Nominalization in English: Semantic restrictions on argument realization*

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One prevalent assumption in the literature on nominalization is that the interpretation of external arguments in the prenominal position is governed by encyclopedic knowledge (cf. Marantz 1997, Harley and Noyer 2000). Thus, in the enemy's destruction of the city, “the possessor can be interpreted as an agent/causer, based on our encyclopaedic knowledge about destroy” (Alexiadou, Anagnostopoulou and Schäfer 2009: 46). Since the possessive position (Spec, DP) is compatible with a range of semantic roles, it also supports the PATIENT interpretation of the internal argument, when it appears prenominally, as in the city's destruction.

If the interpretation of the prenominal possessive is restricted by our knowledge about the world, then it is a puzzle why the prenominal argument of destruction in (1) must be a patient, while the prenominal argument of invasion in (2) can be either an agent or a patient. The same contrast holds for imprisonment in (3) and examination in (4):

(1) a. the enemy's destruction (*AGENT / PATIENT)
    b. the city's destruction

(2) a. the enemy's invasion (AGENT / PATIENT)
    b. the city's invasion

(3) the guard's imprisonment (*AGENT / PATIENT)

(4) the doctor's examination (AGENT / PATIENT)

In what follows, I show that this question has not received a satisfactory explanation. I
then propose that the mapping of arguments in nominals is akin to argument alternations in the verbal domain (Levin 1993) and that the observed differences between (1) and (2) should be explained by the lexical semantic properties of the head nouns.

1. Argument Realization in Nominals – an Overview

Anderson (1977), focusing on the distribution of internal arguments, proposes that they can be mapped into the prenominal position if they are affected: “changed, moved, altered in status or created” (1977: 15). This analysis predicts that the internal arguments of destruction and invasion can appear prenominally ((1b) and (2b)), but it does not explain why invasion allows its prenominal argument to be interpreted agentively, while destruction doesn't (cf. (1a) vs. (2a)). The same criticism applies to the analysis by Doron and Rappaport Hovav (1991) that recasts the affectedness constraint in terms of event structure.

In the literature on nominalization from the 80's it was assumed that the deverbal nominal inherits the argument structure of the verb and thus must realize its internal argument (cf. Chomsky 1981, Zubizarreta 1982, Lebeaux 1986, Roeper 1987). If the internal argument is unexpressed, as in (1a), the construction is ungrammatical under the agentive interpretation. This analysis implies that nominals such as invasion in (2a) are somehow different. This idea became a foundational assumption in Grimshaw (1990), where it is proposed that nominals that realize the internal argument (cf. (1b) and (2b)) and nominals that don't (cf. (2a)) belong to two different types, 'argument structure' (AS) nominals and 'result' (R) nominals, respectively. The two classes are associated with the different clusters of properties. For example, AS-nominals have an eventive
interpretation, and are mass nouns that cannot pluralize, while R-nominals refer to a result state of an action and are count (see Grimshaw 1990 for the full list of diagnostics).

Subsequent research showed that the relation between argument realization and the properties identified by Grimshaw (1990) is not as straightforward as was previously thought. Roeper (1993), Borer (2003), Newmeyer (2009), and Alexiadou (2011) challenged the assumption that eventive interpretation predicts the argument realization pattern. For example, Roeper (1993: 204) points out that the objects of undergo and need in (5) and (6) refer to events, a hallmark of AS-nominals, yet they show different patterns of argument realization: the nominals in (6) are grammatical without expressed internal arguments.

(5) Roeper (1993: 202), ex. (58a, b, h):
   a. *Thebes underwent the enemy's destruction.
   b. *the town underwent the state's establishment.
   c. *the disease underwent the doctor's eradication.

(6) Roeper (1993: 203 – 204), ex. (64b, c, e):
   a. Bill underwent the school's examination.
   b. John underwent the FBI's investigation.
   c. The child needs the court's supervision.

While Roeper (1993: 204) treats the argument realization pattern in (6) as a lexical idiosyncrasy, I would like to propose that the contrast between (5) and (6) is systematic and is due to the lexical semantics of the nominals.
2. Three Patterns of Argument Realization

The analysis I propose is based on expert judgment, corpus study, and information extracted from Nomlex, a computational database for 1000 nominals (Macleod et al. 1998). Focusing on deverbal nominals that surface with a single argument in the prenominal position, I identified three lexical classes: (i) nouns whose single prenominal argument must be a patient (PATIENT-dominant), as in (7), (ii) nouns that require their single prenominal argument to be an agent (AGENT-dominant), as in (8), and (iii) nouns that allow their single prenominal argument to be interpreted as agent or patient (SHARED-dominant), as in (9). A sample of each class is presented in the appendix.

(7) a. the enemy's destruction of the city  PATIENT-dominant
    b. the city's destruction  (PATIENT)
    c. *the enemy's destruction  (*AGENT)

(8) a. the enemy's attack on the city  AGENT-dominant
    b. the enemy's attack  (AGENT)
    c. *the city's attack  (*PATIENT)

(9) a. the enemy's invasion of the city  SHARED-dominant
    b. the enemy's invasion  (AGENT)
    c. the city's invasion  (PATIENT)

In what follows, I show that the choice which event participant is mapped to syntax in single-argument constructions – patient in (7) and agent in (8) – correlates with Levin's (1993) verb classes and argument alternations in the verbal domain, as summarized in Table 1 in the appendix.
2.1 PATIENT-dominant Nominals

The common property of the nominals whose single prenominal argument must be a patient is that they denote a change of state or a change of location. The change can be physical (destruction), psychological (humiliation), or political (democratization); it can be absolute (consumption and creation nouns) or gradual (escalation). The event can be bounded (destruction) or unbounded (education). What unifies this apparently diverse group is that the patient argument undergoes the change. Another relevant property is that the patient is constrained by the semantics of the head: it must be animate for humiliation (the victim's humiliation) and inanimate for absorption (the chemical's absorption), but no such restrictions apply to the external argument.

Verbal counterparts of PATIENT-dominant nominals belong to the following Levin's classes: Change of State, Murder, Destroy, Amuse and other (see Table 1). Members of these classes participate in a range of alternations. Crucially, what these alternations have in common is that the patient argument is invariably preserved, while the agent is either not realized (Causative and Middle alternations) or is replaced with an oblique argument (Instrumental Subject and Possessor Subject alternations).

(10) and (11) show that causative alternation verbs such as escalate and their nominal counterparts show identical behavior with respect to argument realization: if a single argument is mapped into the structure it must be the patient argument.

(10) a. The government escalated the conflict.

b. The conflict escalated / *the government escalated.

(11) a. the government's escalation of the conflict
b. the conflict's escalation / *the government's escalation (*AGENT)

Additionally, verbal counterparts of many PATIENT-dominant nominals participate in the middle construction:

(12) a. The chemist evaporated the perfume.
    b. This perfume evaporates easily.

(13) the perfume's evaporation / *the chemist's evaporation (*AGENT)

While destroy does not participate in either the Causative or the Middle alternation, it shows the Instrumental Subject alternation in (14), from Levin (1993: 239). In (14b) the agent is replaced with an instrument in the subject position, but the patient is unaffected. It is also the patient argument that is realized in the nominal construction in (15b):

(14) a. The builders destroyed the warehouse with the explosives.
    b. The explosives destroyed the warehouse.

(15) a. the builders' destruction of the warehouse
    b. the warehouse's destruction / *the builders' destruction (*AGENT)

The Possessor Subject alternation in (16) achieves the same effect as the Instrumental Subject alternation, and the argument realization pattern in (17) parallels that in (15b).

(16) a. The clown humiliated John with his joke.
    b. The clown's joke humiliated John.

(17) John's humiliation / *the clown's humiliation (didn't take long) (*AGENT)

Ideally, these parallels in the verbal and the nominal domains should be explained from a lexical semantics perspective. A good candidate analysis is proposed by Rappaport Hovav and Levin (2012) for causative alternation predicates. The authors
argue that these predicates have monadic roots, i.e. they encode only the patient argument (see also Guerssell et al. 1985: 54). This analysis is motivated by the fact that the internal argument of causative alternation verbs is thematically constrained, while the external argument is not – it can be an agent, an instrument, or a cause. Since the root lexically encodes the internal argument, in anticausative constructions such as (10b) it is the patient argument that is syntactically realized. This analysis can be straightforwardly extended to nominal counterparts of causative alternation verbs, such as *escalation in (11), and, possibly, to other members of the PATIENT-dominant class.

2.2 AGENT-dominant Nominals

In AGENT-dominant nominals the agent argument has a more prominent syntactic and semantic status with respect to the event denoted by the nominal. If a nominal denotes a change, it is usually the agent argument that undergoes change (cf. *the climber's ascent vs. the trail's ascent). Moreover, the properties of the external argument are restricted by the semantics of the root. For example, *love and other subject experiencer nominals require an animate subject, but their internal argument can be either animate or inanimate. These semantic properties have syntactic correlates. In the verbal domain, the corresponding predicates are represented by Admire, Correspond, Meet, and Inherently Directed Motion classes from Levin (see Table 1). Members of these classes participate in alternations that have the following pattern: the agent argument is preserved, while the patient argument is either unexpressed or is replaced with an oblique argument. This is just the opposite of what we observed for the PATIENT-dominant group.

A good number of the corresponding verbal constructions for AGENT-dominant
class can surface without the theme argument, as in (18a). In the nominal domain, the internal argument, if realized, can often be expressed with an oblique preposition (cf. *Johns' attack on the hospital*). If a single argument is expressed, it must be the agent argument (18b) (cf. also the Unspecified Object and the Preposition Drop alternations for Inherently Directed Motion and Meet verbs).

(18) a. John attacked / visited / called (the hospital).

   b. John's attack / visit / call (*PATIENT)

Moreover, Admire verbs participate in the Possessor Object alternation, shown in (19), adapted from Levin (1993: 73). In this alternation the agent is unaffected but the original patient argument is absorbed into the argument expressing attribute. The single argument in the nominal construction in (20) must have an agentive interpretation.

(19) a. John admired the volunteers for their dedication.

   b. John admired the volunteers' dedication.

(20) John's admiration / the volunteers' admiration (*PATIENT)

Finally, a sizable subset of AGENT-dominant nominals (Meet verbs and Correspond verbs) participate in the Simple Reciprocal alternation, shown below for the symmetrical predicate *collide* in (21) and its nominal counterpart *collision* in (22):

(21) a. The green truck and the yellow truck collided.

   b. The green truck collided with the yellow truck.

   c. *The green truck collided.

(22) a. the green truck and the yellow truck's collision

   b. the green truck's collision with the yellow truck
Even though both event participants of symmetrical predicates appear to have equal status (cf. Levin 1993), the alternative mapping options reflect the privileged status of the agent. It is the agent that is mapped into a more prominent syntactic position in (21b) and (22b), while the patient argument is realized with an oblique preposition or dropped, as in (22c). The latter option is available in nominal constructions only.

The observation that the agent arguments of some predicates are structurally and semantically more prominent than their patients is by no means new, and has been reflected in a number of theoretical proposals (cf. Hopper and Thompson 1980, Van Valin 1990, and Nunes 1993 on nominalizations). Levin (1999) proposed that patient arguments of simple non-causative verbs are not encoded in the event template and that their mapping to syntax is optional (see also DiDesidero 1999 on the extension of this analysis to psych verbs such as love and Rappaport 1983 for a similar analysis). In a similar spirit, Alexiadou (2011) proposed that the theme argument of Admire type nominals is introduced vP internally as a PP rather than as a DP. The nominal data presented above are consistent with these proposals, and suggest that the similarities between the nominal and the verbal domain have a lexical semantic basis.

2.3 SHARED-dominant Nominals

SHARED-dominant nominals are more flexible in that the possessive argument can be either agent or patient. I would like to suggest that this flexibility is due to the fact that the nominals belonging to this class lack a most salient event participant, that is, unlike the PATIENT- and AGENT-dominant nominals, they don't lexically identify one
argument as more prominent. This is perhaps due to the fact that arguments of these nominals are neither prototypical agents – they cannot be characterized in terms of the transmission of force (Croft 1991) (cf. the enemy's attack vs. the scientist's classification) – nor are they prototypical patients – there is no change in the “material integrity” of the object (Hale and Keyser 1987)(cf. the city's destruction vs. the object's representation).

In fact, a considerable number of nominals belonging to this group refer to cognitive activities or denote events that can be characterized by low transitivity (cf. Hopper and Thompson 1980). Verbal counterparts of these nominals are most notably represented by Levin's Characterize, Judgment, Sight, and Assessment classes (see Table 1).

*Invasion*, of course, is different from cognitive activity predicates in that it seems to be a rather prototypical AGENT-PATIENT nominal akin to *destruction*. However, since the external argument of *invasion* undergoes change of location in the direction of some goal, it can also be viewed as a THEME-GOAL nominal (cf. Jackendoff 1987). What we know about themes and goals is that in the verbal domain the arguments associated with these roles can swap syntactic position, if the corresponding verb participates in the dative or the locative alternation:


b. John gave a book (THEME) to Mary (GOAL).

Such a syntactic interchangeability is also available for arguments of *invasion*, even though in this case, as shown in (24), the alternation affects the external and the internal arguments rather than the two internal arguments as in (23):

(24) a. the enemy's (THEME) invasion

10
b. the city's (GOAL) invasion

If this proposal is on the right track, I expect that the discourse and information structure principles would affect the mapping of arguments in SHARED-dominant nominals, similar to the choice of word order in the English dative alternation and locative alternation constructions (cf. Arnold et al. 2000, Bresnan et al. 2007).

3. Conclusion

The results of the empirical study presented in this paper suggest that encyclopedic knowledge alone is not sufficient to explain the mapping of arguments in nominals (cf. also Sichel 2010). I propose that the observed pattern depends on the lexical semantics of nominals and correlates with Levin's verb classes. As pointed out by a reviewer, these results are consistent with the assumptions of the Distributed Morphology framework: if the nature of the category-less root determines the mapping of arguments, then it is expected that the mapping pattern will be consistent across the nominal and the verbal domains. Yet, the question of how encyclopedic knowledge interacts with the lexical semantics of the root still awaits a systematic explanation.

Appendix: Nominal Classes and Levin's Verb Classes

**PATIENT-dominant class:** *(Other) Change of State:* corrosion, democratization, diffusion, disintegration, evaporation, explosion, intensification, stabilization, unionization; *Amuse:* alienation, consolation, demoralization, entertainment, humiliation, intimidation, pacification, satisfaction, terrorization; *Murder:* assassination, elimination, execution, slaughter; *Destroy:* annihilation, demolition, destruction; *Banish:* extradition, removal; *Remove:* eradication, expulsion; *Sight:* redemption, retrieval; *Appoint:* adoption;
Begin: termination; Characterize: establishment; Complete: initiation; Create: creation;

Put: installment.

AGENT-dominant class: Admire: admiration, appreciation, fear, hatred, love,
resentment, respect, tolerance; Correspond: collision, competition, cooperation, quarrel,
rendezvous; Meet: battle, consultation, fight, visit; Inherently Directed Motion: ascent,
descent, entry; Advise: admonition, warning; Avoid: avoidance, evasion; Chase: chase,
pursuit; Conjecture: assertion, suspicion; Mix: fusion, merger; Say: proclamation,
suggestion; Chitchat: conversation; Contiguous Location: domination; Declare:
declaration; Exchange: trade; Judgment: congratulation; Want: desire; Amuse: temptation,
reassurance; Sight: extortion; Characterize: recollection.

SHARED-dominant class: Characterize: certification, characterization, classification,
description, identification, portrayal, recommendation, representation, treatment;
Sight: examination, inspection, investigation, observation; Judgment: celebration,
compensation, impeachment, punishment; Assessment: analysis, assessment, evaluation;
Amuse: encouragement, provocation, stimulation; Advise: instruction; Leave:
abandonment, desertion; Transfer or Message: explanation, demonstration; Amalgamate:
introduction; Performance: performance; Separate: segregation.
Table 1: Nominal classes and Levin's verb classes

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<tr>
<th>Levin's Verb Classes</th>
<th>Nominal Classes</th>
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<td></td>
<td>Agent-dominant</td>
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<td>Amuse V</td>
<td>2</td>
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<td>(Other) Change of State</td>
<td>9</td>
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<td>Murder V</td>
<td>4</td>
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<td>Destroy V</td>
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<td>Sight V</td>
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<td>Remove V</td>
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<td>Appoint V</td>
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<td>Complete V</td>
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<td>Create V</td>
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<td>Put V</td>
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<td>Admire V</td>
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<td>Correspond V</td>
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<td>Meet V</td>
<td>4</td>
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<td>Inherently Directed Motion</td>
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<td>Avoid V</td>
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<td>Say V</td>
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1 For each nominal, Nomlex lists all possible argument realization patterns, including how a single prenominal possessive argument can be interpreted. Based on this information, nominals were assigned to AGENT-dominant, PATIENT-dominant, and SHARED-dominant classes. To check accuracy of information in Nomlex, I selected a sample of 186 nominals and evaluated them against the judgment of a native speaker, who was also a professional linguist. In case of a mismatch between information in Nomlex and expert judgment, I made a decision based on online data. At this stage result nominals, such as *plan* and *order*, and nominals that did not have patients, such as *debauchery*, were discarded. I also corrected some obvious mistakes in the Nomlex database (*expulsion* was classified as allowing agentive interpretation but in fact the prenominal argument is interpreted as patient, as in *the director's expulsion*). Following the reviewers' suggestions, I then manually matched nominals with the corresponding members of verbal classes in Levin (1993). In the process, I narrowed down the original set to nominals whose corresponding verbs are listed in Levin.

2 In a series of experiments, Gleitman et al. (1996) show that the mapping of arguments of symmetrical predicates such as *collide* correlates with the semantic prominence of event participants, characterized in terms of Figure (subject) and Ground (oblique argument).