On the realization of external arguments in nominalizations: a cross-linguistic perspective

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1. Introduction

It has been observed that certain restrictions exist on the realization of the external argument in derived nominals (see Marantz 1997, Harley & Noyer 2000, Pesetsky 1995, Grimshaw 1990, Sichel 2010/2011):

- causers/natural forces are often disallowed, although the corresponding verbal form can have both an agent and a natural force as an external argument:

(1) a. The authorities/the hurricane justified the evacuation of the inhabitants
b. #The justification of the evacuation of the inhabitants by the hurricane
c. The justification of the evacuation of the inhabitants by the authorities

While initially this was described as an agent exclusivity effect,[1] Sichel (2011) argues that in English the restriction is of a different sort: while verbal forms allow both direct and indirect participants as external arguments, nominals derived from them require **direct participation**, i.e. the external argument has to be co-temporal and co-spatial with the unfolding event, cf. Folli & Harley's (2007) notion of *teleological capability*.

Based on the behavior of nominalizations and verbal predicates across languages (English, German, Greek, Romanian, Spanish, French, Hebrew etc.), we show the following:

- an account of (1) based on event complexity that argues that nominals can only host simple events (as in Sichel 2010, 2011) makes wrong predictions;
- similarly, an account in terms of structural deficiency for nominalizations, according to which these contain less verbal structure than their corresponding verbal bases, fails to explain the fact that sometimes external arguments of verbal forms are more restricted than those of the corresponding nominalizations (e.g. Greek passives vs. nominalizations).
- There are in fact two restrictions with respect to the external argument: *agent exclusivity* and *direct participation* and they are exhibited by various (verbal or nominal) constructions across languages

We propose a first implementation of this variation by means of the interaction between three possible types of v heads that introduce external arguments (v-EA) and a Voice head, present both in the verbal and the nominal domain, that comes higher in the structure and exhibits restrictions with respect to the v-EA it selects.

[1] Sichel (2011) suggests that this is so as agents are default direct participants.

Outline:
Section 2: the direct participation effect in English.
Section 3: an account based on event complexity (Sichel 2010/2011)
Section 4: problems for an account based on event complexity
Section 5: cross-linguistic variation with respect to the realization of external arguments
Section 6: towards an account
Section 7: conclusions

2. The direct participation effect in English derived nominals

As is well-known, English nominalizations are morpho-syntactically deficient by comparison to their verbal sources. For instance, they do not allow ECM, double objects, and particle shift (Kayne 1984, Abney 1987), that is, constructions that have been argued to require a VP shell structure (Larson 1988, Harley & Noyer 1998).

(2) a. *John's belief / believing of [Bill to be Caesar] ECM
b. John's believing [Bill to be Caesar]

(3) a. *John's gift /rental /giving (of) Mary of a Fiat *Double objects*
b. John's giving/renting Mary a fiat

(4) a. *John's persuasion / persuading of Mary [PRO to stay] *Object Control*
b. John's persuading Mary [PRO to stay]

(5) a. *John's explanation (away) of the problem (away) *Particle-Shift*
b. John's explaining (away) of the problem *(away)
c. John's explaining (away) the problem (away)

As the examples (2-5) show, the effects hold for both derived nominals and *ing-of* gerunds, but not for verbal gerunds.

- Derived nominals, but not *ing-of* gerunds, show a restriction on the realization of their external argument.

While verbal forms allow both direct and indirect participants, direct participation is required in derived nominals, see data in (6-8) from Sichel (2011). As Sichel shows, the constraint does not involve a restriction to humans. Some natural forces/causers are good (6), and some are bad (7b-c, 8b-c), while clear-cut agents are always possible (e.g. 7d-f, 8d-e):

(6) a. The hurricane destroyed all our crops
b. The hurricane's destruction of our crops
c. The destruction of our crops by the hurricane

(7) a. The approaching hurricane justified the abrupt evacuation of the inhabitants
b. #The approaching hurricane's justification of the abrupt evacuation of the inhabitants
c. #The justification of the abrupt evacuation of the inhabitants by the hurricane
d. The authorities justified the abrupt evacuation of the inhabitants
e. The authorities' justification of the abrupt evacuation of the inhabitants
f. The justification of the abrupt evacuation of the inhabitants by the authorities

(8) a. The results/the expert verified the initial diagnosis
b. #The result's verification of the initial diagnosis
c. #The verification of the initial diagnosis by the results
d. The expert's verification of the initial diagnosis
e. The verification of the initial diagnosis by the expert

Pre-nominal genitives and *by*-phrases show the same thematic restrictions. We focus here on the distribution of *by*-phrases, as the languages we discuss mostly don't permit transitive nominals for independent reasons.

- Following Sichel (2011), we call this the *direct participation effect*.

- A surprising fact: *ing-of* gerunds allow indirect participants as external arguments (9a), although they share with derived nominals other properties in terms of morpho-syntactic deficiency (see 2-5 above):

(9) a. ?the shrinking/diminishing of his salary by the inflation
b. #the shrinkage/diminishment of his salary by the inflation

3. An account based on event complexity: Sichel's (2010, 2011)

- Natural forces are compatible with derived nominals *only if they can be construed as causers that directly bring about the event*. Direct participation may be guaranteed by the relationship between the event denoted by the nominal and some property which is inherent to the entity denoted by the *by*-phrase (*teleological capability*, Folli & Harley 2007). This is the case in (6), but not in (7) and (8).
- Sichel (2010, 2011) claims that this behavior cannot follow from the general morpho-syntactic deficiency of derived nominals, as *ing-of* gerunds are equally deficient. To account for the contrast in (9a vs. 9b), she proposes the following:

1. derived nominals of accomplishments do not inherit the event structure of their source verb. While accomplishments are complex events (Grimshaw 1990), their derived nominals denote simple events, and as such require direct participation of the external argument, which must be co-temporal and in some sense co-spatial with the unfolding event.
2. *ing-of* gerunds denote complex events, and as such do not require co-temporal direct participants.

The restriction to direct participation in nominals is derived from a more general restriction to simple events. A co-temporal complex event is represented as a single, simple event.

Sichel follows Levin & Rappaport Hovav's (1999) discussion of event identification in bare XP resultatives, which are simple events in that the activity described by the verb is co-temporal with progress towards the achievement of the result and the internal argument is shared by both sub-events. In (11) the separately lexicalized activity and result state get identified by means of the rule in (10):

(10) **Conditions on event identification** (Levin & Rappaport Hovav 1999)
I. The sub-events must have the same location and are necessarily temporally dependent.

II. One sub-event must have a property that serves to measure out that subevent in time; this property is predicated of an entity that is necessarily a participant in both sub-events. This ensures temporal dependence.

(11) a. Carey ran/waltzed out of the room
b. The clothes steamed dry
c. The kettle boiled dry
d. Carey rustled out of the room

- English lexical causatives as well as NP-XP resultatives on the other hand, denote complex events, since the two sub-eventualities can be temporally distinct, as in (13).

(12) a. Casey's piano playing woke the baby
b. Terry shocked Sandy by deciding to run for office
c. The widow murdered the old man by putting poison in his soup
d. Mary danced herself sick

The contrast in (13) is to be understood in a similar manner: derived nominals pattern with bare XP resultatives in denoting simple events; *ing-of* gerunds like (13d) are complex events similarly to English lexical causatives and NP-XP resultatives in (12) (see also (14)).

(13) a. the separation of Jim and Tammy Faye by the teacher
b. #the separation of Jim and Tammy Faye by the war
c. #adultery's separation of Jim and Tammy Faye
d. ?adultery's separating of Jim and Tammy Faye

(14) a. the waking of the baby by playing the piano
b. the shocking of Sandy by deciding to run for office
c. the murdering of the old man by putting poison in his soup

Sichel concludes that the relation between the event associated with the external argument and the event denoted by the derived nominal is subject to the condition in (15):

(15) a. If a simple event includes an external argument, the participation of the argument is co-temporal with the initiation of the event.
b. Corollary: when the participation of the external argument is not co-temporal the event is a complex event.

Thus, Sichel argues, the restriction to direct participants has its source in the size of events that derived nominals allow, namely, they only permit simple events.

4. Some problems for an account in terms of event complexity

Sichel does not offer an explicit syntax-event structure mapping, and phrases her account in the framework of Rappaport Hovav & Levin (1999).

From this perspective, unlike their verbal source, derived nominals of accomplishment verbs have a simple event structure, e.g. [x ACT <*MANNER*>].

By contrast, *ing-of* gerunds maintain the complex event structure of the verb, e.g. [[x ACT] CAUSE [BECOME [y <*RES-STATE*>]]].

In syntactic accounts of event structure such as e.g. Ramchand (2008), Alexiadou, Anagnostopoulou & Schäfer (2006), and Harley (2011), cf. Borer (2005), the former have the structure of activities, i.e., lack a Result State component and simply contain a Process/v head, while the latter contain a result component, see (16a) vs. (16b):

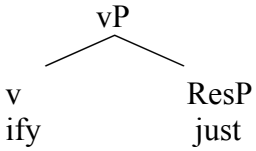
(16) a. [ProcessP/vP]
b. [ProcessP/vP [Result]]

But:

(i) The morpho-syntactic composition of English nominals does not match the semantic interpretation attributed to them in most of the cases.

Following Harley (2011), e.g. *justify* in (1) contains the verbalizing affix *-ify*. This combines with the verbal root that realizes a semi-compositional result head (17).

(17)



Similar observations hold for many of the other verbs discussed in Sichel's work: e.g. *unify*, *separate*, *verify*, (*de)stabilize*, *devastate*.

(ii) Derived nominals permit *re*-prefixation.

(18) a. the re-verification of the diagnosis
b. a re-justification of former notations

- Generalization about the distribution of *re-:* it only has a restitutive interpretation, so it attaches to accomplishments, and requires a result state, Wechsler (1990), Marantz (2009/2011).

(iii) Sichel's proposal suggests that, independently from the choice of the external argument, the event denoted by an accomplishment verb should differ substantially from the event denoted by the corresponding derived nominal.

Levin & Rappaport (1999:32): (19a) is a complex event where the two sub-events (the process and the result state) are not co-temporal: *by putting arsenic...* modifies the process sub-event contributed by *murder*. According to Sichel, the corresponding derived nominal should denote a simple event and thus disallow *by putting arsenic...* This is disconfirmed by the example in (19c) with *assassination*:

(19) a. The widow murdered the old man by putting arsenic in his coffee
b. John assassinated the president by putting arsenic in his coffee
b. The assassination of the president by putting arsenic in his coffee

5. Nominalizations, active and passive Voice across languages
5.1 The direct participation effect in nominalizations

While the morpho-syntactic restrictions on nominalizations in (2-5) and the direct participation effect found with derived nominals cannot have the same explanation, on Sichel's account both effects are linked to *the intuition that nominalizations are less verbal than the verbs they are derived from*.

One way to look at this from a structural perspective is to say (see Abney (1987), Marantz (1997), Kratzer (2003), Alexiadou, Anagnostopoulou & Schäfer (2009) and others) that

i) derived nominals contain fewer verbal projections than their base verbs,

ii) derived nominals contain less verbal projections than *ing-of* gerunds that are more similar to verbs.

An implementation of this idea is given in (20):

(20) a. $[_{ing}$ [VoiceP [vP [Root]]] *'more verbal structure'*
b. $[_{ation}$ [vP[Root]]] *'less verbal structure'*

However, it turns out that this general idea is not supported, if we look at other languages.

From the perspective just outlined, the expectation would be that if a nominalization is structurally similar to English *-ation* nominals, then it should show the effect.

Here we look at German, Greek, Romanian Spanish and French.

Summary of the cross-linguistic picture:

1. Nominalizations that have been argued to have 'less verbal structure' show the effect
2. Nominalizations that have been argued to have 'less verbal structure' do **not** show the effect
3. Nominalizations that show even a stronger effect (*agent exclusivity*) independently of the size of verbal structure that they have been argued to include

Nominalizations in Greek (21), German (22), and French (23) do **not** show the *direct participation effect*.

(21) I epivevosi tis arhikis diagnosis **apo/me ta apotelesmata tis eksetasis**
'The verification of the initial diagnosis by the results of the test'

(22) Die Bestätigung der ursprünglichen Diagnose **durch die Ergebnisse des Tests**
'The confirmation of the initial diagnosis by the results of the test'

(23) La vérification du diagnostic initial **par les résultats du test**
'The verification of the diagnosis initial by the results of the test'

One could argue that the verbal structure of the nominalizations in (21)-(23), just as in English *ing-of* gerunds, is large enough to host complex events. This holds presumably for Greek, which has only one nominalization type, but not for French and German, which have other nominalizations that are arguably 'more verbal'.

Romanian (24) and Spanish (25), on the other hand, show the *direct participation effect*.

(24) justificarea masurilor de austeritate **de catre Emil Boc**/#**ratingul scazut al SUA**
'The justification of the austerity measures by EB/#the downgraded rating of the USA'

(25) La verificación de los diagnósticos iniciales **por el experto**/#**los resultados**
'The verification of the initial diagnosis by the expert/#by the results'

Romanian: *de catre* 'by' (lit. 'by to') introduces only direct participants, like the English 'by':

(26) a. #schimbarea planurilor de weekend **de catre vremea rea**
changing plans.Gen of weekend by weather bad
b. schimbarea pozitiei pietrelor **de catre vant**
changing position.Gen stones.Gen by wind
c. #distrugerea lui Amy Winehouse **de catre alcool**
destruction of Amy Winehouse by alcohol
d. distrugerea recoltei **de catre uraganul puternic**
destruction crops by hurricane.the strong

(24) and (26) are infinitival nominalizations, whose structure contains few verbal projections, i.e. it is similar to (20b) (Iordachioaia & Soare 2009).

However, this cannot be the reason for the restriction, since supine nominalizations, which contain more verbal structure, i.e. have a structure similar to (20a) (see Cornilescu 2001, Iordachioaia 2008, Alexiadou et al. 2011), behave similarly:

(27) a. #distrusul frecvent al vedetelor **de catre alcool**
destroy.Sup.the frequent of popstars.Gen by alcohol
b. distrusul frecvent al recoltei **de catre urganele din aceasta zona**
destroy.Sup.the frequent of crops.Gen by hurricanes.the from this area

=> In Romanian the direct participation effect seems to come from the preposition *de catre* (there is no contrast parallel to the English one on derived nominals vs. *ing-of*)

In **Spanish** the situation is also different from English. While the nominalizations with less verbal structure display a *direct participation effect* (28), the infinitives, which have more verbal structure display an *agent exclusivity effect* (29) (see Picallo 1991, 1999, Alexiadou et al. 2011, Varela 2011, for a discussion of the structure of these nominalizations):

(28) a. El huracán justificó la evacuación de los habitantes
'The hurricane justified the evacuation of the inhabitants'
b. #La justificación de la evacuación de los habitantes **por** el huracán
'The justification of the evacuation of the inhabitants by the hurricane'
c. El huracán destruyó nuestros cultivos
'The hurricane destroyed our crops'

d. 'La destrucción de nuestros cultivos **por** el huracán
'The destruction of our crops by the hurricane'

(29) a. El justificar **las autoridades**/#**el huracán** la evacuación
the justify.Inf the authorities.Nom/the hurricane.Nom the.Acc evacuation

b. El destruir **los soldados**/#**el huracán** la ciudad
the destroy.Inf the soldiers.Nom/the hurricane.Nom the.Acc city

German also displays an *agent exclusivity effect*: while the nominalization in *-ung* does not restrict its external argument, the nominal infinitive does (Alexiadou et al. 2009). Again *-ung* has less verbal structure than the infinitive:

(30) a. um ein Zerstören der Stadt **durch die Soldaten** zu verhindern
in-order-to a destroy.Inf of.the city through the soldiers to prohibit

b. ?* um ein Zerstören der Stadt **durch den Sturm** zu verhindern
in-order-to a destroy.Inf of.the city through the storm to prohibit

English: An *agent exclusivity effect* has also been observed with nominalizations derived from object experiencer verbs (see Pesetsky 1995 ex. (31), (32), attributed to Chomsky 1970, Grimshaw 1990, Doron 2003, Alexiadou & Iordachioaia to appear):

(31) a. *the event's annoyance of John
b. *the event's amusement of the children
c. *the event's embarrassment of the children

(32) a. ?Mary's deliberate annoyance of John
b. ?Mary's deliberate amusement of the children
c. ?Mary's deliberate embarrassment of the censors

To summarize the discussion so far:

- Nominals sometimes but not always restrict their external argument compared to their verbal base.
- This restriction comes in two variants, either as a *direct participication effect* or as an *agent exclusivity* effect.
- The two restrictions **are in no obvious way correlated with the size** (or the number of verbal properties) of the nominalization (e.g., the Spanish verbal infinitive in (29) is almost as verbal as the active sentence in (28a, b) and it still exhibits a restriction).

5.2 Beyond nominalizations: the direct participation effect in active and passive Voice

- Importantly, the idea that a (nominal) construction is in some sense too small (to host complex events) and therefore restricts the type of external argument is challenged by the observation that we find restrictions on external arguments even in the verbal domain.

- The two effects (*direct participation* and *agent exclusivity*) are found in verbal passives but also in active clauses across languages.

The **Romanian verbal passive** shows a *direct participant effect* if the external argument is introduced by the preposition *de catre* (lit. 'by to'), but not if it is introduced by simple *de*:

(33) a. **Alcoolul** a distrus-o pe Amy Winehouse *active*
'Alcohol destroyed Amy Winehouse'
b. Amy Winehouse a fost distrusa **de**/#**de catre alcool** *passive*
'Amy Winehouse was destroyed by alcohol'

(34) a. **Uraganul** a distrus recolta *active*
'The hurricane has destroyed the crops'
b. Recolta a fost distrusa **de**/**de catre uragan** *passive*
'The crops have been destroyed by the hurricane'

This confirms that the effects in Romanian come from the preposition *de catre*. Note that *de catre* is the only preposition that can realize external arguments in nominalizations (see Iordachioaia 2008), which explains the direct participation effect in the nominal domain.

The **Spanish eventive passive** always shows a *direct participation effect*, as indicated by the following active-passive pairs:

(35) a. **El huracán** justificó la evacuación de los habitantes *active*
'The hurricane justified the evacuation of the inhabitants'
b. #la evacuación de los habitantes fue justificada **por el huracán**. *passive*
'The evacuation of the inhabitants was justified by the hurricane'

(36) a. **El huracán** destruyó nuestros cultivo *active*
'The hurricane destroyed our crops'
b. nuestros cultivos fueron destruidos **por el huracán**. *passive*
'Our crops were destroyed by the hurricane'

Since the Spanish passive uses only one preposition, the question arises whether we should relate this effect to the passive itself, or to the preposition, as we proposed for Romanian *de catre*. It seems that the former solution is correct as the same preposition can also introduce indirect participants in constructions other than the eventive passive and nominalizations. This is the case with anticausative and inchoative verbs in (37) where the *por*-phrase clearly introduces indirect participants (see AAS 2006 for further discussion).[2]

(37) a. La puerta se abrió **por** el viento.
'The door opened through/from the wind'
b. La madera se pudrió **por** la lluvia.
'The wood rotted through/from the rain'

[2] Note that in Romanian the preposition *de catre* is out in anticausatives and instead either simple *de* or the complex preposition *de la* is used to introduce causers in this context. This is compatible with the idea that *de catre* is lexically restricted to direct participants.

(i) a. Usa s-a deschis de (la)/*de catre vant.
door.the RF-has opened by (at)/by to wind
'The door opened from/*by the wind'
b. Lemnul a putrezit de ??(la)/*de catre ploaie
wood.the has rotted by (at)/by to rain
The wood rotted from/*by the rain

The Greek passive has been reported to show the *agent exclusivity effect* (AAS 2006). We exemplify this restriction on the basis of de-adjectival verbs (see AAS 2009). This class of verbs gives us a clear contrast between the passive and the anticausative pattern: the former bears non-active morphology, while the latter active morphology. Only causer PPs are licit in the anticausative, while only agent PPs are licit in the passive.[3]

(38) a. To pukamiso katharis**e** **me** to plisimo /**apo** mono tu/***apo** to Jani
the shirt cleaned.Act with the washing/by itself /by the John
b. to pukamiso katharist**ike** **apo** to Jani /***me** to plisimo
the shirt cleaned.Nact by the John /with the washing

Active clauses in some languages can show the restrictions discussed here. Craig (1976) reports what looks like an *agent exclusivity effect* for **Jacaltec**, a Mayan VSO language spoken in Guatemala. While subjects of intransitive verbs may be animate as well as inanimate, subjects of transitive verbs are restricted to animate Agents. Inanimate Causers must be introduced via a preposition combining with the anticausative variant of the verb.

(39) a. speba naj te' pulta (human Agent)
close Cl./he Cl. door
'He closed the door'
b. *speba cake te' pulta (Causer)
close wind Cl. door
'The wind closed the door'
c. xpehi te' pulta yu cake (Causer-PP)
closed Cl. door by wind
'The wind closed the door'
(lit.: the door closed by the wind)

Hebrew: A *direct participant effect* has been reported (though under a different name/characterization) for Hebrew (Doron 2003).[4] While the subject of an active clause in the

[3] Recall that the Greek nominalization is not restricted at all. As AAS (2009) observed, we find nominals of verbs that lack a verbal passive: the example in (ia) has an anticausative, but not a passive interpretation, as the licensing of PPs shows. The corresponding nominalization, surprisingly, allows both agent and causer PPs, introduced by '*apo*' (ib). If one wanted to argue that the nominalization is more restricted in English because it inherits too little verbal structure from the verb, this explanation wouldn't account for Greek.

(i) a. To dasos ka**ike** **apo** ti zesti/***apo** to Jani (*anticausative*/**passive*)
the forest burnt.Nact by the heat/*by the John
b. to kapsimo tu dasus apo ton Jani /apo ti zesti
the burning the forest.Gen by the John/from the heat

[4] Tatevosov (2012) provides data from Tatar and Russian active clauses which look like a direct participant effect. In these languages some accomplishments, which are characterized by specific morphological marking, allow only direct but not indirect participants as their subjects. Consider the following Russian verb pair.

(i) a. Zhizn' bez otca vospita-l-a Volodju siln-ym
life without father.GEN bring.up-PST-F V.ACC strong-INSTR
'The life without the father made (lit. brought up) Volodja strong'
b. ??Smert' otca vospita-l-a Volodju siln-ym
death father.GEN bring.up-PST-F V.ACC strong-INSTR
'The death of his father made (lit. brought up) Volodja strong'

simple template can be either direct or indirect participant, the subject of an active clause in the intensive template needs to be a direct participant.[5] Very often this looks like an agent exclusivity effect as in the examples below:

(40) a. **ha-menahel/macavo ha-bri'uti** patar et dani me-ha-'avoda
the director/the state of his health excused-Simpl Acc Dani from the job
b. **ha-menahel/*macavo ha-bri'uti** piter et dani me-ha-'avoda
the director/*the state of his health excused-Intns Acc Dani from the job (fired)

However, the decisive notion is not agentivity or animateness. In both sentences in (41), the subject is inanimate. The simple verb *produce* in (41a) has a reading where the protein is the trigger for antibodies being produced (an indirect participant in our terms). The intensive-template verb in (41b) can only be interpreted such that the protein actually participates in the production process itself (a direct participant).[6]

(41) a. ha-xelbon **yacar** ba-guf nogdanim
the protein produced-Simpl in the body antibodies
'The protein produced antibodies in the body.'
b. ha-xelbon **yicer** ba-guf nogdanim
the protein produced-Intns in the body antibodies
'The protein manufactured antibodies in the body.'

Conclusion:

- The *direct participation* and the *agent exclusivity effect* are not restricted to the nominal domain, but can also be found in the verbal/sentential domain. Importantly, the effects are found both in active as well as in passive clauses.

6. Towards an account

- **An account in terms of event complexity (Sichel 2010, 2011) cannot be on the right track**. In order to account for the data set in the previous section, one would have to argue that passivization in, e.g., Romanian and Spanish involves a shift in the event structure of the predicate, i.e., an accomplishment becomes a simple event.

- **An account in terms of reduced vs. full verbal structures cannot work** either, as the effect is found in both small and more clausal-like nominalizations, as well as in the verbal domain.

- The Romanian data show that **occasionally the effect is related to the preposition** used: ***de catre* is lexically restricted** in that it can only introduce direct participants. In this case, the effect will arise independently of the type of construction involved (e.g. the effect is observed both in the verbal passive, as well as in derived nominals).

- The only correlation that can be established is that **specific constructions across languages show or do not show the effect**, and this is subject to parametrization in

[5] Doron (2003) reports that the passive of the causative template shows the same restriction on its external argument as the intensive template in the active. As said, this looks to us like a direct participant effect.
[6] Note that Doron does not characterize these data in terms of direct/indirect participation, but in terms of the contrast *causer* vs. *agent of an action* where the agent of an action is not necessarily animate.

the sense that it will not be the same construction across languages that will show the effect.

- What is then the locus of the variation?

- Following most of the recent literature, we adopt the Borer-Chomsky Conjecture in (42), label due to Baker (2008):

(42) All parameters of variation are attributable to differences in the features of particular items (e.g., the functional heads) in the lexicon.

- **What are the particular functional heads that are subject to parametrization?**

6.1. Verbal decomposition

- Several functional heads are involved in the encoding of verbal meaning. The verbal predicate itself is decomposed into two layers:
  - **a v head**, which is a verbalizer head bringing about event implications, and
  - **a root**, as in (43) (see Marantz 2005, AAS 2006, Harley 2011).

(43) is the structural representation of an unaccusative/anticausative predicate, e.g. *the door opened*. The root expresses a result state.[7]

(43) $[_{vP}$ v [Root]]

- **The external argument is severed from the verbal predicate** and is introduced by a functional verbal head (*Voice* in Kratzer 1996, Marantz 1997, AAS 2006, Bruening to appear), *little v* in Hale & Keyser, 2003, Folli & Harley 2007, *Init* in Ramchand 2008, *agency* in Doron 2003, *Originator* in Borer 2005).

==> Here we call this head **v-EA** (to make the relation to the external argument explicit)
- We assume that **v-EA does not introduce a further event.**
- **It introduces a DP in its specifier** (for passives, see below)
- **It determines the thematic relation between the external argument** in its specifier **and the event** in its complement.

(44) [v-EA $[_{vP}$ v [Root]]]

- v-EA comes in three variants (cf. Doron 2003):

  i) v-EA-indirect participant
  ii) v-EA-direct participant
  iii) v-EA-agent

  The three roles are in a subset relation: i $\subset$ (ii $\subset$ iii)

- The $[_{vP}$ v [Root]]-complex semantically restricts the kind of a v-EA head it can co-occur with (AAS 2006, and Marantz 2009, Schäfer in press), as follows:

[7] In mono-eventive structures the root is a manner modifier of v.

- If the root implies intentionality (*murder*), only **v-EA-agent** is possible.

(45) John/*The storm murdered the president

- If the event denoted by the vP is mono-eventive, only **v-EA-direct participant** is possible. In (46a, b), *the wind* and *the rain* are only grammatical if we add a result state and thus obtain a bi-eventive vP. This is not necessary with John in (46c). In (46d), both *the train* and *John* are direct participants of the mono-eventive *whistle*.

(46) a. The wind rolled the ball ??(across the goal-line)
b. The rain washed the stairs ??(clean)
c. John rolled the ball/washed the stairs
d. John/The train whistled

--> The vP-complex determines which v-EA-heads can occur
--> The vP-complex determines the maximal amount of external argument types

6.2. Patterns of variation

Variation 1: Not all languages have all three versions of v-EA; Jacaltec seems to lack the least specified one (v-EA-indirect participant).

- Following Doron (2003), Alexiadou & Doron (2012), Sigurdsson (2011), Bruening (to appear), we assume that a further layer can appear on top of (44), cf. Lundquist (2011). A family of heads can realize this layer.

=> We call these heads **Voice-heads** (under the more traditional understanding of the term as diathesis)

(47) $[_{\text{VoiceP}}$ Voice-N/V $[_{\text{vEA}}$ V-EA $[_{\text{vP}}$ [Root]]]]

- Voices do not introduce the external argument (v-EA does)
- Voices do not introduce an event.
- Voices take an active v-EAP as their complements and give a diathesis alternation.
- Morphologically, Voices introduce characterizing morphology. In addition, nominal Voice also changes the category, which is not the case with verbal Voice.[8]

(48) a. Voice-Passive produces a passive
b. Voice-ation produces an *ation*-nominalization
c. Voice-ing-of produces *ing-of* gerunds

[8] Here we call both the nominal and the verbal functional head that selects for a particular v-EA 'Voice' to indicate the close selectional relation between the two heads, but in the case of nominalizations one would probably prefer to call it N (the nominalizing head) that has a selectional restriction for a v-EAP of a particular type (indirect/direct/agent participant) (see Bruening to appear).

- Syntactically, Voices often absorb the external argument (see Bruening to appear about how the passive/nominalization can technically absorb/existentially bind the external argument in Spec, vP and optionally reintroduce it in a *by*-phrase).

- In this kind of analysis we get an intuition of how nominalization is similar to passivization, as Grimshaw (1990) proposes, see also Borer (1993):[9] just like the passive, the nominalization suffix is a Voice head.
- If the nominalization allows a *by*-phrase, we have evidence that this nominalization contains the layer that introduces the external argument v-EA, as the default assumption is that the same layer that introduces the external argument in the passive should also be introducing the external argument in the nominalization.
- This is the case in all our 'small' nominalizations, which we then take to have the basic structure in (47).

Variation 2: Implementing the *direct participation/agent exclusivity* effect:

Voices can select for a specific v-EA: an illustration

1. The English passive is underspecified for the v-EA it combines with.
2. The English *ing-of* gerund is underspecified for the v-EA it combines with.
3. The English *-ation* selects for v-EA-direct participant.
4. The German *-ung*, French *-ation* and Greek *-m-/-s-* are underspecified for the v-EA they combine with.
5. The German and French passive are underspecified for the v-EA they combine with.
6. The Greek passive select for v-EA-agent.
7. Spanish *-cion* and the passive select for v-EA-direct participant.
8. Spanish and German nominalized infinitives select for v-EA-Agent.
9. In Romanian, the effect is related to the lexical status of the preposition.

NB: From what we know so far about these effects, we cannot explain why a specific Voice selects a specific v-EA.

Further Motivation: Hebrew provides clear evidence for this type of decomposition in the verbal domain:

1. Morphological evidence for the existence of different v_{EA} heads: in (49), we see once again that the simple template is underspecified for the type of external argument involved, while the intensive template is not.

(49)	a.	**ha-yeladim/ha-tiltulim ba-argaz**	šavru	et-ha-kosot
		the children/the shaking within the box	broke-Simpl	Acc the glasses
	b.	**ha-yeladim/*ha-tiltulim ba-argaz**	šibru	et-ha-kosot
		the children/*the shaking within the box	broke-Intns	Acc the glasses

[9] Obviously, this analysis does not capture all types of nominalizations in the sense that not all nominalizations are passive. Some, such as the Spanish verbal infinitive, are active (in which case nominal Voice re-classifies/restricts the external argument), some do not contain verbal layers at all, finally others lack a nominalization head, e.g. English verbal gerunds. See Alexiadou (2001), Alexiadou, Iordachioaia & Schäfer (2011), and Bruening (to appear), for discussion.

NB. Hebrew has a third template, the causative template. As this agency head is not only used to form transitive variants of anticausative predicates, but is also used to derive causatives of transitive predicates, we do not discuss it hear, see Doron (2003) for details.

2. Only the intensive template can combine with Voice- passive. As Doron (2003) states, 'the simple template lacks the passive voice', see (50) from Alexiadou & Doron (2012):

(50) [$_{R}$yšv] 'sit, inhabit'

	Agency	
VOICE	*Simple*	*Intensive*
Active	yašav 'sit, inhabit'	yišev 'settle, populate'
Passive	----------	yušav 'be settled, populated'

This is expected under an approach to Voice that is based on selection as the one put forth here.[10]

7. Conclusions and outlook

In this paper, based on cross-linguistic evidence we showed the following:

- there are in fact two restrictions with respect to external arguments: *agent exclusivity* and *direct participation* and they are exhibited by various (verbal or nominal) constructions across languages.
- an account based on event complexity that argues that nominals can only host simple events (as in Sichel 2010, 2011) makes wrong predictions;
- an account in terms of the structural deficiency of nominalizations also fails to explain the fact that sometimes verbal forms are more restricted than nominalizations (e.g. Greek passives vs. nominalizations). In terms of layers related to external arguments, our nominalizations have the same internal structure, cf. Borer (2012).[11]

- We proposed a first implementation of this variation by means of the interaction between three possible types of v-EA heads that introduce external arguments (indirect/direct/agent participant), and a Voice-V/Voice-N head that comes higher in the structure and exhibits restrictions with respect to the v-EA it selects.

Open questions:

- Some of the nominalizations discussed here have been argued to contain additional functional structure to the projections we have been concerned with: for instance, they have been argued to contain outer Aspect (Romanian supine). In the verbal passive, outer Aspect is higher than Voice. In the nominal domain, the Voice head that makes the whole structure nominal should be higher than Aspect. But then how would the selection requirements of Voice be satisfied? (Two ways out: i) say that outer Aspect

[10] Nore that, as Doron observed, 'every intransitive active intensive verb is always unergative'. See (46) above.
[11] Borer (2012) actually argues that 'both *ing-of* and *-ation* nominals in English may include a layer introducing the external argument and both may be missing it'.

is always outer Aspect, i.e. higher than Voice, ii) adopt the strategy of *Pruning*, proposed in Embick (2010), that makes intermediate nodes somehow invisible).

- What about nominalizations of unaccusatives? Do they involve root attachment (Bruening to appear)? Do they involve a different Voice head (middle, Doron 2003)?
- What about the morpho-syntactic differences in (2-5)? From the current perspective, these cannot be attributed to differences in the internal structure of nominalizations. Are they related to the absence of Tense in nominals (Alexiadou 2001)? Is it the case that some of them do not hold (e.g. ECM and Control, Bruening to appear)?
- Finally, what about the disjoint reference effect observed in the literature on verbal passive and correlated with the presence of Voice in e.g. Kratzer's work? In this system, it is independent of Voice, since all our nominalizations contain Voice. But note: only some of them show the disjoint reference effect, e.g. English *-ing-of* gerunds do, but *-ation* nominals don't. Is the effect related to the syntax of Voice, or not directly, as argued in Bruening (to appear)?

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