

# THE ROOT DERIVATION OF PSYCH NOMINALS: IMPLICATIONS FOR COMPETING OVERT AND ZERO NOMINALIZERS

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**Abstract:** This paper is concerned with nominalizations derived from psychological verbs in English. Based on particular properties in their realization of argument structure, which have long been noticed in the literature, I will argue that in a syntax-based approach to word formation such as Distributed Morphology these nominals must be derived from the psychological root alone and cannot include any event structure. This contrasts with non-psych nominals, which more readily include verb event structure. I will show that this difference lies in the different ontological status of the two kinds of roots. Furthermore, psychological verbs and their special roots allow us to conclude that there is no structural difference between derived nominals (based on Latinate suffixes such as *-al*, *-ance*, *-ation*, *-ion*, and *-ment*) and zero-derived nominals, whose suffix is covert. A clear difference, however, is posited between these nominals and those based on *-ing*.

**Keywords:** psych nominals, external arguments, zero-derived nominals, English, Distributed Morphology

## 1. Psych verbs and psych nominalizations

Psychological verbs have long made the focus of intense linguistic debate due to their apparent special properties, which make them different from other standard verb classes (see Belletti and Rizzi 1988, Pesetsky 1995, Iwata 1995, Arad 1998, 2002, Pylkkänen 2000, Reinhart 2001, Verhoeven 2008, Landau 2010, Rozwadowska 2017b, Grafmiller 2013, Rozwadowska and Willim 2016, Bondaruk et al. 2017, Hirsch 2018, among others). As Alexiadou and Iordăchioaia (2014a) put it, there are two main sources of this special behavior. First, the experiencer argument may be realized either as a subject or as an object, giving rise to Subject Experiencer (SE) and Object Experiencer (OE) verbs, as illustrated for the experiencer *John* in (1) and (2). I will call the other argument a stimulus, whether it is realized as a subject as in (1a) and (2b), a prepositional object as in (1b) or a direct object as in (2a). Interestingly, the alternation between OE and SE exemplified in (1) is not always subsumed by the causative alternation, as one may be tempted to think: Alexiadou and Iordăchioaia (2014a) argue that the psych causative alternation appears with a few verbs in Romanian and Greek, but not in English.

- (1) a. The television set worried *John*. (OE)  
b. *John* worried about the television set. (SE) (Pesetsky 1995: 18)
- (2) a. *John* loves that song. (SE)  
b. That song upset *John*. (OE)

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Second, psych verbs have been shown to often exhibit aspectual ambiguity or even new aspectual distinctions that are not found with other verbs (see van Voorst 1992, Tenny 1994, Martin 2006, Marín and McNally 2011, Rozwadowska 2012). The Romanian OE verb *a enerva* ‘to annoy’ may have both a telic and an atelic eventive reading, as shown by its compatibility with *in* and *for*-adverbials in (3a), but also a stative reading, when the stimulus is inanimate as in (3b). Incompatibility with the locative modifier and the predicate “take place” shows that (3b) cannot be eventive (see Alexiadou and Iordăchioaia 2014a).

- (3) a. Ion a enervat-o pe Maria (în parc) în/timp de cinci minute  
 John has annoyed her ACC Mary (in park) in/time of five minutes  
 (Asta a avut loc ieri.)  
 This has had place yesterday  
 Ion annoyed Maria (in the park) in/for five minutes. (This took place yesterday.)
- b. Freza lui Ion a enervat -o pe Maria (\*în parc)  
 haircut the.GEN Ion has annoyed her ACC Mary (in park)  
 timp de o oră.  
 time of one hour  
 (\*Asta a avut loc ieri.)  
 This has had place yesterday  
 John’s haircut annoyed Mary (\*in the park) for one hour. (\*This took place yesterday.)

Nominalizations derived from psych verbs have also been argued to exhibit special properties. Lakoff (1970) notices that in spite of the alternation of psych predicates (whether verbs or adjectives) between OE and SE cognates, the psych nominalization is always SE: see his examples in (4)-(6). Although *amuse*, *surprise* and *enjoy* have both SE and OE realizations in (4) and (5), their nominalizations in (6) all realize the experiencer as the higher/external argument and the stimulus as the lower/internal one. This mismatch and other related properties of psych nominals have been in the foreground of later literature such as Grimshaw (1990), Pesetsky (1995), Iwata (1995), Landau (2010), Alexiadou and Iordăchioaia (2014b), Rozwadowska (1998, 2017a), among many others.

- (4) a. *I* was amused/surprised at what he did. (SE)  
 b. What he did amused/surprised *me*. (OE)
- (5) a. *I* enjoy movies. (SE)  
 b. Movies are enjoyable *to me*. (OE)
- (6) a. *my* amusement/surprise at what he did (SE)  
 b. *my* enjoyment of movies (SE)

In this paper<sup>1</sup> I am concerned with one such property of psych nominals, namely, their restricted realization of external arguments that are not experiencers. It has been noticed in the above-mentioned literature that psych nominals derived from OE verbs only realize external arguments that are humans and can make agents. In (7), taken from Grimshaw (1990: 120), we see that the OE verbs *amuse* and *entertain* can take either a human or a non-human subject, but the nominalization allows only the former:

- (7) a. *The clown/the movie* **amused/entertained** the children.  
 b. *the clown's/\*the movie's* **amusement/entertainment** of the children

If we compare (7) with non-psych nominalizations, we see that the latter are not as restricted, since the non-human causer *the hurricane* can be realized in (8b):

- (8) a. *The enemy/the hurricane* **destroyed** the city.  
 b. *the enemy's/the hurricane's* **destruction** of the city

OE verbs in general have been called causative to the extent that their subjects – i.e. the stimulus, whether a subject matter or target of emotion (see Pesetsky 1995) – represent the cause of a mental state in the experiencer in an arguably similar fashion to that of causative verbs like *destroy* in (8a). For this reason, I will refer to the subjects of OE verbs as (agentive or non-agentive) causers for the beginning. However, upon further investigation, in section 5 I will argue against the similarity between OE verbs and non-psych causative verbs, by showing that not all uses of OE verbs are causative like non-psych causative verbs, but only the eventive ones are (see also Alexiadou and Iordăchioaia 2014a, cf. Martin and Schäfer 2014 for an overview on causation).

The first question that I will address within the background of investigating the special properties of psychological verbs/nouns – or simply psychological roots – is what exactly triggers this special behavior of psych nominalizations as in (7b). Is it the nominalization process that is responsible for it or is it the psychological root at the basis of the derivation? Given that non-psych nominals as in (8b) are not similarly restricted, we already see that it cannot be only the nominalization process, there must also be something about the psychological root. I will argue that it is a mixture of the two: on the one hand, derived nominals have themselves restricted properties and cannot nominalize just any verbal structure (see Chomsky 1970); on the other hand, psychological roots also play an important role, since they are dyadic predicates whose main argument is the experiencer and in this respect contrast with the roots of change of state verbs, which are monadic and host the patient of the complex change of state event.

I will essentially argue that the psych nominals that fail to realize non-agentive causers are derived from the root and not from verbal structure, in contrast to the ones that realize agents, which are built on agentive verb structures. The implication is that

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such nominals can realize both arguments as in (6a), but being derived from the root the realization of the two arguments must follow the configuration of the root, in which the experiencer is the higher argument, while the subject matter or target of emotion will be realized by a root-specific preposition. As Lakoff (1970) remarks, these nominalizations will have to be of the SE type.

Second, the root derivation of psych derived nominals prompts us to the question whether we find any difference between suffix-based (SNs) and zero-derived nominals (ZNs) of psych verbs. The latter have generally been argued to lack verbal properties and be root-derived (see Grimshaw 1990, Borer 2013), and the question is whether the overtness of a derivational suffix plays any role in nominalizations from psych verbs, given that many psych verbs build ZNs. I will show that psych ZNs may realize arguments of the root or agents in the same fashion that psych derived nominals (built on the Latinate suffixes *-al*, *-ance*, *-ation*, *-ion*, *-ment*) do in (6). However, both nominals differ from *ing*-nominals, which are known to require eventive bases and consequently, are only compatible with agentive readings. The implication of this comparison is that the overtness of the suffix does not play a role in how much verbal structure a nominalization can accommodate, but suffix-specific aspectual restrictions as in the case of *-ing* do.

The paper is organized as follows. In section 2 I present Pesetsky's (1995) morphological solution to the external argument restriction in (7) and show that it faces several challenges within English and across languages. In section 3 I continue with a syntactic-semantic investigation of the issue, by first looking at a comparable restriction that has been observed in non-psych nominals in terms of what Sichel (2010) called *direct participation* in the event. Following Alexiadou, Iordăchioaia et al. (2013), I will show that what non-psych nominals cannot realize as external arguments is indirect causers, which associate with a stative interpretation of the nominal. However, they may realize direct causers, which associate with an eventive reading as in (8b). This leads to the conclusion that stative nominals cannot project the external argument of the base verb. Turning back to psych nominals in section 4, I will show that the restriction in (7) is of the same type as that in non-psych nominals with the difference that psych nominals only allow agents, while on the non-agentive reading they are stative and fail to realize the external argument. In this section I address two further questions: (i) Why shouldn't stative nominals realize external arguments? Do we indeed find no stative nominals with external arguments?, and (ii) What is the status of direct causers in psych nominals? Are they available with the verbs and, if so, why aren't they available in psych nominals? In section 5, I offer an analysis of the different types of psych nominalizations and argue that the stative ones are derived from the root, while the agentive ones involve a coerced change of state root, similar to that of non-psych causative verbs. In section 6 I address the question as to whether the overtness of the nominalizing suffix plays a role in the structural complexity of psych nominalizations. I argue that zero-derived nominals are similar to derived nominals but different from *ing*-nominals, as the latter require some eventive component, which the former do not. Section 7 presents my conclusions.

## 2. A morphological approach: Pesetsky (1995)

Pesetsky (1995) builds on Lakoff's (1970) observation that OE psych verbs form SE nominalizations although he does not directly address the contrast given in (7). Pesetsky's aim is to account for the lack of causative readings in psych nominals derived from OE verbs. Thus, for a sentence like (9a), Pesetsky (1995: 9) shows that we can form the SE nominal in (9b), but not the causative one with a causer external argument in (9c):

- (9) a. The book **annoyed** Bill.  
 b. Bill's **annoyance** at the book  
 c. \*the book's **annoyance** of Bill

To explain the contrast in (9b-c), Pesetsky invokes a morphological restriction concerning zero suffixes. In his implementation of psych verbs, Pesetsky (1995: 71-85) argues that OE verbs are built on bound SE roots, which are causativized by a zero causative morpheme CAUS, as illustrated in (10) for the verbs *annoy* and *amuse*. Following the structures in (10) and the contrast in (9b-c), Pesetsky argues that nominalizations can be formed from the root alone as in (11a) but not on top of the causative morpheme as in (11b).

- (10) a. [[ $\sqrt{\text{annoy}}$  V] CAUS V]  
 b. [[ $\sqrt{\text{amuse}}$  V] CAUS V]  
 (11) a. [[ $\sqrt{\text{amuse}}$  V] ment N]  
 b. \*[[ $\sqrt{\text{amuse}}$  V] CAUS V] ment N]

What prevents the formation of the structure in (11b), according to Pesetsky, is Myers's (1984) generalization given in (12) in Pesetsky's (1995: 75) formulation (cf. Myers 1984: 62). In (11b), we have the zero morpheme CAUS which turns the SE verb root into an OE verb and this segment is licit on its own as in (10b), leading to the OE verb in (9a); however, the attachment of a further derivational suffix like the nominalizer *-ment* is ruled out by the generalization in (12). This accounts for the fact that we cannot build OE nominalizations as in (9c).

- (12) Myers's generalization:  
 Zero-derived words do not permit the affixation of further derivational morphemes.

There are several challenges to this analysis. First, Pesetsky (1995: 76) himself notes that the generalization in (12) is challenged by some exceptions. (13a, b) are his examples with the suffixes *-able* and *-er*, which attach to denominal zero-derived verbs like *accent* and *document*.

- (13) a. accentable, documentable  
 b. accenter, documenter

Similarly, the nominalizing suffix *-ing* itself may also attach to a null causativizer as in (14d), as noted by Chomsky (1970) in contrast to the suffixes of derived nominals:

- (14) a. Tomatoes **grow**. (inchoative)  
 b. John **grows** tomatoes. (causative)  
 c. the/\*John's **growth** of tomatoes (inchoative)  
 d. the/John's **growing** of tomatoes (causative)

Second, Landau (2010: 143-149) challenges Pesetsky's explanation by showing that in Hebrew, where the causativizing morpheme is overt, psych nominalizations from OE verbs still exhibit this restriction and cannot realize the causative reading, see (15). This shows that the restriction in psych nominals is independent of the covertness of the causativizing morpheme. In further support of this, Alexiadou and Iordăchioaia (2014b) show that Romanian and Greek psych nominalizations, which also involve null causativizers can realize OE psych nominals with causers introduced by special prepositions, as illustrated for Romanian in (16)<sup>2</sup>.

- (15) \***zi'azua** Rina/ha-xadašot et Gil  
 shock.CAUS.NOM Rina/the-news ACC Gil  
 'Rina's/the news' shock of Gil'  
 (16) **enervarea** Mariei *de la joc*  
 annoy.INF.the Maria.GEN of at game  
 'Mary's getting annoyed with the game'

Third, much in the spirit of the example in (16), the data in (7) show that a causative nominalization of the OE verb is possible even in English, it just requires the realization of an agent. This has already been noticed in Grimshaw (1990), who relates this restriction to the unavailability of eventive passives with OE verbs (see Belletti and Rizzi 1988) and her thesis that nominalization is similar to passivization. The analysis I will propose below is compatible with Grimshaw's, although I will not dwell on passives but focus on the behavior of nominalizations.

### 3. The restriction on external arguments in non-psych nominals

#### 3.1 Argument structure in nominalizations

In this section I will lay out the background assumptions that I will be making in my endeavor to account for the external argument restriction in psych nominalizations

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<sup>2</sup> Note that the nominalization in (16) is derived from the SE alternate of the OE verb *annoy*. As Alexiadou and Iordăchioaia (2014b), however, argue, this is a truly causative construction, since it involves a structural causer similar to that of anticausative cognates of causative verbs (see Alexiadou et al. 2015 for further details).

illustrated in (7). In her seminal work, Grimshaw (1990) argues that deverbal nominals are ambiguous between readings on which they inherit event structure and argument structure from their base verbs – what I will call here Argument Structure Nominals (ASN; see Borer 2013) – and some on which they behave like other lexical nouns, without a particular relationship to the base verb, which she calls Result Nominals. The contrast is illustrated in (17), where the ASN in (17a) has an event reading and realizes both the external and the internal argument of the verb to examine. By contrast, the result nominal in (17b) denotes an object, cannot realize the internal argument and *the instructor's* is interpreted as a possessor and not as an external argument, given the infelicity of the adjective *intentional* in this context (cf. (17a)).

- (17) a. The instructor's (intentional) examination of the papers took a long time.  
 b. The instructor's (\*intentional) examination (\*of the papers) was on the table.

The modeling of ASNs has received extended attention in the cross-linguistic generative literature after Grimshaw (1990): see Marantz (1997), Rozwadowska (1998), van Hout and Roeper (1998), Cornilescu (1999, 2001), Harley and Noyer (2000), Alexiadou (2001) and their later works or the recent contributions in Borer (2013) and Lieber (2016), among many others. Below I expose a simplified version of the basic assumptions that I will build my analysis on. I am assuming Distributed Morphology as a model of word formation, but my explanations will stay general enough as to be implementable in other syntax-based or even lexicalist frameworks.

I start with the assumption that a word is made up of a root, which contributes idiosyncratic lexical content, and some template/functional structure, which is compositional, regular and captures abstract generalizations over particular classes of words. This view is shared among proponents of a lexical decomposition approach to verb meaning (see Levin and Rappaport Hovav 1995, Alexiadou et al. 2015 and references therein) but also among specialists who work on derivation and word formation in general. To take an example, the structure of the causative verb *destroy* in (18a) involves the root  $\sqrt{\text{destroy}}$  and a complex event structure as in (18b). The event structure consists of a vP layer, which verbalizes the uncategorized root, and a VoiceP projection, which hosts the external argument. In combination with the stative root, *v* builds a causative structure (see Alexiadou et al. 2015). Importantly, following Kratzer (1996), we make a distinction between the internal argument, which is part of the verb's lexical meaning, and the external argument, which is introduced by an external projection VoiceP. The intrinsic relationship between the verb and its internal argument is expressed in (18b) by keeping the latter together with the root within a root phrase (see Harley 2014).<sup>3</sup>

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<sup>3</sup> The syntactic structures in this paper represent the lowest part of the particular construction (what Ramchand 2008 calls “first-phrase syntax”), in which the root gets categorized and placed in an event structure. Further steps in the derivation concerning the various movement operations (i.e. head movement of the root to collect the functional structure specification and A-movement of the arguments to acquire Case) will not concern us here, but I refer the reader to the various implementations of nominalizations cited above (e.g. Cornilescu 2001).

- (18) a. The enemy destroyed the city.  
 b. [<sub>voiceP</sub> *the enemy* Voice [<sub>VP</sub> *v*<sub>caus</sub> [<sub>VP</sub> [<sub>√</sub>destroy ] *the city*]]]

The corresponding ASN will be built on top of the structure in (18b) as in (19b).

- (19) a. the enemy's destruction of the city  
 b. [<sub>NP</sub> *-ion* [<sub>voiceP</sub> *the enemy* Voice [<sub>VP</sub> *v*<sub>caus</sub> [<sub>VP</sub> [<sub>√</sub>destroy ] *the city*]]]

### 3.2 External arguments in nominalizations

Non-psych nominalizations have also been reported to present restrictions in realizing external arguments (see Sichel 2010, Harley and Noyer 2000, Folli and Harley 2005, Alexiadou, Iordăchioaia et al. 2013, Alexiadou, Cano et al. 2013). Example (20) is taken from Sichel (2010) and based on Harley and Noyer (2000). While *adultery* makes a good external argument for the verb *separate* in (20b), it cannot be realized in the nominalization *separation* in (20c). By contrast, an inanimate external argument like *the hurricane* can be realized in (21b), which resembles (8):

- (20) a. *The judge* **separated** Jim and Tammy Faye Bakker.  
 b. *Adultery* **separated** Jim and Tammy Faye Bakker.  
 c. *The judge's/??adultery's* **separation** of Jim and Tammy Faye Bakker
- (21) a. *The hurricane* **destroyed** our crops.  
 b. *the hurricane's* **destruction** of our crops  
 c. *The judge/the approaching hurricane* **justified** the abrupt evacuation.  
 d. *the judge's/\*the approaching hurricane's* **justification** of the abrupt evacuation

Sichel (2010) formulates this restriction in terms of direct participation. She differentiates between direct and indirect participants in an event. Entities/causers that directly bring about the event are direct participants, while those that do not are indirect participants. Following Alexiadou, Iordăchioaia et al. (2013), which build on Wolff's (2003) distinction between unmediated and mediated causation, I employ the terms "direct" and "indirect causers". As Sichel argues, *the hurricane* in (21a) is a direct participant in the destruction of the crops, but *the adultery* in (20b) is not a direct causer of the separation. In Wolff's terms, the destruction of the crops by the hurricane is unmediated causation, while the separation of two people can only be mediated by adultery. Similarly, *the hurricane* in (21c-d) only mediates the justification of the evacuation (Alexiadou, Iordăchioaia et al. 2013). As these works argue, human participants are always perceived as direct causers.

In view of the distinction between direct and indirect causers, the verb *separate* in a sentence like (22) admits of the two readings in (22a) and (22b). The sentence in (20a) could be ambiguous as well, but given the human subject *the judge*, the agentive reading is more likely. The sentence in (20b), however, can only be interpreted as in (22b), where *adultery* is the reason of the separation. Implicitly, the nominalization in (20c) is able to realize only the direct causer/agent reading.



- (22) Bill separated Jim and Mary.  
 a. Bill was active in separating the two (agent/direct causer)  
 b. Bill was the reason that the two separated (indirect causer)

Alexiadou, Iordăchioaia et al. (2013) argue that indirect causers trigger a stative use of the verb, which is demonstrated by the infelicitous use of the progressive in such contexts. For the sentence in (22), we see that the progressive is fine in (23a), but for the one in (20b) with *adultery* it is not (see (23b)). If we take a non-human direct causer (or a natural force in Sichel's terminology), the progressive works as in (23c) and the corresponding nominalization is also OK in (23d).

- (23) a. *Bill was separating* Jim and Mary when we met them.  
 b. \**Adultery was separating* Jim and Mary when we met them. (indirect causer)  
 c. *The war was separating* many families at that time. (direct causer)  
 d. *the war's separation* of many families

From (23) we may conclude that the presence of an indirect causer correlates with a stative use of the verb and, given that such causers cannot be realized in nominalizations, we can imply that what fails to be realized in these nominalizations is the external argument of stative base verbs. In what follows, I will show that this is indeed the source of the restriction in psych nominalizations.

#### 4. External arguments and aspect in psych nominalizations

##### 4.1 Aspectual properties of psych verbs

I already mentioned in Section 1 that the aspectual ambiguity of psych verbs is one property that has drawn a lot of attention in the literature. It also seems to be a common assumption that the truly psychological meaning of such verbs comes with the stative aspectual properties (e.g. Grimshaw 1990, Arad 1998). My analysis of the external argument restriction in psych nominals will provide further support in this respect, although my claim will be limited to the particular cases I will discuss and I would not generalize from here that eventive readings cannot be truly psychological.

Iwata (1995) observes that in comparison to non-psych causative verbs, psych causation highlights the resultant state and not the causative process. First, the psych causative verbs in (24a) allow modification by *rather*, which does not work with a causative verb like *break* in (24b):

- (24) a. That *rather* **amused/entertained/depressed/amazed** them.  
 b. \*John *rather* **broke** the window.

Second, an adverb like *horribly* in (25) receives a degree interpretation (i.e. to a high degree) with the psych verb *frighten* and a manner interpretation (i.e. in a horrible way) with the non-psych verb *kill*:

- (25) a. The cavern **frightened** Mary *horribly*. (degree)  
 b. They **killed** him *horribly*. (manner)

Third, the use of the manner adverb *slowly* in (26) shows that the presence of an agent makes the causative process more prominent than the resultant state. The verb *depress* is non-agentive and thus incompatible with a manner adverb:

- (26) Peter *slowly* **frightened**/\***depressed** the girl.

Agentivity has long been related to eventivity in the literature, and failure of agentivity tests has often been used to diagnose stative aspect after Lakoff (1966). Although it is yet unclear whether there is a one-to-one correspondence between non-agentivity and stative aspect or agentivity and eventive/dynamic aspect in general, non-agentive psych verbs like *impress*, *disappoint*, *interest*, *depress*, *amaze* do behave like states. In (27), we see contrasting examples with agentive *annoy* and *humiliate* vs. non-agentive *depress* and *amaze* in employing the agentive adverb *deliberately*. *Annoy* and *humiliate* allow *deliberately* with a human subject (*the clown*) but, as expected, not with a non-human subject (*the movie*) in (27a). Even when the external argument is human (*the doctor*), verbs like *amaze* and *depress* disallow *deliberately* and qualify as non-agentive in (27b).

- (27) a. *The clown*/\**the movie* (deliberately) **amused**/**humiliated** the audience.  
 b. *The situation*/*the doctor* (\*deliberately) **amazed**/**depressed** the patients.

(28)-(29) show that the agentive verbs are eventive, while the non-agentive ones are stative: (28) illustrates the test with the progressive and (29) employs the manner adverb test with *quickly*.<sup>4</sup>

- (28) a. *John* **was annoying/humiliating** Mary.  
 b. \**The situation*/*The doctor* **was depressing/amazing** the patients.  
 (29) a. *John* **amused/humiliated** Mary *quickly*.  
 b. \**The situation*/\**The doctor* **depressed/amazed** Mary *quickly*.

#### 4.2 Aspectual properties of psych nominalizations

Nominalizations from psych verbs turn out to inherit the aspectual properties of their bases. In (30) *to be a witness to* diagnoses eventive nominals, while *to persist*

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<sup>4</sup> The use of the manner adverb in final position imposes a manner-only reading in English (see Alexiadou and Iordăchioaia 2014a).

diagnoses stative nominals (see Iordăchioaia et al. 2015 for details on these tests). Nominalizations from non-agentive verbs are incompatible with the eventive context in (30a) but felicitous with the stative one in (30b):

- (30) a. \*I *was a witness to* the **depression/amazement** of the patients. (eventive)  
 b. The **depression/amazement** of the patients *persisted* for a while. (stative)

Nominalizations derived from agentive psych verbs allow both eventive and stative readings in (31), like their verbs. However, (32) shows that when the agent *the clown* is realized, the nominalizations are disambiguated for an eventive reading; the stative use is excluded in (32b).

- (31) a. I *was a witness to* the **amusement/humiliation** of the audience. (eventive)  
 b. The **amusement/humiliation** of the audience *persisted* for a while. (stative)  
 (32) a. I *was a witness to* the **clown's amusement/humiliation of the audience**.  
 b. \***The clown's amusement/humiliation of the audience** *persisted* for a while.

This contrast confirms the conclusion we drew from the behavior of non-psych nominals in section 3, namely, that what nominalizations fail to realize is the external argument of stative verbs. The expectation is that nominalizations from non-agentive psych verbs, which are always stative (see (30)), should fail to realize any external arguments and this is indeed confirmed by (33), where both the human and the non-human external argument fail to be realized (cf. (27b)):

- (33) \**the situation's*/\**the doctor's* **amazement/depression** of the patients

Two further questions arise within this background. First, what happens with direct (non-agentive) causers of the type in (21b) and (23c) in psych nominals? Do we find direct causers with psych verbs and their nominals? Second, why should stative psych nominals not realize external arguments? Does this happen with all stative nominals? I will discuss these in the next two sections.

### 4.3 Direct causers in psych verbs and nominals

We saw in section 3.2 that direct causers (just like agents) correlate with eventivity. In section 4.2 just above, we saw that typical non-agentive psych verbs are stative. But may psych verbs receive eventive readings with non-agentive (direct) causers? Alexiadou and Iordăchioaia (2014a) offer some examples for English, cited in (34), where the sentence final manner adverb *quickly* confirms the eventive use of these verbs.

- (34) a. The situation **humiliated** Mary *quickly*.  
 b. The dinner **satisfied** Bill *quickly*.

(34) shows that psych verbs may also realize non-agentive causers on eventive readings and yet, in (35) we see that these cannot be hosted by psych nominalizations, which contrasts with the facts concerning non-psych nominals in (21b) and (23c). This indicates that indeed there is something about psych derived nominals (by contrast to non-psych nominals) that prevents them from realizing such causers. In section 5, I will argue that this difference is due to the nature of the psych roots.

- (35) a. *\*the situation's* **humiliation** of Mary  
 b. *\*the dinner's* **satisfaction** of Bill

#### 4.4 External arguments with stative (non-psych) nominals

We concluded above that the stative readings of psych and non-psych nominals fail to realize non-agentive (indirect) causers, which led to the question whether all stative nominals block external arguments. A search in the English TenTen15 corpus reveals several cases of nominalizations from stative verbs that realize external and internal arguments, some of which I illustrate in (36b-g), besides some well-known ones as in (36a). Human external arguments cannot make agents, given that these nominalizations are unambiguously stative.

- (36) a. *John's* **knowledge** of all the answers  
 b. An additional innovative component is the *project's* **inclusion** of economic support and technical assistance  
 c. *Pakistan's* **possession** of nuclear warheads is not a secret  
 d. The Ballon Bleu is so named for *its* **resemblance** of a balloon  
 e. to celebrate *the young woman's* **resistance** of male power  
 f. *Jesus'* **resistance** of the Accuser's temptations  
 g. *France's* **resistance** of the Germans

#### 5. The make-up of psych nominals and their argument structure

If stative nominals are not banned from realizing external arguments, why are these banned in psych nominalizations and the non-psych nominals in (20c) and (21d)? First, external arguments are *not* always banned in psych nominals – they are just not causers but experiencers. This is what Lakoff (1970) and Pesetsky (1995) observed: psych nominals do realize both arguments, it is just that the experiencer is their highest argument. (37) presents examples of psych verbs comparable to the stative nominals in (36) (see also (6)).

- (37) a. *the children's* **amusement** at the movie  
 b. *the people's* **amazement** at his teachings

- c. *a woman's* chronic **depression** from her father's early death
- d. *my husband's* **depression** over losing a good friend
- e. *the artist's* **fascination** with geometry

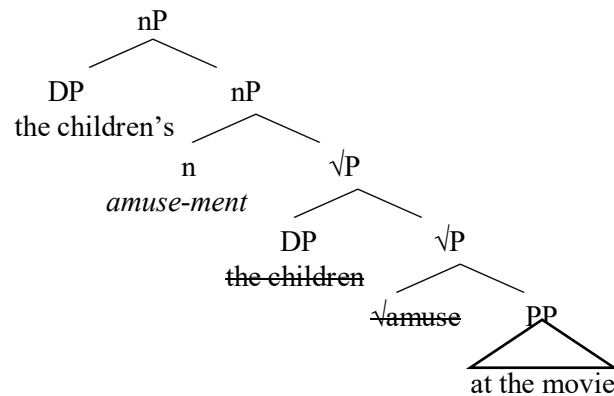
As Kratzer (1996) and Alexiadou (2011) argue, the external argument of a stative verb is the holder of that state. The holder of the state is realized in (36) with non-psych nominals and in (37) with psych nominals. In neither case, is this, however, a causer. The argument that can be realized as a causer in psych verbs is the target of emotion/subject matter, which in (37) is introduced by a root-specific preposition: *at, from, over, with*. Some non-psych verbs also employ such specific prepositions: cf. *his resistance to temptation*.

### 5.1 The structure of stative psych nominals

In view of these facts, I propose that stative psych nominals are derived from the SE root of the verb and not from the apparent causative stative OE verb. The reason that they realize two arguments is that psych roots are dyadic predicates, i.e. they (can) introduce two arguments. As Pesetsky (1995) argues, one is directly introduced by the root – the holder of the state (i.e. the experiencer) – and receives a structural realization as a possessive in the derived nominal, the other is hosted by a specific PP as illustrated in (37). The structural representation of such a nominal is as in (38).

(38) follows basic assumptions of word formation from Distributed Morphology (DM) along the lines in Marantz (1997), Harley and Noyer (1998), Alexiadou (2001) and many more recent works. Besides the foundational idea that roots need to be categorized by little n/v/a heads to form words and that they undergo head-movement to these heads (and possibly further functional heads), there is nothing special in my account that relies on DM. These structures could easily be implemented also in Borer's (2013) Exo-Skeletal Model or other such syntactic accounts to word formation. It could be argued that genitive case for *the children's* is assigned at a higher level, i.e. Spec, DP of the full nominalization or some Spec, AgrP (see e.g. Cornilescu 1999, 2001), but I will not dwell on this issue, since it is not specific to the nominalizations discussed here but applies to all derived nominals and whatever analysis is chosen does not conflict with my account.

- (38) a. the children's amusement at the movie  
 b.



The psych root phrase  $\sqrt{P}$  is categorized by the suffix *-ment* as a derived nominal in (38). It could, however, be categorized by an adjectivizer to form an adjectival construction – see *The children are amused at the movie* – or it could be verbalized by a v stative head (see Arad 1998), as in (39b). In this configuration, the holder of the state (i.e. the experiencer) *the children* stays in the root phrase and the subject matter is promoted as an apparent external argument of the stative verb.

- (39) a. The movie amused the children.  
 b. [<sub>v-stateP</sub> *the movie* [<sub>v-stateP</sub> v-state [ $\sqrt{P}$  *the children* [ $\sqrt{\text{amuse}}$  ]]]]  
 (revised in (41))

The stative verb structure in (39b) is quite similar to the one assumed for causative constructions, for instance, in Alexiadou et al. (2015). For a causative construction like in (21a), we would have a structure as in (40b).

- (40) a. The hurricane destroyed our crops.  
 b. [<sub>v-eventP</sub> *the hurricane* [<sub>v-eventP</sub> v-event [ $\sqrt{P}$  *our crops* [ $\sqrt{\text{destroy}}$  ]]]]

The only apparent difference between (39b) and (40b) is that the verbalizer is stative in (39) and eventive in (40). I argue, however, that a further difference exists between the two structures with respect to the root. Namely, while the root in (39) is dyadic, the same as in (38), the root in (40b) is monadic. As a root that requires external causation (see Levin and Rappaport Hovav 1995),  $\sqrt{\text{destroy}}$  requires a bi-eventive verbal template with (at least) a causative sub-event (v-eventP in (40b)), which introduces the external causer *the hurricane*. The argument of the root, i.e. the holder of the state, becomes the holder of a state resulting from the causative event and will be interpreted as a patient in the bi-eventive structure in (40b) (see Alexiadou et al. 2015).

The psych root in (39b) is of a different nature, however: it is a dyadic predicate, a state that takes two arguments as in (38b). Consequently, the argument *the movie* is not a proper external argument introduced by a verbal sub-event, it comes already with the root, which can realize it syntactically via a PP as in (38). The root does not need the template of a stative verb to introduce this argument. This means that v-stative solely functions as a categorizer, it has no eventive structure of its own and contributes no argument. The complete structure for (39a) is given in (41), where the argument of the root hosted by a preposition in (38) is promoted to Spec, v-stativeP without any sub-event being added. v-state inherits the stative aspect of the root under the morphological shape of a verb.

- (41) [<sub>v-stateP</sub> *the movie* [<sub>v-stateP</sub> v-state [ $\sqrt{P}$  *the children* [ $\sqrt{\text{amuse}}$  [<sub>pp</sub> ~~*the movie*~~ ]]]]]]

The structure in (41) cannot be nominalized as such (cf. (7b)); nominalization only applies to the root, as in (38). I propose that the reason the nominalization cannot be derived from (41) is that there is no meaning component in (41) extra to the meaning of the root and for reasons of economy, the nominalization will not host non-meaningful

structure. The role of v-state is to categorize a root, but since *-ment* can nominalize the root itself, it need not nominalize a semantically vacuous v-stative.

## 5.2 The structure of agentive psych nominals

An agentive causative construction as in (42a) receives the same structure as in (40b) with an additional VoiceP layer, which hosts the agent external argument (see Alexiadou et al. 2015 for reasons to distinguish non-agentive causers as introduced by v-eventP and agents by VoiceP; cf. also Alexiadou and Iordăchioaia 2014a for non-agentive causers). Like in (40), the monadic root in such constructions needs a template with external causation. This is provided by [VoiceP + v-eventiveP], which also introduces the agent.

- (42) a. The enemy destroyed the city.  
 b. [<sub>VoiceP</sub> *the enemy* [<sub>VoiceP</sub> Voice [<sub>v-eventP</sub> v-event [<sub>√P</sub> *our crops* [<sub>√</sub>destroy ]]]]]

The question is how do we model agentive psych verbs and their nominalizations? It has often been argued that agentive readings are not typical for psych verbs, or that they do not represent psych readings of these verbs (see Iwata 1995, Arad 1998, Landau 2010, Grafmiller 2013). Following this intuition, I propose that agentive readings of psych verbs involve a coerced root of the type we find in (non-psych) causative verbs. That is, a dyadic root as in (38) is coerced into a monadic root, whose sole argument is the experiencer (the holder of the state) and is realized as the argument of the result state following an agentive causative event. For (43a), we obtain the structure in (43b), which is parallel to (42b).<sup>5</sup> Nominalizations can be derived from both the psych and the non-psych structures. (43d) presents the psych nominalization:

- (43) a. The clown amused the children.  
 b. [<sub>VoiceP</sub> *the clown* [<sub>VoiceP</sub> Voice [<sub>v-eventP</sub> v-event [<sub>√P</sub> *the children* [<sub>√</sub>amuse ]]]]]  
 c. the clown's amusement of the children  
 d. [<sub>nP</sub> *the clown's* [<sub>nP</sub> *-ment* [<sub>VoiceP</sub> ~~the clown~~ [<sub>VoiceP</sub> Voice [<sub>v-eventP</sub> v-event [<sub>√P</sub> *the children* [<sub>√</sub>amuse ]]]]]]]]

## 5.3 The realization of direct causers

The next question is how to model the realization of direct non-agentive causers as in (21b), (23d) and their failure to be hosted in psych nominals (see (35)). The first part is straightforward: the suffix *-ion* nominalizes the structure in (40b) to derive (21b), repeated below in (44a).

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<sup>5</sup> This root coercion analysis resonates well with Grafmiller's (2013) argument that agentive readings are inferences that arise from the integration of several semantic, syntactic and, especially, contextual information in a clause.

- (44) a. the hurricane's destruction of our crops  
 b. [nP *the hurricane's* [nP *-ion* [<sub>v-eventP</sub> *the hurricane* [<sub>v-eventP</sub> v-event [<sub>VP</sub> *our crops* [<sub>√destroy</sub> ]]]]]]]

The challenge is that psych nominals do not realize such external arguments: while *humiliate* and *satisfy* realize direct causers on eventive readings in (34), *humiliation* and *satisfaction* in (35) do not. I believe that the source of this behavior is again the type of the root. Both nominalizations can realize both their arguments with a PP: see examples in (45) from the English TenTen15 corpus, providing evidence for a root derivation as in (38b):

- (45) a. he confessed *his humiliation at having been unfaithful* to his wife  
 b. *his humiliation at being turned down* was intensified when ...  
 c. I expressed *my satisfaction with the appointment*  
 d. I can't begin to share *my utter satisfaction with this club*.

For the eventive reading to obtain, however, the dyadic root must undergo coercion into a monadic root involving external causation and it seems that a non-agentive context is not enough for this coercion to happen. For non-psych nominalizations, it is possible to accommodate an eventive structure as in (40b), because these structures involve monadic roots that require external causation and a corresponding verbal template. But psych roots do not require such templates. They may appear in such templates but do not need them. When they do, they would form similar structures to the stative one in (41) with a v-eventP instead of a v-stateP. This vP would contribute a meaning component but given that it does not introduce an argument, the root will be nominalized on its own with the two arguments as in (45).

## 6. Overt and zero nominalizing suffixes

A last point I would like to address here is whether the overtness of the nominalizing suffix makes any difference for the derivation of psych nominals. Since Grimshaw (1990), zero-derived nominals (ZNs) have been considered not to be able to project argument structure, which indicates that they cannot inherit event structure from their base verbs (see (46a)).<sup>6</sup> This contrasts with derived nominals with overt suffixes, which are taken to be ambiguous between the result nominal readings without event/argument structure in (17b) and the ASN-readings with event and argument structure in (17a), repeated here as (46b).

- (46) a. the **break** in the glass/\**John's break of the glass*  
 b. *The instructor's* (intentional) **examination of the papers** took a long time. (ASN)

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<sup>6</sup> Some exceptions have long been noted in the literature and also recognized in Borer (2013), (e.g. *murder*, *(mis)use*, *release*, *(ex)change*), but they will not concern us here.



Psych nominals represent an interesting testing ground for the distinction between ZNs and SNs, since we saw above that psych derived nominals with overt suffixes are built on roots and do not include verbal structure, as testified by their failure to realize direct causers in (35). For SNs, however, we need to distinguish between *derived nominals*, based on Romance suffixes (*-ion, -ation, -ment, -al, -ance*) and *ing-nominals*, which are more prompt to inheriting event structure (see Grimshaw 1990, Borer 2013; cf. Chomsky 1970). As we will see, the distinction between *-ing* and the other nominals is motivated from the perspective of psych verbs, but that between ZNs and derived nominals is not.

### 6.1 Psych zero-derived nominals

ZNs are particularly frequent in the domain of psych verbs: both SE and OE verbs form them (e.g. SE *love, hate, dread, mourn, grudge, regret, like, dislike* and OE *worry, daze, surprise, anger, concern, baffle, insult, hurt, trouble, torment*). Some of them like *love* date back to Old English and we cannot tell if they are derived from the verb or the verb is derived from them. However, given the many others that are historically attested much later than the verbs, it seems reasonable to assume that there is a coherent class of psych ZNs.<sup>7</sup>

A corpus search of SE and OE psych ZNs reveals that they behave similarly to what we saw above for derived nominals: they may realize both the experiencer and the stimulus, but the experiencer is the higher argument, i.e. they look like SE nouns (see (47); cf. (37)). Like the psych derived nominals in (37), the ZNs in (47) realize the experiencer as a possessor and the stimulus as a PP. This shows that ZNs behave similarly to derived nominals, which is well accounted for by a root-derivation of both.

- (47) a. *Peggy's love for our community*  
 b. *women's dread of childbirth*  
 c. *the Chinese government's dislike of widespread VPN usage*  
 d. *the girl's anger at her own family*  
 e. *the opposition's concern over the very low Hungarian birthrate*  
 f. *Mary's surprise at the news*  
 g. *the main character's torment over losing her standing in the LDS church*  
 h. *the Conservative party's trouble in keeping the woman voter happy*

The question that arises is whether we can form agentive psych ZNs from agentive OE verbs in a similar fashion to derived nominals. While the latter cannot realize non-agentive causers of OE verbs (as in (35)), they allow agents, as in (7b) and (43). At first

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<sup>7</sup> Arad (1998) analyzes OE verbs as syntactically derived from corresponding nouns (e.g. *frighten* < *fright*), but there are clear cases of OE deverbal ZNs such as *anger, concern, baffle*, which are registered as such by the Oxford English Dictionary and are also attested much later than the verbs. It is reasonable to consider that those borrowed together with the verbs from Old French (e.g. *insult, torment, trouble*) followed a similar pattern. Importantly, however, under the account I pursue here that all these ZNs are root-derived, it does not even matter what the direction of the derivation was, since the account involves no directionality.

sight, this looks like a real difference between derived nominals and ZNs, since the examples in (48) show that the latter do not realize agents.

- (48) a. Sam *intentionally* **angered/surprised/bothered** his colleague  
 b. \*Sam's (*intentional*) **anger/surprise/bother** of his colleague

Such a difference may also throw doubt on my analysis of psych derived nominals as root derived. Given the alleged difference between derived nominals and ZNs in accommodating verbal event structure, the contrast above may be taken as additional evidence. However, there are two reasons for which this reasoning cannot hold. First, some ZNs do realize agents, as shown for *insult* and *torment* with corpus examples:

- (49) a. The first question was on *Donald Trump's insult of Rosie O'Donnell*  
 b. *our insult of other religions* and persecution of religious minorities  
 c. After Emma was taken to the asylum when Adri was ten, *her father's torment of his son Christian* increased  
 d. Dwight, also is particularly harsh, if hilarious, in *his* ongoing **torment of Andy Bernard**, who actually hasn't done anything to deserve it  
 e. Very often, Christians sought to justify *their torment of the Jews* by saying that the Jews deserved it.

Second, psych derived nominals do not straightforwardly realize the agent of their base OE verb. For instance, *annoyance* fails to do so in (50b, c), although *annoy* is a typical psych verb that allows agentive readings (see (50a); see Grafmiller (2013), Alexiadou et al. (2019)). *Annoyance* can realize both the experiencer and the stimulus in (50d) like the other psych nouns in (37) and (47), on a root derivation (see also Pesetsky 1995: 72).

- (50) a. John intentionally **annoyed** the girl.  
 b. \**John's annoyance* of the girl  
 c. \**Our constant annoyance of Mary* got on our nerves. (Pesetsky 1995: 74)  
 d. *the residents' annoyance at the kids/with noise*

The fact that for both derived nominals and ZNs we find some psych verbs for which the nominalization realizes the agent and some others for which it does not indicates that the contrast cannot be structural, i.e. in terms of how much event structure is inherited from the base verb. This rather looks like the effect of idiosyncratic properties of the involved roots. In terms of my analysis of psych derived nominals in Section 5 the difference between e.g. *amusement* and *annoyance*, or *torment* and *anger* lies in the propensity of the root to be coerced from a dyadic state into a monadic state, the latter of which can form the result state of a complex change of state event. *Amuse* and *torment* can undergo this coercion in the context of a nominal, but *annoy* and *anger* cannot.

## 6.2 Psych *ing*-nominals

A last piece of confirmation that derived nominals and ZNs formed from psych verbs are similar in being nominalizations of roots comes from a comparison with *ing*-nominals built on the same verbs. *Ing*-nominals have long been known to be sensitive to the aspectual properties of their base. Asher (1993), Borer (2013) show that they cannot be derived from stative verbs: see (51):

- (51) a. \*Guy's **knowing** of all the answers  
b. \*the stain's **resisting** to cleaning

Borer (2013) relates *-ing* to progressive *-ing* in its restriction to eventive bases. Iordăchioaia and Werner (2018) further show that *ing* cannot denote result states of change of state events either and are mostly incompatible with psych verbs, whether agentive or non-agentive: see (52), cf. section 4.

- (52) a. \*the **depressing/amazing/humiliating/amusing** of the patients  
b. the **depression/amazement/humiliation/amusement** of the patients

Interestingly, however, such *ing*-nominals become felicitous once we enforce agentivity on them with an external argument, as in (53a). Moreover, *angering* and *annoying* are also felicitous with an agent and not perfect but sensibly better than the corresponding derived or zero nominals in allowing non-agentive causers: see (53b, c).

- (53) a. the clown's **amusing/humiliating** of the audience  
b. Sam's/?the article's **angering** of Bill  
c. John's/?the noise's **annoying** of the girl

These facts receive a straightforward explanation if, following previous literature (e.g. Grimshaw 1990, Borer 2013, Iordăchioaia and Werner 2018), we assume that *-ing* requires an eventive template. The presence of an agent in a VoiceP, as in (42)-(43), forces the coercion of the dyadic psych root into a monadic root, which is further mapped onto a result state of the complex change of state event. In this case, we obtain an externally caused change of state reading of the psych verb and we can build an *ing*-nominal from this base. By contrast to *-ing*, derived nominals and ZNs do not impose such templatic restrictions on the base, so they are more flexible and end up more faithful to the meaning of the base, which explains why the root derivation is fine. Moreover, unlike *-ing*, Latinate suffixes and zero are not incompatible with ontological states and nothing can prevent them from forming such nominalizations (cf. *-ing* in (51)-(52)).

## 7. Conclusions

In this paper I have argued that the restrictions that psych nominalizations present in realizing the external arguments of their corresponding verbs, as shown in (7), indicate

that they are derived from the psych root of these verbs and not from the verb's templatic structure. That is, "true" psych nominals do not include any event structure.

This analysis has been built on two grounds: (i) a comparison of psych nominals with non-psych nominals derived from causative verbs, which display a similar but not identical restriction; and (ii) an investigation of the aspectual properties of psych nominals in comparison to their base verbs.

I have argued that the difference from causative non-psych nominals can only be accounted for if we accept an ontological difference between psych roots and the roots of causative change of state verbs, to the extent that psych roots are dyadic state predicates, while the roots of change of state verbs are monadic. The former roots take two arguments – the experiencer and the stimulus (subject matter/target of emotion), while the latter take only one argument – the holder of the state, which is eventually encoded as the patient of the change of state complex event. Consequently, psych roots are not dependent on a particular type of verbal template/event structure. They may be categorized by a *v* head, leading to a stative verb, or an *a* head leading to an adjective. These categorizers contribute nothing to the lexical meaning of the root. Change of state roots, however, require a change of state verb template, they must be part of a complex event structure, in which they deliver the result state. When change of state roots are nominalized, the verbal event structure will be readily inherited by the nominalization, since it is intrinsic part of the meaning of the verb. For psych verbs, the categorizing *vP* has no meaning contribution and will not be visible in the nominalization, leading to stative nominals built from the root. The two arguments of the root may be realized, but they follow the hierarchy of the root predicate, in which the experiencer is the holder of the emotion and the stimulus is realized as a *PP*.

To account for the occasional agent readings of psych nominals, I have argued that the dyadic psych roots may sometimes be coerced into monadic change of state roots, in which case, they will behave just like the change of state non-psych roots. However, coercion usually requires strong contextual conditions and for psych verbs it can only be triggered by agentive contexts, because the agent, hosted by *VoiceP*, enforces an eventive *vP* subevent, which, in its turn, maps the psych root onto a result state. The original experiencer argument of the psych root (i.e. its holder of the state) is now mapped onto a patient in a change of state event.

This analysis is compatible with Grimshaw's (1990), according to which nominalization is a process of suppression of external arguments and psych verbs lack such arguments on their basic non-agentive reading, making it impossible to nominalize them on their causative meaning. That is, only agents make real external arguments with psych verbs and only these will be able to appear in psych nominals. The non-agentive verbs will give rise to result state nominals. The point where my analysis differs from Grimshaw's is that I argue for an ontological difference between the roots at the basis of agentive and non-agentive readings. This way I can account for why not all psych nominals project agents (cf. *annoyance* in (50)) and the fact that all these nominals may realize both the experiencer and the stimulus, as predicted by the root. This ontological difference between the two types of roots also accounts for the fact that psych nominals that realize two arguments stay stative, while causative non-psych nominals realizing two arguments are eventive (see *the hurricane's destruction of the crops* vs. *the children's*

*amusement at the movie*). For this reason, I argue that psych nominals are not nominalizations of result states of change of state events, but nominalizations of dyadic roots (cf. Iordăchioaia et al. 2015, Melloni 2017).

Furthermore, I have argued that in the domain of psych nominals, there is no structural difference between derived nominals built on the Latinate suffixes and zero-derived nominals. I have shown that they display similar degrees of restrictions and flexibility in accommodating the readings of their base psych verbs, which heavily contrast with the properties of *-ing* nominals, known to require an eventive template to attach to. Psych verbs represent the ideal grounds to test the different nominalizing mechanisms, given the special status of their roots. I have shown that *-ing* is only compatible with readings in which the original psych root is coerced into a change of state root that requires an event template. The basic psych root requires no such template and pure stative readings, which involve no change of state, are not possible with *ing*-nominals. The implication of this comparison between the nominalizing suffixes is that the overtness of the suffix does not play a role in how much verbal structure a nominalization can accommodate, but suffix-specific aspectual restrictions as in the case of *-ing* do. Of course, this claim will have to be further tested in the semantic domain of other verb roots and deverbal nominals.

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