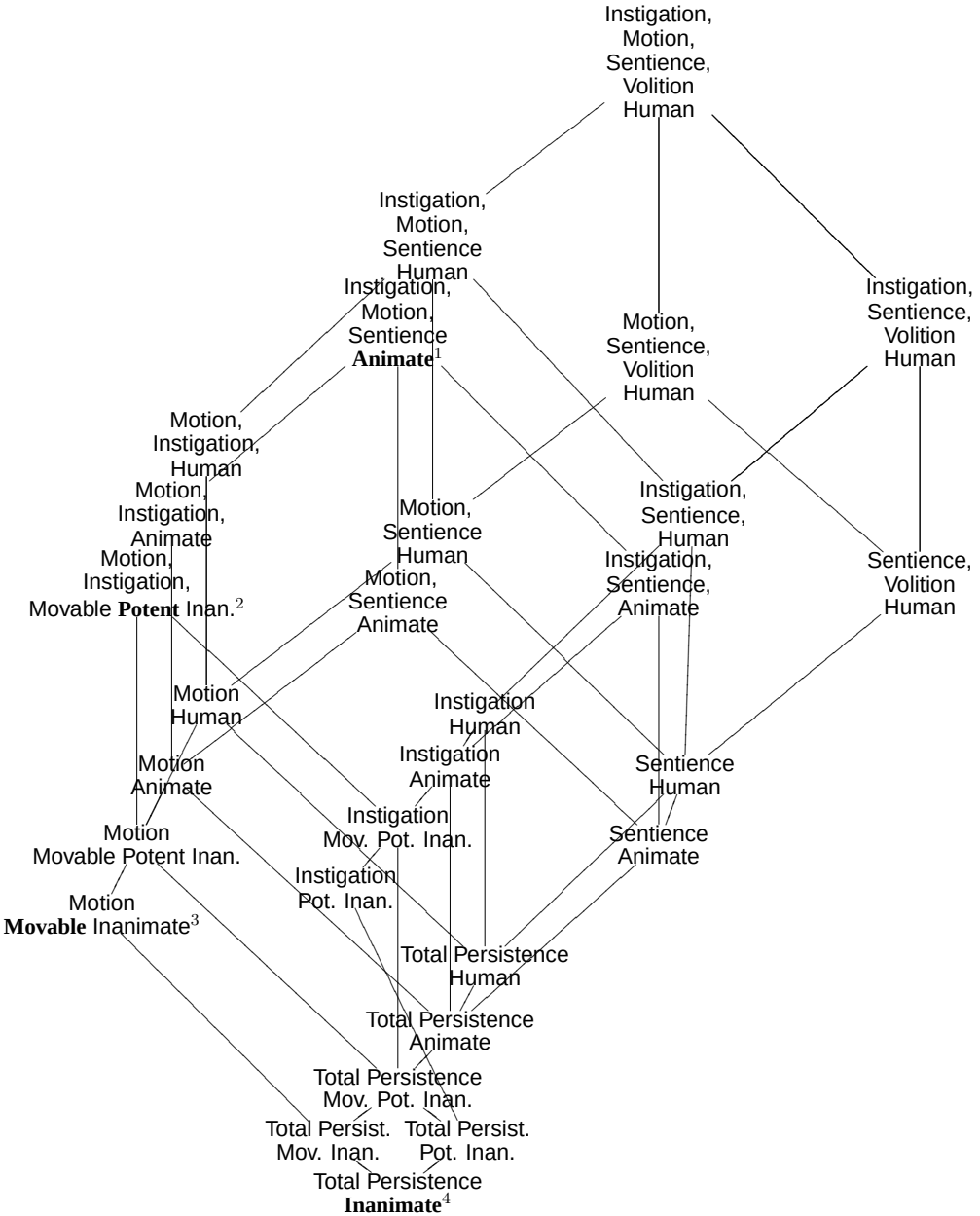
# Animacy Hierarchy

- Feature combinations are constrained by entailments, e.g., *human* $\models$ *sentient*, *sentient* $\models$ *movable*, and *sentient* $\models$ *potent*.
- As a partial order:
  - $\{\emptyset\} \subset$ {movable}, {potent} $\subset$ {movable, potent} $\subset$ {movable, potent, sentient} $\subset$ {movable, potent, sentient, human})
- Corresponds to a version of the familiar animacy scale:
  - place $<$ movable entity, potent entity $<$ autonomous mobile $<$ animate $<$ human

# Agency and Animacy

- Can take the Cartesian product of the agency and animacy structures
- Displays the possible instantiations of argument structure property combinations by nominal entities.
- The higher in the lattice, the fewer entities qualify to instantiate.
  - Only entities possessing *movable* can satisfy the *motion* entailment
  - Only entities possessing *potent* can satisfy the *instigation* entailment

# The Intersection of Agency and Animacy



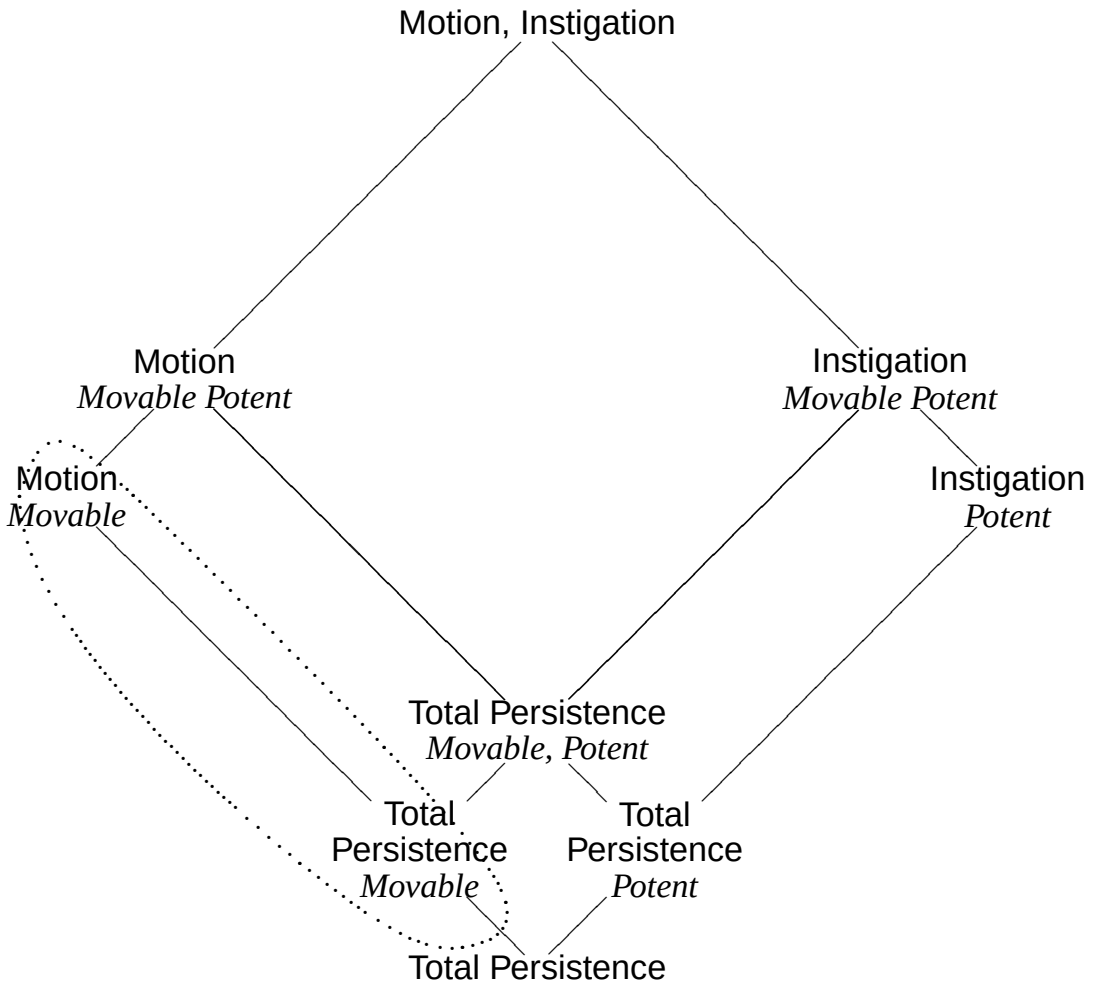

1 : Maximal Node for Animates

# Analysis

- The unified structure produces the acceptability patterns of the instrumental subject data.
- Only certain entities qualify for satisfying the entailments of a predicate.
- Canonical instruments are limited to one connected region of the lattice
- When the predicate entailments coincide with this region, instruments may be realized as subjects

# Agency and Inanimates

Canonical instruments (knife, stick, etc.) are consistent with the region within the dotted circle.

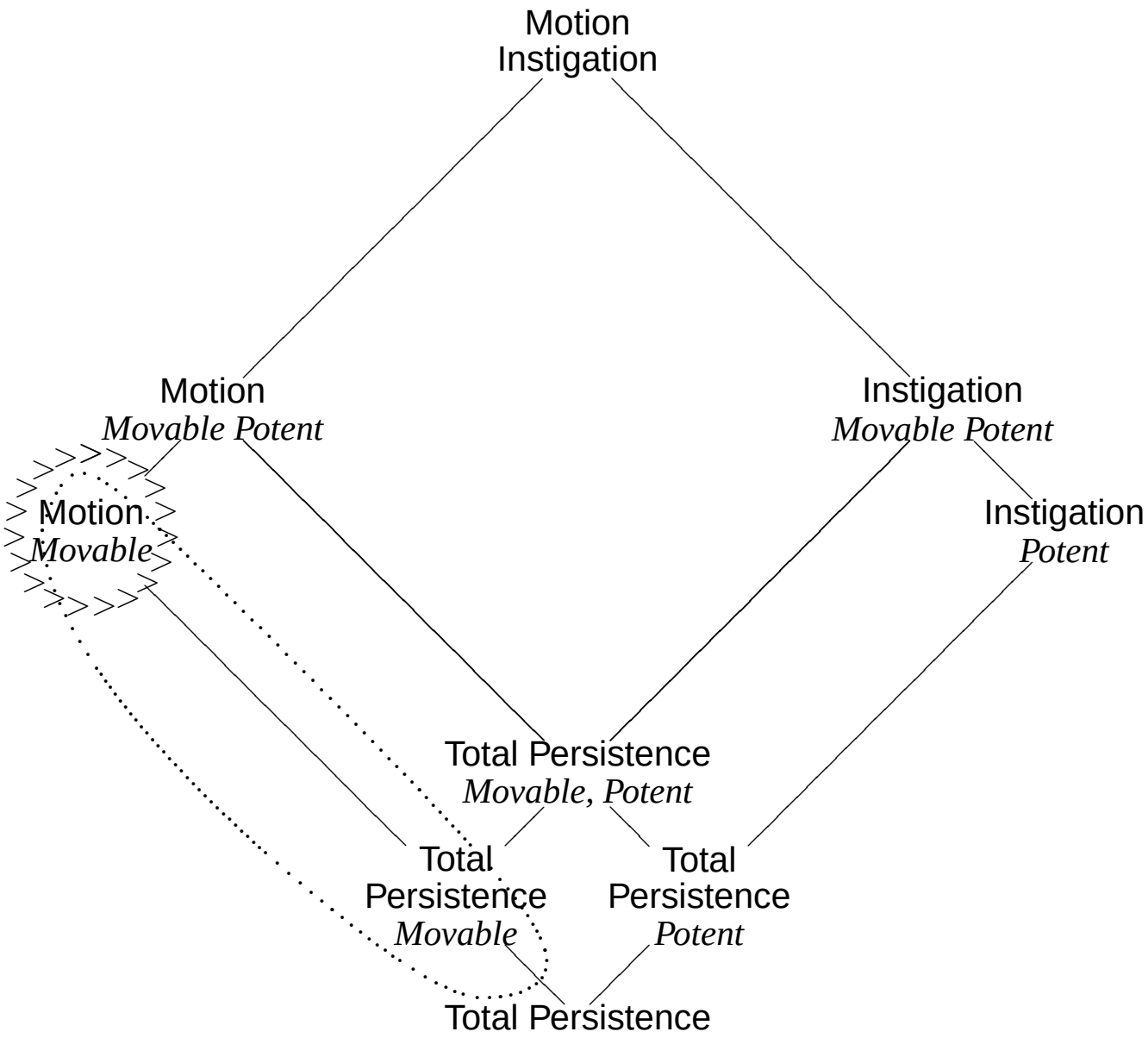


# Basic Instrumental Subject

(15) a. Marvin hit the horse with a stick.
b. The stick hit the horse.

- The subjects of ‘hit’ typically are in motion and are unaffected by the event. (Since the focus is on the impact, *instigation* is not at issue.)
  $\rightarrow$ Subject entailments for ‘hit’:= *Motion*, *Total Persistence*
- Coincides with canonical region of instrument
- ‘stick’ possess the feature *movable*, thus it can inhabit the region of the structure which corresponds to the entailments of the verb ‘hit’, and is therefore acceptable.

# Basic Instrumental Subject



# Restricted Instrumental Subject

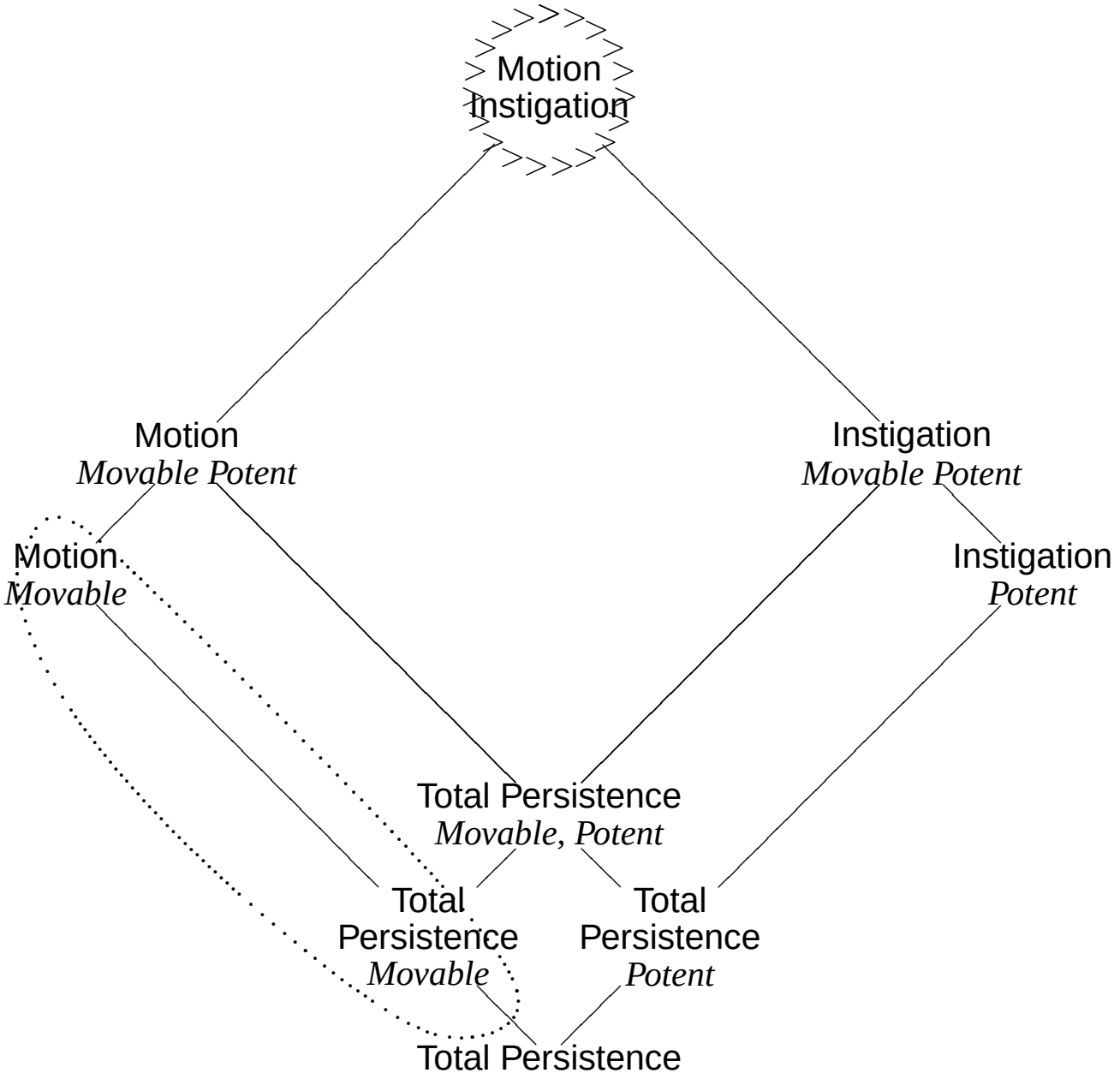
(16) (modified from Levin (1993))

a. The worker moved the dirt with the crane/shovel.

b. The crane/*shovel moved the dirt.

- Subject entailments for transitive 'move'=: *Instigation*, *Motion*, *Total Persistence*
- Object properties of 'crane': *movable*, *potent*
  $\rightarrow$ Satisfies the entailments of 'move'
- Object properties of 'shovel': *movable*
  $\rightarrow$ Fails to satisfy the entailments 'move'

# Restricted Instrumental Subject



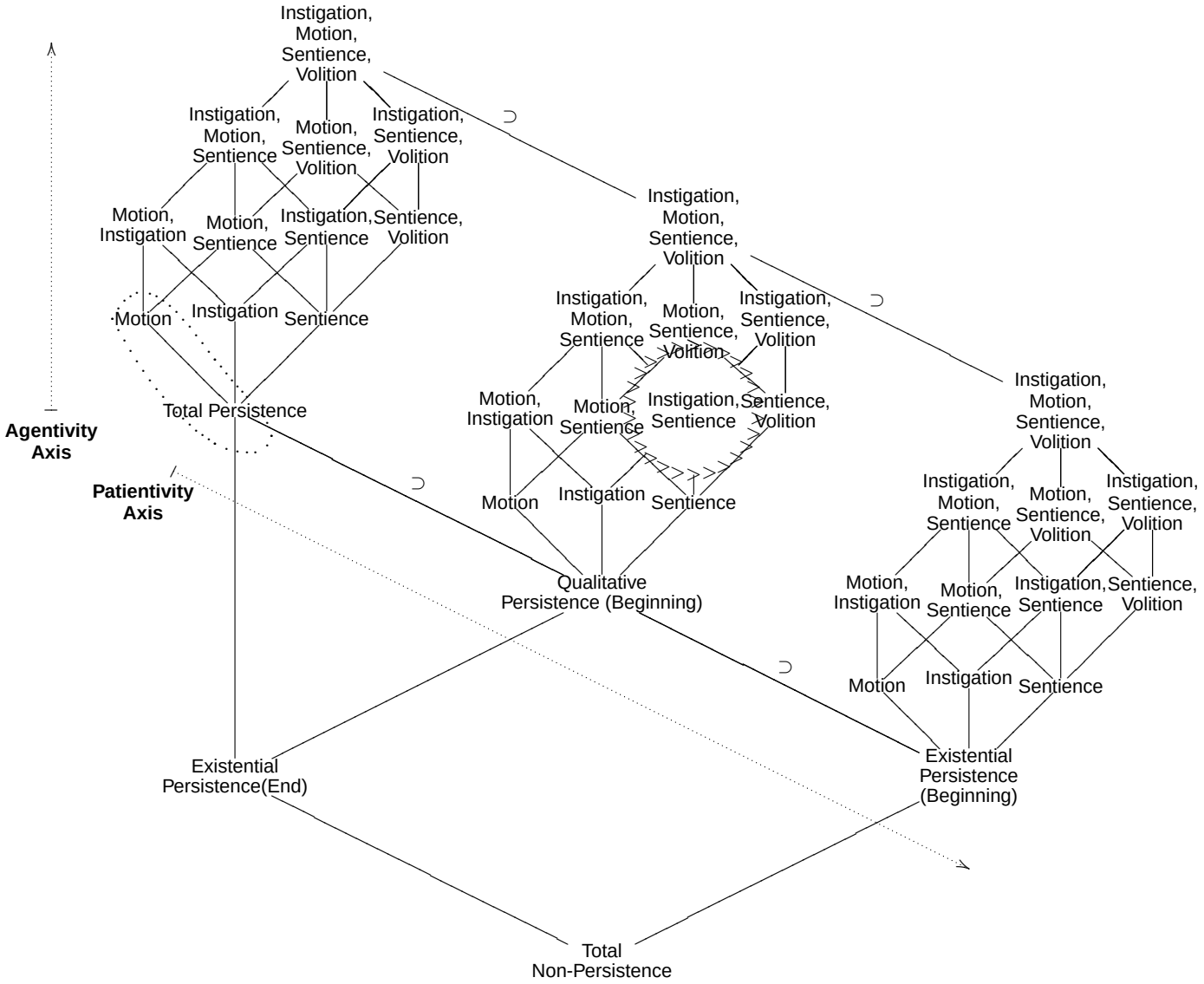
# Impossible Instrumental Subject

(17) a. Carl ate spaghetti with a fork.

b. *The fork ate spaghetti.

- Subject entailments for ‘eat’: *Sentience*, located on the *Qualitative Persistence (Beginning)* branch of the lattice (i.e., qualitatively affected)
- Object properties of ‘fork’: *movable*
  $\rightarrow$ Fails to satisfy the entailments of ‘eat’ (not *sentient*)

# Impossible Instrumental Subject



# Interim Conclusion

- This model can give a unified account of instrumental subjects and their restricted distribution
- Lingering question: Is this model at all in touch with language use?
- The accounts discussed above, and to which the theory was a reaction to, all rely on constructed examples (Fillmore 1968, Schlesinger 1989, Van Valin & Wilkins 1996, Kearns 2000)
- These accounts would benefit from a study of *naturally-occurring* sentences
- Further, how does the picture above relate to inanimate subjects in general?

# Inanimate Subjects: An empirical view

- Joint work with Marie-Catherine de Marneffe
- Preliminary analysis of the inanimate subjects for 7 verbs:
  *kill*, *melt*, *smash*,
  *hit*, *scrape*, *puncture* and *push*.
- First goal is to examine what kind of inanimate subjects naturally occur with these verbs.
  - To our knowledge, this is the first corpus study of such inanimate subjects
- Second, we will look at how the sets of examples correspond to the proposed analysis.

# The Corpus

- From the written texts of the British National Corpus, we extracted at most 100 instances of each verb with Inanimate Subjects, excluding metaphorical uses.
- The frequency of Inanimate Subjects depends on the verb:
  - For *push*, Inanimate Subjects are rare: only 37 instances out of 5,000.
  - For *puncture*, 1/4 of the 120 sentences possess inanimate subjects.
- As a heuristic procedure, we grouped the Inanimate Subjects into 10 ontological categories: e.g., body part, natural force, weapon

# The Theoretical Predictions

- The verbal entailments of the verbs *kill*, *smash* and *melt* include the *instigation* property, requiring subjects to possess the feature *potent*.
- *hit*, *scrape* and *puncture* entail *motion*, only nominals possessing the property *movable* can serve as subjects.
- *push* entails *instigation* and *motion* (similar to *move*)

# Distribution of inanimate causer categories

| causer category | **kill** | **melt** | **smash** |
|---|---|---|---|
| *artifact* | – | **9** | **8** |
| *biology* | **14** | – | – |
| *body part* | – | 1 | **5** |
| *natural force* | **16** | **12** | **6** |
| *natural element* | 5 | **7** | 2 |
| *event* | **25** | 2 | 4 |
| *product/poison* | **20** | 1 | – |
| *projectile* | 3 | – | **5** |
| *vehicle* | 1 | – | **6** |
| *weapon* | **15** | 1 | **5** |

# Correlating data and theory: *kill* and *smash*

- *natural force*, *weapon*, *product/poison* and *biology* (for kill), and *body part* (for smash) are the most frequent entity categories for these verbs. These categories also qualify as intrinsically *potent*.
- The categories *artifact*, *projectile* and *vehicle* are not intrinsically *potent*. Yet, all the attested subjects are in motion and possess a substantial kinetic force. Thus, these subjects are construed as having the force to bring about the event.

  He then picked up a stool and brought it down towards her but it **smashed** a ceiling light. (K55 943)

# Correlating data and theory: *melt*

- *melt* also appears frequently with *natural forces* and *elements*, as well as with *artifacts*.
- Beyond the superficial alignment with the category distribution, there is the deeper generalization that all the subjects radiate heat, which is what constitutes *potent* for *melt*.

| | |
|---|---|
| artifact | *hot metal*, *gas torch*, *braziers*, *iron* |
| natural force | *warmth*, *fire*, *flames*, *sunrise* |
| natural element | *sun*, *volcano* |

- Therefore, the verbal entailments correctly cross-classify over the ontological categories.

# Distribution of inanimate causer categories

| causer category | **hit** | **puncture** | **scrape** | **push** |
|---|---|---|---|---|
| *artifact* | **22** | 7 | 8 | 4 |
| *biology* | – | – | – | – |
| *body part* | 6 | 2 | 14 | **9** |
| *natural force* | **18** | – | – | **13** |
| *natural element* | 7 | 6 | 2 | 3 |
| *event* | 7 | 4 | – | 5 |
| *product/poison* | – | – | – | – |
| *projectile* | **24** | – | – | – |
| *vehicle* | **16** | – | – | 4 |
| *weapon* | – | 7 | 1 | – |

# Correlating data and theory : *hit*

- *hit* entails *motion*, requiring a subject possessing the property *movable*.
- The attested uses all possess a subject which is explicitly or implicitly in motion:

| | |
|---|---|
| artifact | *parachute*, *boots* |
| natural force | *storm*, *sea*, *wave*, *thunder* |
| projectile | *bullet*, *shell* |
| vehicle | *sledge*, *train*, *lorry* |

# Correlating data and theory: *push*

- *push* entails *instigation* and *motion* (similar to *move*), requiring subjects which *potent* and *movable*.
- The most frequent categories in the data for the inanimate subjects of *push* are *natural force* and *body part*.
- Natural forces qualify as *potent* and *movable*, and body parts, too, in the proper context—when attached to a living body.

  A firm, insistent hand between my shoulder-blades **pushed** me further into the room . . .
  (CA9 16)

# Correlating data and theory: *push*

- With the other categories for *push*, *vehicles* and *artifacts*, the context of the sentences allows to construe these subjects as in motion.
  The feature *potent* comes from the fact that a force is necessary in the bringing about of the event:

  > Time after time my boots lost their grip and **the load pushed** me backwards down the scree. (AT3 2431)

# Summary of Empirical Section

- The proposed theory correlates well with the corpus data.
- The properties necessary to treat instrumental subjects generalize well to inanimate subjects.
- The ontological categories align with the verbs' particular entailments:
  - Globally, for a given verb, the ontological categories that occur most frequently are those which intrinsically possess the properties required by the verb's entailments
  - Categories not intrinsically associated with the necessary properties are either not attested or benefit from contextual construal

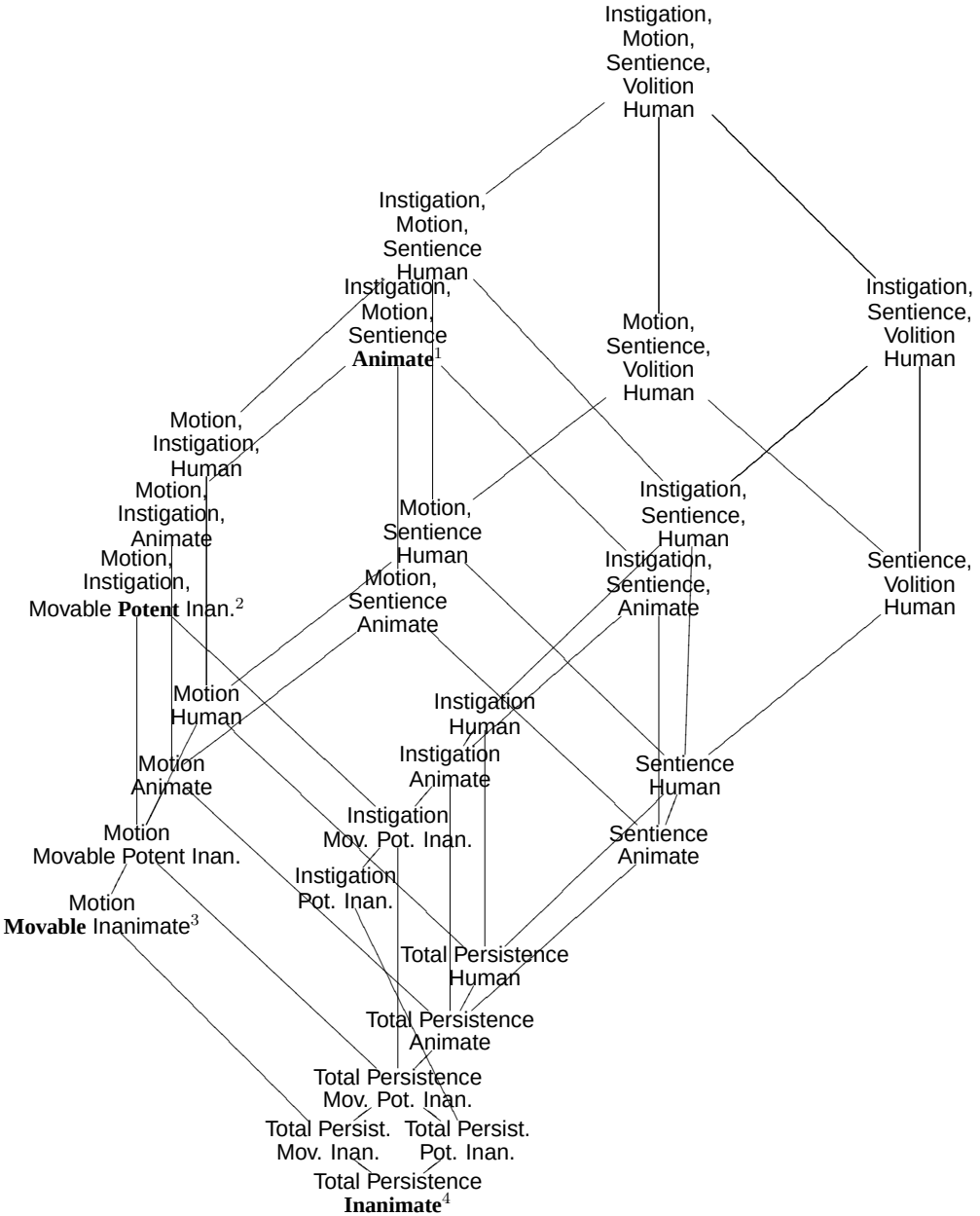
# Instrumental Subject Conclusion

- A more fine-grained and structured representation of argument structure properties permits to model interaction between verbal entailments and nominal properties.
- This model can give a unified account of inanimate subjects and their restricted distribution.
- The theoretical model provides an account of the idiosyncratic restrictions on inanimate subjects, i.e. negative evidence.
- The ongoing corpus study provides positive evidence that the space generated by the theory's system of verbal entailments tightly describes naturally-occurring inanimate subjects.

# Discriminatory and Indexical Views

- Towards Reconciling the Discriminatory and Indexical Views:
- Often discriminatory and indexical views on case marking appear to be opposed
- There is nothing which necessarily makes these two views on case-marking incompatible
- The picture here suggests we can synthesize the two views

# The Intersection of Agency and Animacy




1 : Maximal Node for Animates

# Discriminatory and Indexical Views

- The higher you are on the animacy scale, the more access you have to the higher reaches of the agency lattice
- Inanimates don’t need to be marked, since by their inherent characteristics they are constrained; animates and humans are the problem
- This is nothing new
  - Here the intuition behind the discriminatory view is visualized
  - Further prediction: DOM should be sensitive to verbal class

# Conclusion

- Can give a consistent core semantics to case-marking in terms of agency properties
- Allows for typological and language particular predictions
- Allows for modelling the interaction of different semantic parameters, e.g., agency and definiteness

# Thank you

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