



# Corpus Based Lexical Semantic Analysis of minimal pairs of deverbal adjectives with Spanish *-dor/-nte* suffix

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## Abstract

This paper shows the semantic differences and similarities between Spanish active deverbal adjectives with the *-dor* and *-nte* suffixes. Minimal pairs of derivatives with the suffixes will be quantitatively analyzed, as the patterns of modification are the center of the interest. This study concludes that the derivatives' modification patterns are parallel with the denotation patterns of nominal derivatives with the same suffixes.

## 1 Introduction

This paper aims to show semantic differences and similarities between Spanish active deverbal adjectives with the *-dor* and *-nte* suffixes. More specifically, I will quantitatively analyze minimal pairs of the deverbal adjectives for each suffix with the same base verb such as *estimulador/estimulante* (for the verb *estimular* 'to stimulate') and describe the typical modification patterns. Based on these analyses and descriptions, I will explain the semantic differences and similarities between two types of adjectives with similar functions.

Before starting the discussion, I will briefly explain the two suffixes in question. Both suffixes are attached to verbs forming adjectives and nouns: *Fumar* 'to smoke' > *fumador*, *calmar* 'to calm' > *calmante*. The second resemblance is that they are syntactic-semantically active. They are called "active" because they modify nouns that represent entities corresponding to the subject of base verbs or denote such subjective entities. They therefore do not only denote or modify AGENT but also entities that can correspond to the subject of base verbs, like INSTRUMENT, CAUSE, EXPERIENCER and so on. For these reasons, the deverbal adjectives in question are replaceable with relative pronoun constructions *que V* 'that V,' as in the examples below.

- (1) *El jefe fumador* > *El jefe que fuma* 'the boss that smokes'
- (2) *El fármaco calmante de dolor* > *El fármaco que calma dolor* 'the medicine that calms pain'

For these reasons, they are considered as active and similar. However, their characteristics and functions are not completely identical. For example, there are verbs that each suffix cannot attach to: *matador*/*\*matante* (with the verb *matar* ‘to kill’) and *\*sobrevividor*/*sobreviviente* (with the verb *sobrevivir* ‘to survive’). Curiously, there are minimal pairs of deverbal adjectives with both suffixes whose base verbs are identical, like *picador* and *picante* (with the verb *picar* ‘to sting’). However, the two adjectives’ use is not always the same. For example, *picador* usually modifies nouns representing instruments such as drills, blades, and knives (*martillo/cuchilla picador(a)* ‘hammer/blade that stings’), while *picante* is used to modify materials like chili (*ají/pimentón picante* ‘pepper/paprika that is hot’). In these contexts, the two deverbal adjectives are not substitutable: *\*matrillo picante* and *\*ají picador*. This is why the two suffixes are considered to be similar, but not same.

The two suffixes are still productive and the difference between them has been discussed in several antecedent works. However, it seems that this question is not completely addressed, especially because there are very few works focusing on the semantic difference between the two deverbal adjective types. A main reason for this may be the lack of adequate resource for analyzing the modification or the collocation patterns of deverbal adjectives. The two suffixes also form deverbal nouns and in many cases, such nouns have been chosen mainly as the object of the analysis to consider the semantic difference between the two suffixes. There can be various explanations but the principle one is how deverbal nouns analyses are methodologically simpler. There are dictionaries containing deverbal nouns’ meanings, which make objective semantic analyses possible. On the contrary, as for the semantic difference between adjectives, it has been considered that the semantic difference should appear as the different patterns of modification or differences of semantic types of modified nouns. In other words, it is assumed that through analyzing the modification patterns of the derivatives for both suffixes, the semantic difference between them could be explained. However, such study has yet to be completed. One explanation for this could be how there was no objective resource to examine the modification patterns. For example, dictionaries do not contain information on the typical modification patterns of deverbal adjectives. The lack of an objective methodology made it difficult to describe the typical collocation patterns of each deverbal adjective with the suffixes in question. Laca (1993) and Cano (2013) proposed the typical modification patterns but their analysis were based on intuition and introspection; empirical examination is therefore necessary.

To solve this problem, I will analyze the two adjective types using a corpus and then differentiate them through empirical arguments. For the analysis, I will use the *esTenTen* corpus. The object of analysis is minimal pairs of deverbal adjectives like *picador*/*picante*. I will mainly focus on the modification patterns and the noun types the deverbal adjectives modify. The hypothesis is that each adjective will show different modification patterns, which is attributed to the variation in the two suffixes’ semantic nature.

## 1.1 Hypothesis and antecedent works

This study describes the different modification patterns of the two deverbal adjective types. I will explain the noun types each deverbal adjective can and cannot modify. The discussions will help address the hypothesis that each adjective’s modification pattern parallels the denotation distribution of the suffix’s deverbal nouns.

For example, there is a minimal pair of deverbal adjectives *secador*/*secante* (both adjectives are from *secar* ‘to dry’) and the noun *máquina* ‘machine’ (abstractly labeled as INSTRUMENT) can only be modified by *secador* ‘that dries’: *máquina secadora* ‘drying machine’, *\*máquina secante*. Both adjectives can be used as nouns, but only the *secador* denotes machines or INSTRUMENT and *secante* cannot. The noun *secante*, only represents materials, or CAUSE: *un secador* ‘a dryer, a drying machine’ and *un secante* ‘blotting paper.’ The entities corresponding to INSTRUMENT can only be denoted and modified by *-dor* derivatives and *-nte* derivatives rarely do so. This is the parallelism that I try to defend.

This assumption is not particularly novel. For example, Laca (1993), one of the most influential studies on the semantic difference between the two suffixes implicates this parallelism.

As discussed, there are several antecedent works on the semantic difference between deverbal nouns with the two suffixes (Beniers (1992), Laca (1993), Rifón (1997), Cano (2013), Tsutahara (2014), etc.).

In Tsutahara (2014) all the deverbal nouns with two suffixes attested more than once after 20th century in the *Corpus del español* corpus were analyzed and classified with denotations of deverbal nouns in the following 6 classes:

- CAUSATIVE AGENT: Agents who cause change to objects
- INSTRUMENT: Artifacts used by agents that causes change to objects
- NON-CAUSATIVE AGENT: Agents who do not cause change to objects
- CAUSE: Entities that cause change to objects without control of the action
- NON-AGENT: Animate entities in some state
- PATIENTIVE: Entities corresponding to the subjects of unaccusative verbs

According to Tsutahara (2014), the two types of deverbal nouns are in different distributions. The analysis in Tsutahara (2014) can be summed up in Table 1.

semantic role	dor	nte	
CAUSATIVE AGENT	***		***: typically denotes
INSTRUMENT	***		
NON-CAUSATIVE AGENT	**	**	** : can denote
CAUSE	**	***	*: rarely denotes
NON-AGENT	*	**	
PATIENTIVE		**	no mark: hardly denotes

Table 1. Distribution of deverbal nouns with *-dor* & *-nte*

As apparent above, the typical denotation of each derivative is different. The *-dor* nouns typically represent CAUSATIVE AGENT & INSTRUMENT (*transformador* ‘transformer’) and *-nte* nouns rarely represent such entities. This can be considered as one of the principal semantic differences between the two suffixes.

On the contrary, non-agentive entities (e.g., NON-AGENT and PATIENTIVE) are denoted almost exclusively by nouns with *-nte* (e.g., *restante* ‘what is left’). This distribution also differentiates the two suffixes.

Table 1 shows both the difference and similarities between the two types of nominal derivatives. According to the table, both types can denote entities corresponding to NON-CAUSATIVE AGENT, CAUSE, and NON-AGENT (although *-nte* deverbals seem to be vinctulated more strongly with the latter two types).

This study’s preliminary assumption is that the distribution of the two deverbal nouns’ denotations and the modification patterns of the deverbal adjectives with the same suffixes are identical. From the description in Tsutahara (2014), hypothesis for this research was thus formed. The following hypotheses will be tested in this study.

1. The deverbal adjectives with *-dor* can modify nouns denoting entities corresponding to the CAUSATIVE AGENT & INSTRUMENT of the actions denoted by base verbs, while the deverbal adjectives with *-nte* cannot.

2. The deverbal adjectives with *-nte* can modify nouns denoting PATIENTIVE entities of the actions denoted by base verbs, while the deverbal adjectives with *-dor* cannot.
3. Both types of adjectives can modify nouns denoting entities corresponding to NON-CAUSATIVE AGENT and CAUSE of the actions denoted by base verbs.

## 2 Methodology

The object of this analysis is the minimal pairs of deverbal adjectives with the two suffixes like *estimulador/estimulante* (from the verb *estimular* ‘to stimulate’). I will specify and observe the modified nouns tied strongly to each of the deverbal adjectives as a collocation. Based on this analysis and each collocation pattern, I will try to explain the difference between the two types of adjectives. In such minimal pairs, the two types of adjectives are differentiated by the suffixes attached to them. If a semantic difference is observed, it may be attributed to the suffixes’ different semantic natures. It is therefore possible to specify how the two suffixes work semantically in deverbal adjectives. This is why such minimal pairs are the focus of this analysis. In this section, I will explain how I gathered the minimal pairs and analyzed them.

### 2.1 Minimal pairs

To gather the minimal pairs of deverbal adjectives, I initially identified all the adjectival derivatives with *-dor*, its allomorph *-tor*, *-sor*, *-or*<sup>\*</sup>, and *-nte*, which have been used more than once since 20<sup>th</sup> century in the *Corpus del español*. From that list of adjectival derivatives, minimal pairs were extracted. I then identified 40 minimal pairs in which the use of derivatives with each suffix is attested more than 1000 times in the *esTenTen* corpus, where this study’s analysis will be conducted. This study subsequently only analyzed high-frequency derivatives. This is because for an accurate empirical analysis, a certain quantity of data was needed.

The minimal pairs of the following base verbs were analyzed in this study.

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<sup>\*</sup>*-tor*, *-sor*, *-or* are variants of *-dor*.

	dor (raw frequency)	n-te (raw frequency)	total
integrar 'to integrate'	47885	193942	241827
gobemar 'to govern'	127048	42430	169478
dominar 'to dominate'	6370	154342	160712
conservar 'to conserve'	145449	4352	149801
visitar 'to visit'	2352	106090	108442
contaminar 'to contaminate'	3562	87374	90936
cantar 'to sing'	6636	60804	67440
portar 'to carry'	50136	3994	54130
operar 'to operate'	44532	4636	49168
estimular 'to stimulate'	2941	36723	39664
limitar 'to limit'	2576	35030	37606
aspirar 'to vacuum, aspirate'	1853	33580	35433
amenazar 'to threaten'	9303	24636	33939
triunfar 'to triumph'	11220	17444	28664
motivar 'to motivate'	21653	4300	25953
donar 'to donate'	2243	20439	22682
cortar 'to cut'	3708	18360	22068
contar 'to count, tell'	16843	3961	20804
aislar 'to isolate'	1441	17865	19306
tranquilizar 'to calm'	9944	4554	14498
navegar 'to navigate'	6809	6154	12963
embriagar 'to make drunk'	2639	9549	12188
volar 'to fly'	6736	5222	11958
deslizar 'to slide'	2100	9491	11591
observar 'to observe'	9969	1478	11447
cautivar 'to captivate'	5929	4037	9966
secar 'to dry'	7531	2047	9578
globalizar 'to globalize'	7042	1618	8660
estabilizar 'to stabilize'	7148	1007	8155
detonar 'to detonate'	2046	6103	8149
cargar 'to carry'	6677	1396	8073
avasarlar 'to push around'	4818	3181	7999
discriminar 'to discriminate'	5067	2648	7715
certificar 'to certificate'	6032	1091	7123
bloquear 'to block'	3643	3041	6684
totalizar 'to totalize'	5233	1412	6645
socializar 'to socialize'	3586	1220	4806
perforar 'to drill, cross'	2665	1468	4133
quemar 'to burn'	2037	1330	3367
moralizar 'to moralize'	1407	1936	3343
total	616809	940285	1557094

Table 2. Objects of the analysis

## 2.2 Sketch Engine -Word Sketch Differences function-

The gathered minimal pairs were analyzed in the *esTenTen* corpus. This corpus was chosen for its size (9,497,402,122 words). To the best of the author's knowledge, this is one of the largest Spanish corpus and in the study of collocation patterns, it is assumed that the bigger the corpus size is, the more confident/accurate the analysis will be. This is why this corpus was chosen for this study.

For the analysis, the analytic function "Word Sketch Differences" was employed. The function is explained to show "those patterns and combinations that the two items have in common, and also those patterns and combinations that are more typical of, or unique to, one word rather than the other (manual of the corpus)." By using this function, the two adjectives are analyzed simultaneously and the program shows the typical nouns modified by each type. Based on this data, I tried to describe the modification patterns of each type of deverbal adjectives and address the hypotheses. The corpus provides a ranking of typical nouns modified by each of the two adjectives. The commonness is measured by the logDice score<sup>†‡</sup>.

For example, the minimal pair *limitador/limitante* (from the verb *limitar* 'to limit') is analyzed as follows in the corpus.



Figure 1. analysis of *limitador/limitante*

<sup>†</sup> The score is calculated from the Dice score and the score is computed from the frequency of occurrence of two words and the frequency of co-occurrence of the two words. The score is reliable for measuring the strength of association between two words. However, the Dice score is sometimes to be understood. Rychlý (2008), when evaluating it as a reasonable measure, pointed out a problem, where the values are usually very small. This author thus proposed to use the logarithm. The logarithmized score is the logDice (cf. Rychlý (2008): 9); this score is much easily understood and is convenient for discussion.

<sup>‡</sup> A ranking based on the row frequency is also available.

In the green part, nouns vinculated strongly with *limitador* (or only modified by the *-dor* adjective) are listed and are organized based on their logDice score. In the white part, nouns modified by both adjectives are shown, while the red lists nouns modified exclusively by *limitante*. From these data, it is possible to consider not only the difference but also the similarity in the modification patterns. By analyzing these tables, the hypotheses were examined.

### 3 Analysis

It seems that the analysis revealed a parallelism between the denotation patterns of the nominal derivatives with the two suffixes and the modification patterns of the adjectival derivatives. The analysis thus supported the hypotheses. In the following subsections, I will present some of the minimal pair analyses.

#### 3.1 *limitador/limitante*

For the verb *limitar* ‘to limit,’ both suffixes can be used to form the adjectival minimal pair *limitador/limitante* ‘that limits, limiting.’ Both derivatives seem to be synonymous but according to the analysis, each derivative modifies different types of nouns.

First, as hypothesized, only *limitador* modifies nouns corresponding to INSTRUMENT. Examples (which include the logDice scores in brackets) include *brida* ‘bridle’ (7.1), *fusible* ‘fuse’ (4.9), and *impedencia* ‘impedence’ (4.7). Among the nouns typically modified by *limitante*, INSTRUMENTAL nouns were not found.

On the other hand, many nouns typically modified by *limitante* are chemical materials or medicine (thus corresponding to CAUSE or PATIENTIVE entities), such as *aminoácido* ‘amino acid’ (7), *reactivo* ‘reagent’ (6.5), and *nutrimento* ‘nutriment’ (5.7). Remember that deverbal nouns with the *-nte* suffix typically denote these entities. In other words, patterns of denotation and modification for *limitador/limitante* are parallel.

In short, the parallelism and different modification patterns occur as predicted in the hypotheses.

#### 3.2 *estabilizador/estabilizante*

Like the minimal pair *limitador/limitante*, there is a pair from the verb *estabilizar* ‘to stabilize something’ namely *estabilizador/estabilizante*. In dictionaries, the two derivatives are synonymous and mean an object or a person “that stabilizes something.” However, according to our observation, their modification patterns are different.

As predicted, among the nouns modified by *estabilizador*, nouns corresponding with INSTRUMENT were found. The noun with the highest logDice score was *barra* ‘bar’ (7.6). The NP *barra estabilizadora* denotes a stabilizing bar, where the bar can be considered an INSTRUMENT with which an AGENT can stabilize something. *Aleta* ‘flap’ (5.7), *tobillera* ‘ankle support’ (4.6), and *resorte* ‘suspender’ (2.7) are also modified exclusively by *estabilizador*; all of them are considered an INSTRUMENT.

On the contrary, there is only one salient noun modified by the *estabilizante* adjective, namely *ampolla* ‘ampule.’ Obviously, this is not an INSTRUMENT but instead corresponds with CAUSE.

As was observed in *limitador/limitante*, this pair demonstrates the same type of contrast, such that only the *-dor* adjectives modify INSTRUMENTAL entities.

### 3.3 *perforador/perforante*

The verb *perforar* ‘to drill something, to cross’ is the base verb for the minimal pair: *perforador/perforante*. The different modification pattern of each adjective is also suggestive.

As seen in previous examples, among the salient nouns modified by *perforador*, INSTRUMENTAL nouns were found; examples include *martillo* ‘hammer’ (8), *máquina* ‘machine’ (6.4), *barrena* ‘drill, gimlet’ (6.3), and *broca* ‘bit (of drill)’ (6). However, apart from these INSTRUMENTAL nouns, some animate nouns are also found, such as *poliqueto* ‘polychaete, annelid worms’ (6.9) and *escarabajo* ‘scarab’ (5.1). Obviously, these insects are not an INSTRUMENT but are CAUSATIVE AGENTS. Despite being non-human, insects make holes and have control over this action.

On the contrary, among the nouns modified saliently by *perforante*, INSTRUMENTAL and AGENTIVE nouns were not found. As in the former cases, the modified nouns correspond with CAUSE, such as *arteria* ‘artery’ (6.5), *tálamo* ‘thalamus’ (6.3), and *vena* ‘vein’ (4.9). These nouns are modified by *perforante* because they cross fascia.

### 3.4 *secador/secante*

In the pair *secador/secante*, from the verb *secar* ‘to dry something,’ the unique modification pattern for *-nte* adjectives was observed.

At first, *secador* (like former *-dor* adjectives) modifies INSTRUMENTS: *tolva* ‘hopper, chute’ (5.6), *filtro* ‘filter’ (4.1), and *rodillo* ‘roller’ (3.1).

Such INSTRUMENTAL nouns were not found among nouns saliently modified by *secante* adjective. Instead, CAUSE nouns were found. For example, *talco* ‘talcum powder’ (5.6) and *papel* ‘paper’ (4). Modified by *secante*, these nouns denote materials that can dry something. Besides these, the noun *aceite* ‘oil’ (3.1) was also found. However, *aceite secante* does not denote ‘oil to dry something’ but rather ‘drying oil,’ namely oils “that hardens to a tough, solid film after a period of exposure to air (*Wikipedia*).” *Secante* in *aceite secante* is therefore considered to be derived from the pronominal or intransitive version of the verb *secar* ‘to dry out (intransitive).’ The noun *aceite* is thus considered PATIENTIVE; PATIENTIVE nouns are only saliently modified by *-nte* adjectives and never by *-dor* adjectives. Note that this contrast also supports the parallelism being examined. In previous works, it was confirmed that between *-dor* and *-nte* nouns, only *-nte* nouns could denote such entities (see Table 2).

### 3.5 *cautivador/cautivante*

The Word Sketch Differences function can detect both the salient modification patterns as well as nouns that can be modified by both adjective types. Among the pairs of deverbal adjectives analyzed, *cautivador/cautivante* from the verb *cautivar* ‘to captivate, attract something’ showed the widest variety of such nouns: *melodía* ‘melody’/-dor: 2.7, -nte: 1.6, *encanto* ‘charm’/-dor:2.2, -nte:1.2, *mirada* ‘look’/-dor: 2.5, -nte:1.6, *fragancia* ‘fragrance’/-dor: 3.5, -nte: 2.7, *paisaje* ‘landscape’/-dor:2.2, -nte: 1.4, *perfume* ‘perfume’/-dor: 2.2, -nte:1.4, *aroma* ‘aroma’/-dor:2.3, -nte: 2, *belleza* ‘beauty’/-dor: 2.1, -nte: 1.9, *frescura* ‘freshness’/-dor: 1.9, -nte: 1.9, *prosa* ‘prose’/-dor: 2.6, -nte: 3.2. Curiously, all these nouns denote entities corresponding with CAUSE. For example, a melody captivates someone without the participation of an AGENT.

This result can also be predicted from the hypothesis. Remember that deverbal nouns with both suffixes could denote causal entities at certain frequencies (cf. Table 2). In other words, as there is a parallelism between the denotation pattern of nominal *-dor/-nte* suffixes and the modification patterns of adjectival *-dor/-nte* suffixes, it can be assumed that both adjective types can modify these entities.



In the 40 minimal pairs analyzed in this study, 85 nouns that can be modified saliently by both deverbal adjective types were detected. The majority of these nouns (i.e., 60 nouns) were analyzed as CAUSE. This fact supports the assumption that derivatives with both suffixes can denote and modify CAUSE, thus serving as a similarity between the two adjective types.

The majority of nouns typically modified by both adjective types have the semantic role CAUSE; the second biggest group was formed by abstract nouns like *efecto* ‘effect.’ However, this type of collocation cannot be analyzed in the same way because when the deverbal adjectives modify these nouns, they are in the relational rather than active use.

This relational use is syntactic and semantically different from its active counterpart. For example, the deverbal adjectives in active use can be paraphrased as *que V* ‘that V’: *jefe fumador* > *jefe que fuma* ‘boss that smokes.’ On the contrary, when they modify abstract nouns (i.e., in relational use), they cannot be paraphrased in this way but are instead phrased as *de V* ‘of Ving’: *efecto tranquilizador/tranquilizante* > *\*efecto que tranquiliza/efecto de tranquilizar* ‘effect of paralyzing, paralyzing effect.’ As seen in this paraphrase pattern, the nouns modified by the deverbal adjectives do not correspond with the subject of the base verbs’ action. For these reasons, this study separates deverbal adjectives in relational use as our objective is to describe modification patterns of active deverbal adjectives. For the more detailed discussion on relational deverbal adjectives, see Rainer & Wolborska (2012) and Tsutahara (2015a, b).

In summary, it was confirmed that 85 noun types can be modified by the two deverbal adjective forms originating from the same base verbs. The largest majority of such nouns have the semantic role CAUSE (60 of 85 nouns) and the second group was abstract nouns (10 of 85), however the latter should be addressed separately. It would be possible to conclude that the two adjective types are more semantically similar when they modify nouns denoting entities corresponding with CAUSE or abstract nouns.

### 3.6 Recapitulation

The analyses found a semantic difference between two types of deverbal adjectives, as it was shown that only *-dor* adjectives modify CAUSATIVE AGENT and INSTRUMENT nouns. It is considered that this is because the *-dor* suffix favors these entities, while the *-nte* suffix does not. In 27 of the 40 minimal pairs analyzed in this study, this contrast was observed. See the following table.

Derivatives	Modified CAUSATIVE AGENT & INSTRUMENT
operador 'to operate'	brazo 'arm' /3.6 INSTRUMENT
secador 'to dry'	tolva 'hopper' /5.6, cilindro 'cylinder' /4.4, filtro 'filter' /4.1, sib 'sib' /3.9, estufa 'stove' /3.1, rodillo 'roller' /3.1, máquina 'machine' /2.7, INSTRUMENT
cortador 'to cut'	oruga 'larva' /8.9, hormiga 'ant' /8, isoca 'caterpillar' /7.7, gusano 'caterpillar' /6, aguilón 'large eagle' /5.7 CAUSATIVE AGENT soplete 'blow lamp' /6.6, draga 'dredge' /5.9, máquina 'machine' /5.7 INSTRUMENT
certificar 'certificate'	veterinario 'veterinary' /2, médico 'doctor' /0.9 CAUSATIVE AGENT
estabilizador 'to stabilize'	barra 'bar' /7.6, aleta 'flap' /5.7, tobillera 'ankle support' /4.6, paracaída 'parachute' /4.4, resorte 'suspender' /2.7 INSTRUMENT
conservador 'to conserve'	político 'politician' /5.7, caudillo 'leader' /5.3, candidato 'candidate' /5.3 CAUSATIVE AGENT
bloqueador 'to block'	lengueta 'reed' /5.2, perno 'bolt' /4.4, polea 'hoist' /4.3, relé 'relay' /4.1 INSTRUMENT
cargador 'to charge'	palá 'shovel' /10.5, retroexcavadora 'digger' /6.7, minipala 'minishovel' /6.4, horquilla 'fork' /4.5, tolva 'hopper' /3.8, máquina 'machine' /3.3 INSTRUMENT
motivador 'to motivate'	conferenciante 'speaker' /4.6, conferencista 'speaker' /3.3 CAUSATIVE AGENT palanca 'lever' /2.8, resorte 'spring' /2.3 INSTRUMENT
perforador 'to drill sting'	poliqueto 'polychaete' /6.9, escarabajo 'beetle' /5.1, insecto 'insect' /4.7 CAUSATIVE AGENT martillo 'hammer' /8, máquina 'machine' /6.4, barrena 'drill' /6.3, broca 'bit' /6, taladro 'drill' /5.3 INSTRUMENT
globalizador 'to globalize'	capitalista 'capitalista' /3.2 CAUSATIVE AGENT
integrador 'to integrate'	maestro 'teacher' /5.3 CAUSATIVE AGENT
socializador 'to socialize'	agente 'agent' /4.4 CAUSATIVE AGENT instrumento 'instrument' /0.1 INSTRUMENT
contador 'to count'	perito 'specialist' /9.4, bacea 'executor' /4.6 CAUSATIVE AGENT báscula 'scale' /4.4, máquina 'machine' /3.6 INSTRUMENT
totalizador 'to totalize'	contador 'counter' /4.5 INSTRUMENT
quemador 'to burn'	bicho 'insect' /4.3, gusano 'larva' /2.5 CAUSATIVE AGENT coque 'coke' /7, fierro 'branding iron' /5.5, hornillo 'portable stove' /5.5, mechero 'lighter' /4.2, RAM 'RAM' /2.9 INSTRUMENT
aislador 'to isolate'	buje 'hub' /6.5 INSTRUMENT
detonador 'to detonate'	pistola 'pistol' /5.3, revólver 'revolver' /5.2, pistón/ 'piston' /4.3 INSTRUMENT
limitador 'to limit'	brida 'bride' /7.1, resistor 'to resist' /5.6, fusible 'fuse' /4.9, impedencia 'impedence' /4.7, válvula 'valve' /4.5 INSTRUMENT
amenazador 'to threaten'	ogro 'giant' /3.9 CAUSATIVE AGENT
aspirador 'to aspirate'	barredora 'sweeper' /8.6, robot 'robot' /6.9, irrigador 'sprinkler' /6.1 INSTRUMENT
estimulador 'to stimulate'	vibrador 'to vibrate' /5.6 INSTRUMENT

Table 3. CAUSATIVE AGENT&amp; INSTRUMENT modified uniquely by -dor adjectives

On the contrary, the PATIENTIVE nouns were only found among the nouns typically modified by *-nte* adjectives and *-dor* adjectives never modify such entities. In the following pairs, this contrast was observed.

Derivatives	Modified PATIENTIVE entities
lim itante 'to limit'	am noácido 'ám no acid' /7, nutrimento 'nutriment' /5.6
secante 'to dry'	aceite 'oil' /3.1
deslizante 'to slide'	anticaída 'fall protection' /7.1, compuerta 'hatch' /6.4, tapa 'cover' /6.0, tackle 'tackle' /5.2, vector 'vector' /5.2, toldo 'sunshade' /5.2, acoplamiento 'docking' /4.9, embrague 'clutch' /4.9, pistón 'piston' /4.9, carcasa 'frame' /4.8, bandeja 'tray' 4.7
volante 'to fly'	ceniza 'ash' /8.4

**Table 4.** PATIENTIVE entities modified uniquely by *-nte* adjectives

It was shown that the both adjective types sometimes modify the same nouns and the majority of such nouns correspond to CAUSE. This fact can be considered as a similarity between the two adjective types.

## 4 Conclusion and future tasks

This study demonstrated that there is a parallelism between patterns of denotation and modification of two derivative types.

As discussed, the existence of this parallelism was assumed in the literature but never examined empirically. The principal contribution of this study is therefore examining the hypotheses proposed in many antecedent works.

In addition, this study, among the studies of semantics of word formation with the suffixes *-dor/-nte*, can be characterized as the complementary study. Many of the arguments in the literature on this issue are based on type frequency analysis (e.g., Tsutahara (2014)). As was presented, Tsutahara (2014) stated that CAUSATIVE AGENTS and INSTRUMENTS are typical denotation of deverbal nominals with *-dor* because most animate denotations of deverbal *-dor* nominals correspond to CAUSATIVE AGENT. The study concluded that the *-dor* suffix is a suffix that favors highly agentive entities. However, the author points out that the study is based on the type frequency and analysis from other perspectives would therefore be necessary to ensure his conclusion, as many nominal derivatives with the two suffixes are highly polysemous. For example, a deverbal noun *revelador*, from the verb *revelar* 'to reveal', denotes "someone who reveals secret (CAUSATIVE AGENT)" and also "liquid for photos or developer (CAUSE)". Therefore, it might be possible, for example, that *-dor* nouns denote CAUSE more frequently and denote CAUSATIVE AGENT very rarely (although it is grammatically possible). If so, it will not be adequate to describe that *-dor* is a suffix that prototypically denotes CAUSATIVE AGENT. In this sense, Tsutahara (2014) concluded that an examination from other perspective would be necessary.

This study is therefore "an examination from other perspective." In this study, the deverbal adjectives were individually analyzed (remember that the unit of the analysis in Tsutahara (2014) were more general, "nouns with *-dor* suffix"), typical patterns of modification of limited number of adjectival derivatives were treated. This study is thus based on the token frequency of deverbal adjectives.

This study therefore affirmed the first two hypotheses.

1. The deverbal adjectives with *-dor* can modify nouns denoting entities corresponding to CAUSATIVE AGENT & INSTRUMENT of the actions denoted by base verbs and the deverbal adjectives with *-nte* cannot.
2. The deverbal adjectives with *-nte* can modify nouns denoting entities corresponding to PATIENTIVE entities of the actions denoted by base verbs and the deverbal adjectives with *-dor* cannot.

Curiously, these findings are parallel with the description in antecedent works and as it is emphasized, the analysis was done from the other perspectives. Therefore, it is possible to conclude that the result of the analysis in this study supports the descriptions already done in antecedent works. The analyses based on the type frequency in the literature and an analysis based on token frequency made in this study both indicate that the two suffixes denote or modify entities corresponding with subjects of base verbs; however, each suffix favors different types of subjects. The *-dor* suffix prefers highly agentive entities like CAUSATIVE AGENT and INSTRUMENT and *-nte* rarely combines with such types of subjects. On the contrary, *-nte* favors less agentive subjects like CAUSE, especially, denotation or modification of PATIENTIVE entities, which are extremely low agentive, is a unique function of *-nte*.

As for the hypothesis 3, it would be necessary some more examination.

3. Both types of adjectives can modify nouns denoting entities corresponding to NON-CAUSATIVE AGENT and CAUSE of the actions denoted by base verbs.

The analysis revealed that both adjective types can denote entities with CAUSE, even sometimes modifying same nouns corresponding with CAUSE. It is therefore possible to conclude that one of the semantic resemblances between two suffixes is to denote and modify CAUSE.

However, from antecedent works, it was supposed that both types of adjectives would modify not only CAUSE but also NON-CAUSATIVE AGENT and this supposition was not examined because among the analyzed cases, such cases in which two adjectives modify same nouns that denote NON-CAUSATIVE AGENT were not found. However, it seems impossible still to reject the assumption (I have analyzed only 40 minimal pairs.). So extending the data and examination of the modification of NON-CAUSATIVE AGENT will be one of the biggest tasks in the future to complete the description.

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