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CHAPTER 13

Transitivity and verb classes

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The received concept of transitivity includes several semantic properties based on the idea that transitive clauses express an action performed by an agent on a patient, and suggest that transitive syntactic structures typically refer to concrete actions. Arguably, a semantic characterization of syntactic transitivity requires independent definitions of semantic and syntactic transitivity and needs more empirical support. This paper is an initial quantitative exploration of semantic verb types and transitive syntactic structures in a Spanish corpus-based syntactic-semantic database (ADESSE) and in a typological valency patterns database (ValPaL), and it somewhat calls into question the hypothesis that transitive syntactic structures are more strongly associated with verbs expressing concrete actions performed by an agent than with verbs expressing certain kinds of mental states.

Keywords: transitivity, process type, verb class

1. Introduction

The term and the traditional concept of transitivity can be traced back to the concept of *transitio personarum* developed by Priscian in his *Institutiones grammaticae* (c. 500 CE). An intransitive construction involves only one person, whereas a transitive clause involves two persons so that there is a transfer (*transitio*) of the action. In Priscian's text, many relevant factors of the transitivity concept are already present and two aspects have continued to be present in the traditional concept of transitivity since the time of Priscian's work: a morphosyntactic facet – the presence of two arguments with specific formal properties (in Latin, nominative case plus accusative or other oblique case) – and a notional-semantic aspect derived from the presence of two participants, which gives rise to the transfer metaphor. Taking up this traditional concept of transitivity, Hopper and Thompson (1980) put the focus on its notional-semantic aspect:

> Transitivity is traditionally understood as a global property of an entire clause, such that an activity is 'carried-over' or 'transferred' from an agent to a patient. (Hopper and Thompson 1980: 251)

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From this starting point, Hopper and Thompson propose that transitivity "can be broken down into its component parts, each focusing on a different facet of this carrying-over in a different part of the clause. Taken together, they allow clauses to be characterized as more or less transitive" (Hopper and Thompson 1980: 253). They propose ten parameters (participants, kinesis, aspect, punctuality, volitionality, affirmation, mode, agency, affectedness, and individuation) that are related to the nature of the event and the participants. Similar subsequent approaches have focused on different aspects of this set. For example, DeLancey states that "the cluster of attributes associated with transitivity define a semantic construct which approximates the notion of EVENT as opposed to STATE" (DeLancey 1987: 58), and Næss defines a prototypical transitive clause as "one where the two participants are maximally semantically distinct in terms of the roles in the event described by the clause" (Næss 2007: 30).

Hopper and Thompson show that the semantic parameters that define transitivity may be reflected in the morphosyntax of a wide variety of languages and they formulate the hypothesis that "whenever an obligatory pairing of two Transitivity features occurs in the morphosyntax or semantics of a clause, the paired features are always on the same side of the high-low Transitivity scale" (p. 254). However, given this multifactorial concept, they note that it may be the case that a clause with two participants such as *Jerry likes beer* may rate lower in transitivity than one with a single participant like *Susan left*. The former only displays one feature of high Transitivity (two participants) whereas the latter displays four: action, telic, punctual, and volitional (Hopper and Thompson 1980: 254).

This paradox can only be resolved by separating the concepts of semantic transitivity, on the one hand, and syntactic transitivity, on the other, and by empirically investigating the degree of association between them. I will therefore consider semantic transitivity to be defined by a set of features similar to those proposed by Hopper and Thompson in order to measure the degree to which the activity of an agent affects a patient. Syntactic transitivity is defined by the set of morphosyntactic features that can serve to recognize a syntactic pattern as Subject + V + Direct Object (or the equivalents in typologically diverse languages). I agree with LaPolla et al. (2011: 474) that "the lumping of a morphosyntactic property (transitivity) together with a semantic quality (effectiveness) under the same name is problematic", and then I will use the terms *transitivity* and *(in)transitive* to refer to the morphosyntactic properties of a clause. In case there is any potential ambiguity, I will specify whether the transitivity is syntactic or semantic.

The problem I will address is how we can empirically show if there is a strong correlation between semantic transitivity (Agent-Patient) and syntactic transitivity (Subject-Object), once they are defined by independent criteria. More specifically, the goal is to determine whether or not there is some correlation between syntactic transitivity and verb types. We know that verbs may differ in their syntactic encoding and that languages differ in the extent to which they make use of transitive encoding for verbs having a similar meaning. However, it seems that some verbs are more likely to adopt a transitive encoding, and they allegedly represent a higher level of transitivity:

> Many discussions of transitivity recognize a core – and perhaps for that reason privileged – subset of transitive verbs. These verbs have a clear semantic characterization, fitting the 'agent act on and cause an effect on patient' mold that is behind the name 'transitive'. Members of this set in English include *cut*, *destroy*, *kill*, and transitive *break* and *open*. I call these verbs, which are defined by a conjunction of syntactic and semantic properties, 'core transitive verbs' (CTVs) […]. Given this definition, CTVs are verbs that qualify as 'highly' transitive in Hopper and Thompson's 1980 sense. (Levin 1999: 224)

A classical reference concerning the crosslinguistic association of semantic types of verbs and morphosyntactic transitivity is the work of Tsunoda (1981; 1985), who proposes a transitivity scale of two-place predicates in terms of *affectedness*, in terms of transitive *case frames*, and in terms of four *syntactic processes*: passivization, antipassivization, reflexivization, and reciprocalization. His scale, based on nine ergative languages, has become known as Tsunoda's hierarchy (Table 1) with prototypical transitivity at the left end. The patient is more affected at the left end of the table, but tends to be less and less affected as we move towards the right end. As we go down the scale, transitive case frames are less likely to occur, and syntactic processes such as passivization are less likely to be applied.

Table 1. Transitivity scale of two-place predicates (adapted from Tsunoda 1985: 388)

Type	**1**		**2**		**3**	**4**	**5**	**6**	**7**
Meaning	**direct effect**		**perception**		**pursuit**	**knowledge**	**feeling**	**relation**	**ability**
Subtype	1A	1B	2A	2B					
Examples	*kill, break*	*hit, eat*	*see, hear*	*look, listen*	*search, wait*	*know, remember*	*like, want, fear*	*have, lack*	*capable, good*
	ERG – ABS NOM – ACC							Other frames	

In the literature, many see a close relationship between transitivity and aspectuality. Three of the parameters of Hopper and Thompson's cardinal transitivity are kinesis, telicity and punctuality, which are also the three basic parameters of the aspectual classes proposed by Vendler (1957). Although the same aspectual class may admit both transitive and intransitive structures, it seems reasonable to hypothesize that the probability of being transitive may depend on the aspectual class. Tsunoda's hierarchy contains accomplishments with an object that delimits the event at one end, and states at the other end.

> Prototypical transitive verbs are agent-patient verbs such as *destroy*, *cut*, or *open*; that is, they denote an action in which an agent acts on and causes a change in a patient. The direct objects of such verbs are typically incremental themes; the verbs are canonical accomplishments in the Vendler-Dowty sense. Verbs that deviate from this prototype are less likely to be transitive (i.e., to take a subject and a direct object) crosslinguistically […]. For example, statives, which, by definition,

> do not have arguments which measure out or delimit an event, show a greater degree of variation in argument realization crosslinguistically. Verbs of perception and verbs of psychological state each include stative subclasses whose members show a range of argument realization options across languages.
>
> (Levin and Rappaport Hovav 2005: 101)

Below I will try to determine whether verbs that do not denote accomplishments, that is stative verbs, perception verbs and others, are less likely to be transitive, both in a corpus of a particular language (using the ADESSE database of Spanish) and in a crosslinguistic sample (using the ValPaL database). However, although there is some relationship between aspectual classes such as those proposed by Vendler and conceptual classes such as those enumerated in Tsunoda's hierarchy, I will focus on conceptual, not aspectual, verb classes.

Turning then to semantic classes of verbs, Levin (1993) proposes a useful verb classification based on the assumption that "the syntactic behavior of verbs is semantically determined" and "any class of verbs whose members pattern together with respect to diathesis alternations should be a semantically coherent class" (p. 14). However, her classes are relatively homogeneous semantically but less so syntactically. On the other hand, even for verbs that are syntactically and semantically similar, what we find in corpora is a gradation with respect to the probabilities of them occurring in a particular structure or a particular diathesis alternation. For example, the causative-inchoative alternation is typical of change-of-state verbs, but some verbs are more frequent in the transitive counterpart and others in the intransitive alternant.[1] The same applies to diathesis alternations that involve the second argument (for example, the conative alternation). Therefore, the different probability of each transitivity alternant entails different probabilities for a particular verb to occur in a transitive construction. I will explore this kind of probability below. On the other hand, Levin's classification is too detailed for the purposes of this paper and I will refer to a different classification with broader verb types.

2. Transitivity and process types in SFG (Halliday)

In Systemic Functional Linguistics (Halliday 2014), the typology of processes is tied to his concept of Transitivity. From an experiential perspective, the grammar of the clause chunks the flow of events into quanta consisting of a process, participants involved in it and circumstances. The so-called Transitivity system construes the world of experience into a manageable set of *process types*. Each process type provides its own model or schema for construing a particular domain of experience. The basic distinction is between inner and outer experience: *mental* processes ('sensing') vs.

1. Cf. Haspelmath et al. (2014)for a study of the relation between the frequency of each alternant and the morphosyntactic coding in causal / non causal verb pairs.

material processes ('doing' or 'happening'). In addition, we can relate one fragment of experience to another: *relational* processes ('being'). On the borderline between material and mental processes are the *behavioral* processes: those that represent the outer manifestations of inner workings (e.g., 'sleep', 'laugh'). *Verbal* processes represent symbolic relationships that are constructed in human consciousness and enacted in the form of language, such as saying and meaning. Finally, there are *existential* processes, by which phenomena of all kinds are simply recognized to exist, or to happen. (Halliday 2014: 213 ff).

Each type of process is characterized by process-participant configurations where the participant functions are particular to that process type. Nevertheless, there is also the search for more general models following two paths that Halliday labels as the "transitive model" and the "ergative model" (Halliday 2014: 332–355). The basic question is how many participants are there, one or two, and those models essentially involve profiling the situation expressed by the clause in different ways. The *transitive model* is an extension model based on the configuration of Actor + Process: an Actor does something and that action may or may not be extended to impact another participant (a Goal), for example: *the tourist hunted* vs. *the tourist hunted the lion*. This model is confined to material clauses. In non-material clauses, the second participant (if it exists) is not impacted by the process, it is not a Goal, leading to a range of other configurations of functional roles: Senser and Phenomenon in mental processes, Carrier and Attribute in intensive relational processes, and so on. In the *ergative model*, the variable is not one of extension but one of causation. There is at least one participant engaged in a process, and the process may be brought about by that participant (*the bomb exploded*) or by some other entity (*the police exploded the bomb*). This model may be generalized across different process types.

Given that the second participant of non-material clauses cannot be interpreted as impacted, Matthiesen (2004: 602–603) thinks that behavioral, mental, verbal, relational and existential clauses would appear to be largely 'intransitive', i.e., they are systemically lower in transitivity than 'material' clauses in terms of the transitivity hypothesis proposed by Hopper and Thompson (1980). This lower semantic transitivity may have morphosyntactic reflexes:

> In terms of case marking, 'mental' clauses seem to be more diverse than 'material' ones in patterning, perhaps reflecting the difficulty in construing the identity of the "source" of processes of consciousness. Moving around languages we find that either the Senser or the Phenomenon may be realized as a nominal group in the nominative case; and other cases marking the Senser include a dative, oblique or accusative case, whereas other cases marking the Phenomenon include an accusative or locative case. (Matthiessen 2004: 593–594)

These observations point in the same direction as Tsunoda in the sense that non-material processes are frequently expressed through more diverse formal resources than effective material actions.

3. Transitive and intransitive constructions

In this paper I am making a distinction between semantic transitivity and syntactic transitivity. The former refers to the transfer of an action from an agent to a patient. The latter refers to a clausal structure with a subject and an object, which in turn are defined by formal properties such as case and agreement. Since agreement, case and other formal properties used to define grammatical relations are not universal but instead vary by language, grammatical relations themselves are also language-specific. Therefore, if we consider transitivity from a formal point of view, it may be manifested differently in different languages and even among different constructions in the same language. In other words, transitivity, like grammatical relations and form classes, is a language-specific and construction-specific phenomenon.

> Thus, although we may see transitivity as a phenomenon manifested in many languages, it is not universal, and when manifested, it may be manifested differently between languages, and even between different constructions of a single language. […] The overall conclusion then is that transitivity, like grammatical relations and form classes, is a construction-specific phenomenon. When working on individual languages, we need to look at each construction in the language, and in natural contexts, before we consider whether something like transitivity can help us understand how the system of the language is organised.
>
> (LaPolla, Kratochvíl, and Coupe 2011: 486–7)

To make the transitivity concept useful for crosslinguistic comparison, it must be conceived not as a universal category but as a comparative concept (Haspelmath 2010). Comparative concepts allow us to identify comparable phenomena across languages. In linguistic typology the labels S, A, and P (O is also used instead of P) are used as comparative concepts for grammatical relations or syntactic functions (Haspelmath 2011). In any language, S is the sole argument in the major monoactant construction, and A and P are, the arguments of the transitive construction. The ergative-absolutive and nominative-accusative alignment systems are determined on the basis of the distribution of morphosyntactic properties across S, A, and P. However, in many languages there are several different two-argument patterns and not all of them are considered transitive. Following Lazard, I will assume that "The *transitive construction* in any language is the major biactant construction" (Lazard 2002: 152). There are two main criteria for identifying the major biactant construction of a language (Witzlack-Makarevich 2010: 109–111). The first is qualitative: the construction used with verbs expressing prototypical actions, such as 'kill' and 'break'. This is the kind of criterion proposed by Comrie (1989: 111), Lazard (2002: 152), and Haspelmath (2011). The second criterion is quantitative: the construction having greater productivity, higher token frequency and/or higher type frequency. This last criterion is preferred by Witzlack-Makarevich and it is preferred here because of the need to define syntactic transitivity and semantic transitivity using independent criteria. Therefore, I will consider that in any language the most type-frequent biactant construction is transitive,

and that any construction with two arguments which are coded as the arguments in the major biactant construction is also transitive.

In Spanish, as in many other languages, all these criteria converge on the same pattern: Subject-Object is the biactant pattern that has the highest type and token frequency and it is also the pattern of *matar* [kill], *romper* [break] and many other common effective action verbs. Following the practice of traditional grammar, the syntactic function Subject is defined as the argument indexed by person and number verb morphology, and a Direct Object (DO) as the argument that *may* be indexed by Accusative case pronominal clitics (i.e. the set of forms *lo*, *la*, *los*, *las*). A transitive construction is a construction with a Subject and a Direct Object, and possibly other arguments, as in the corpus examples in (1). Note that complement clauses are considered arguments and may be Subjects or Objects, as in (1b)

(1) a. Subj V DO
El comisario abrió la boca. [HIS:168.31]
[The inspector opened his mouth]
b. Subj V DO(Compl)
Plácida Linero pensó que había pasado el peligro. [CRO:117.21]
[Plácida Linero thought the danger was over]
c. Subj V DO IO
Le daré una copia a *la Hortensia*. [SON:193.26]
[I'll give Hortensia a copy]
d. Subj V DO Obl
Puso el paquete en la cama. [DIE:120.02]
[She put the package on the bed]

Intransitive clauses do not include a DO and may have one or more arguments. In the following pages examples like those of (2) are counted as having a single argument, whereas those of (3) and (4) are intransitive clauses with two arguments.

(2) a. Subj V
El 'Prestige' se hundió porque quiso. [El País 13/11/2013]
[The Prestige sank because she wanted to]
b. Subj V Attr
Tú vas a seguir calladito. [PAS:064.22]
[You are going to continue to be quiet]
c. Subj V: Quote
¡Mamá –gritó David–, no hay luz!… [JOV:051.35]
["Mom!" shouted David, "there's no electricity!"]

(3) Subj V Obl
a. *Estamos en casa de papá*. [CIN:050.22]
[We're at dad's house]
b. *Cuba no fue devastada por una guerra*. [TIE:088.03]
[Cuba was not devastated by a war]

(4) Subj V IO
   a. *A David le gustaban las flores.* [SON:256.25]
      [David liked the flowers]
   b. *Se me rompió la uña del índice.* [DIE:149.03]
      [I broke the nail on my index finger]

Many verbs are used in both transitive and intransitive constructions. I will define a *transitive verb* as a verb whose most frequent valency pattern is a transitive construction.

4. Corpus analysis: Transitivity of verb classes in ADESSE

In this section, I will use data from the ADESSE database to test the correlation between syntactic transitivity and semantic process type. As indicated and exemplified above, I will consider any clause in the corpus that has a Subject and a Direct Object to be a transitive clause. ADESSE[2] is a database with the (manual) syntactic and semantic annotation of the clauses from ARTHUS, a 1.5 million word corpus of Spanish texts. The database contains the features of 158,538 clauses corresponding to more than 4000 verb entries and 3434 verb lemmas.

The database includes a hierarchical conceptual classification of verbs with 70 semantic classes[3] mainly based on lexical relations (para-synonymy, hyponymy, meronymy), rather than an aspectual or syntactic classification. This means that verbs such as *decir* [say] and *hablar* [speak] are grouped in the same class (Communication verbs) even though they are syntactically different: *hablar* is more often intransitive than *decir* and it rarely admits complement clauses. Examples of other sets of verbs that are ascribed to the same class despite their syntactic differences include: *ver* [see], *mirar* [look (at)], and *mostrar* [show, let see] (Perception) and *nacer* [be born], *vivir* [live], *morir* [die] and *matar* [kill] (Life).

The higher level classes in the ADESSE hierarchy broadly correspond to Halliday's process types, perhaps the main difference being that the ADESSE classification is a bit more independent of syntactic behavior than Halliday's process types. Some other differences in the details derive from particular differences in the basic criteria. For example, Behavioral processes are not considered a top-level type either in ADESSE or in the data that I will present below. A few low-level classes are ascribed to different general types. These cases have been reclassified for this study by more closely following Halliday's criteria: for example, verbs of acquisition (*ganar* [gain, take, earn], *recibir* [get, receive]) and of transfer (*dar* [give]) have been reclassified as material processes, whereas in ADESSE they were grouped with possession verbs, and all of them were included within relational type verbs.

2. ADESSE can be accessed on line at http://adesse.uvigo.es/

3. http://adesse.uvigo.es/data/clases.php

By observing the syntactic behavior of particular verbs in the corpus, it is easy to see that they show a great deal of variability in the number of explicit arguments they present, from those always appearing in one-argument constructions to those that always appear in poly-argument constructions. Many verbs alternate between one-argument intransitive constructions and two-argument transitive constructions. Moreover, whenever there are two or more arguments, we can have a structure with a Subject and a Direct Object (transitive) or a structure without a Direct Object (intransitive). For each verb in the database, I have calculated the proportion of transitive clauses in relation to the total number of clauses of this verb in the corpus, and its proportion in relation to the number of clauses with two or more arguments. These figures will be used as an index of the transitivity of each verb. The question I will try to answer now is whether or not the transitivity index follows general tendencies that depend on the semantic class.

Verbs with similar meaning evoke similar conceptual frames and are expected to have a similar number of inherent participants and a similar level of transitivity. Nevertheless, it may also be that lexical items of the same domain differ in the relative prominence attributed to frame elements and/or in the valency patterns they allow, and in that case they may show differences in transitivity. In Examples (5) and (6), there are verbs of emotion and possession, respectively; but sentence (a) of each pair is transitive and sentence (b) intransitive.

(5) a. *Solamente nosotros **queríamos*** tanto a Glenda. [GLE:020.06]
[We were the only ones who really loved Glenda]

b. *A los hombres no les **gustaban*** las mujeres tristes. [USO:041.16]
[Men did not like sad women]

(6) a. *Nosotros no **tenemos** ese problema.* [MAD:358.23]
[We do not have that problem]

b. *La GGT **carece de** un procedimiento de evaluación comparable con el que se usa en las ciencias.* [LIN:105.20]
[GGT lacks an evaluation procedure comparable to that used in the sciences]

In fact, for almost every semantic class there are both transitive and intransitive clauses in the corpus database. Should the semantic class have no influence on transitivity, the global indexes of transitivity would be roughly equivalents. However, there is great variation from one class to another. At one end, more than 90% of the clauses with verbs of possession (*tener…)*, volition (*querer*, *desear*…), and acquisition (*conseguir*, *recibir…*) are transitive. At the other end of the spectrum, meteorological verbs (*llover…*), attributive verbs (*ser*, *estar*, *parecer…*), and existential verbs (*haber*, *existir*, *ocurrir…*) rarely if ever appear in transitive constructions. In between these two extremes, in most semantic classes there are transitive and intransitive clauses corresponding to transitive verbs, intransitive verbs, and verbs that occur in both transitive and intransitive constructions. However, are there significant differences in the proportion of transitive clauses among more general process types? Is it true, for

example, that syntactic transitivity is more related to concrete actions than to mental processes and states? Figure 1 shows the percentage of transitive clauses for each main process type: mental processes are clearly above average, whereas existential processes are clearly below average. The proportion of transitive clauses for material processes is average.

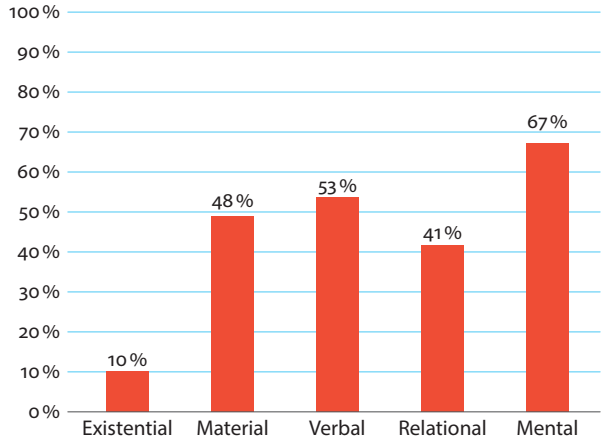

Figure 1. Percentage of transitive clauses for each process type

In part the differences in the degree of transitivity among verb classes depend on the number of inherent arguments they have. For example, verbs of existence (*haber*, *existir*, *ocurrir*, *aparecer*, etc.) usually occur with only one inherent argument: the Existent entity; whereas mental processes (*sentir*, *saber*, *ver*, *gustar*, etc.) usually require two inherent arguments, namely, the Experiencer (Senser) and the Stimulus (Phenomenon). However, what we are now looking for is not the number of arguments that can be expected in each class, but rather the probability of structuring two or more arguments through a transitive syntactic construction. Thus, from now on only clauses with two or more arguments will be considered in the data and illustrations presented: Transitive: **S D (X)** vs. Intransitive: **S I (X)**, **S Obl (X)**, etc. We may therefore pose the following question: What is the probability that a second argument will be a Direct Object rather than an Indirect Object, a Locative, or some other type of Oblique argument?

As expected, Figure 2 shows a higher proportion of transitive clauses than Figure 1, as transitive structures are the default coding of two-argument predications. But only relational processes present a transitivity index that is clearly lower than that of the other process types. A boxplot displays the variation in the transitivity of the verbs of each class more clearly. In a boxplot such as that of Figure 3, the bold line indicates the median. In other words, one half of the verbs have a proportion of transitive uses above this line and the other half below it. The spaces between the different parts of the box indicate the degree of dispersion in the data.

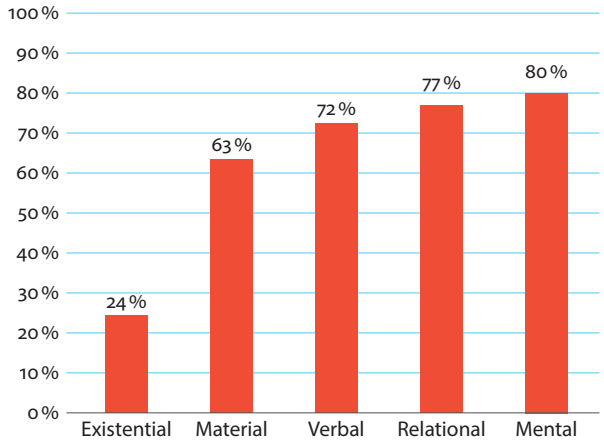

Figure 2. Percentage of transitive clauses / clauses with two or more arguments

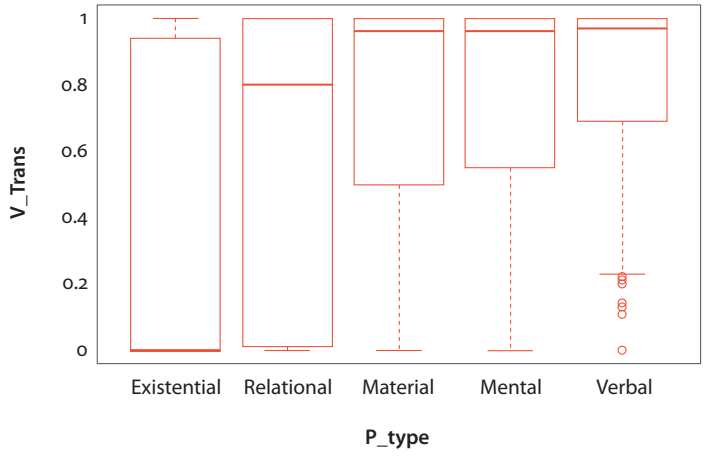

Figure 3. Transitivity of ADESSE verbs of each process type in two-argument clauses

Most existential verbs are intransitive because their second argument (if there is one) is usually either a locative or an IO (*quedar*, *faltar*, *ocurrir*, *suceder*, etc.). Only causatives of existence (*provocar*, *generar*, *causar*, etc.) are found mostly in transitive clauses. Relational processes show relatively high indices of transitivity in Figure 3 and Figure 2, as compared to Figure 1, because possession verbs are predominantly transitive, whereas intransitive attributive clauses with *ser*, *estar*, and *parecer*, etc. do not count as two-argument predications.

Among mental processes (Figure 4), perception clauses and verbs are overwhelmingly transitive. The rates of transitive clauses and verbs are relatively lower with verbs of cognition (i.e., knowledge and opinion) and sensation (i.e., emotion and volition).

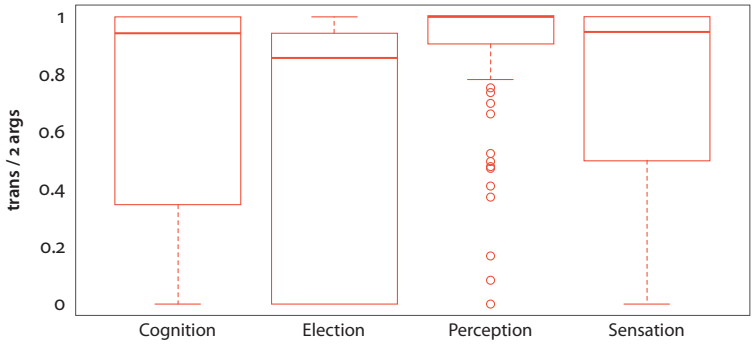

Figure 4. Transitivity of ADESSE verbs expressing mental processes in two-argument clauses

With mental verbs in general and emotion verbs in particular, patterns with Experiencer as Subject are almost always transitive in Spanish (and the Stimulus is the Direct Object), although they are usually stative. If the Stimulus becomes the Subject, then the coding of the Experiencer alternates between a dative-like IO (as in *gustarle* or *molestarle*) and an accusative-like DO (as in *molestarlo*). IOs tend to be used for less effective, more stative relations. In this case, it seems clear that lower semantic transitivity implies lower syntactic transitivity (Vázquez Rozas 2006).

Among material processes (Figure 5), there are relatively higher transitivity indexes with verbs of modification, which involve a change in the object, be it creation, affectedness, or destruction. Other facts, i.e. verbs that do not imply change, such as verbs of control, contact, and so on, more frequently require an oblique second argument. Non-causative verbs of motion and location combine with oblique locatives and directionals.

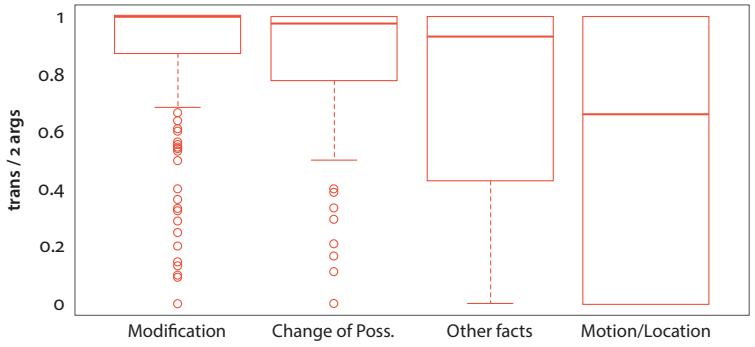

Figure 5. Transitivity of ADESSE verbs expressing material processes in two-argument clauses

The differences between particular verbs and between low- and medium-level classes seem to be more evident than between macroclasses. There are clear differences between specific classes, but it is not the case that the entire set of material processes is more transitive than the set of mental processes. However, it is true that material processes may in some way be associated with transitivity since most transitive verbs and clauses represent material processes. However, the reason is that material processes have a higher type- and token-frequency, i.e. there are more clauses and more verbs of this type than of any other. For that same reason, most intransitive verbs and clauses also represent material processes. Since most verbs represent material processes, this may be a core component of the verb concept, but not necessarily part of the transitivity concept. To prove the association between a certain process type and transitivity, we need to take into account both the observed frequency (O) and the expected frequency (E). Among the various different statistical tests than can be used to measure the strength of association between two variables, I have chosen in Table 2 Pearson's residuals (= (O–E)/SQR(E)). Negative values such as those of existential and relational processes indicate a tendency toward intransitivity, whereas a positive value indicates that verbal processes are associated with transitivity. Although they present positive values, the association of material and mental processes with transitivity is weak.

Table 2. Number of verbs that mostly (>50%) occur either in transitive or intransitive syntactic patterns in clauses with two or more arguments

P_type	Transitive	Intransitive	Expected F (Transitive)	Pearson's residuals*	Fisher test p-value
Existential	21	34	41	−3.12	3.40E-05
Relational	216	133	260	−2.71	1.90E-04
Material	1649	533	1622	0.68	0.044
Mental	416	122	397	0.95	0.057
Verbal	265	51	234	2.04	3.36E-05
[Other]	107	61	121	−1.26	0.018
Total	2674	934	2674		

* = (Observed Transitive – Expected Trans)/sqr(Expected F trans)

We can therefore conclude that in language use there are no significant differences in the proportion of transitive clauses and verbs when comparing material and mental processes. The higher type-frequency of transitive patterns with material processes is met by the higher type-frequency of intransitive patterns. We may ask whether this is a particular feature of Spanish or if it has some crosslinguistic validity.

5. Transitivity crosslinguistically vs. transitivity in the corpus: ValPaL vs. ADESSE

In this section I will present some exploratory statistics to search for transitivity correlations between verbs in a corpus-based database of Spanish (ADESSE) and a typological database of verb classes and valency patterns, the Valency Patterns Leipzig database [ValPaL][4] (Hartman, Haspelmath, and Taylor 2013). ValPaL is an important tool that was created as a result of a study of valency patterns in 35 languages from around the world. A consortium of 35 author teams (experts in their respective languages) provided a dataset of about 80 basic verb meanings with detailed valency information. As they use the same set of basic verb meanings and valency information is recorded in a standard way, the individual datasets are easily comparable. From this dataset, I have explored the basic coding frames of 77 verb meanings and compared them to one of their closest equivalent Spanish verbs in the ADESSE database (see Appendix). Only patterns with two or more arguments are examined and each pattern has been classified as transitive or intransitive. As indicated above, in Spanish a syntactic pattern is considered transitive if it has a Subject and a Direct Object. For crosslinguistic comparison, a pattern is considered transitive in any language if it contains an A and a P argument. The comparative concepts A and P have been defined in some typological literature (Comrie 1989; Lazard 2002; Haspelmath 2011) by making reference to the arguments of action verbs like 'break' and 'kill'. Since one of the purposes of this paper is to assess the relationship between semantic and syntactic transitivity, I prefer to avoid any reference to action verbs and to define A and P as the two arguments in the major biactant pattern, which in turn is defined as the biactant pattern with higher type-frequency (Witzlack-Makarevich 2010: 109–111). The proportion of transitive patterns between two-argument patterns will be called the index of transitivity.

Figure 6 shows that there is a clear correlation between the index of transitivity of verbs in ADESSE, using the Spanish-language corpus data, and the index of transitivity of verb meanings in ValPaL, with the elicited data of 35 languages.

If we distribute those 77 verb meanings among Halliday's main process types (see Appendix), we can compare the transitivity indices of two-argument patterns in both databases, as in Table 3 and Figure 7.

There is no clear tendency concerning the transitivity index of each process type. The highest values correspond to the relational meaning NAME, which is transitive in patterns with two or more arguments. But most patterns with this and other relational verbs are counted as one-argument intransitive patterns, since Attributes are not considered to be arguments. The other process types show very similar figures for the mean and median of their transitive patterns, although in ValPaL the material processes show higher values than the mental processes and in ADESSE the mental processes rank higher than the material processes.

4. The aggregated database is published online at http://valpal.info

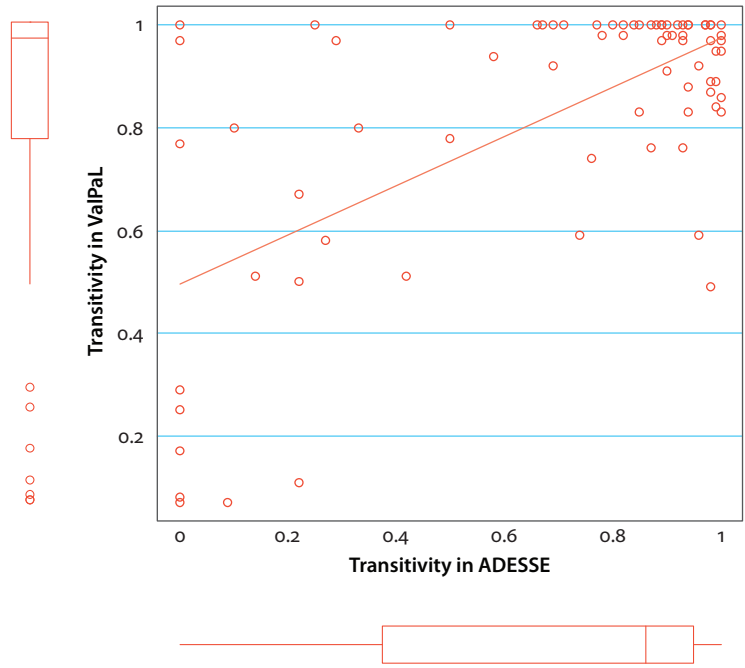

Figure 6. Transitivity of Basic Coding Frames in ValPaL and transitivity patterns in ADESSE for 77 verb meanings (patterns with two or more arguments) Pearson's product-moment correlation = 0.663, p-value < 0.001

As mentioned earlier in this paper, Tsunoda (1981; 1985) proposes a transitivity scale of two-place predicates in terms of affectedness, in terms of transitive case frames, and in terms of four syntactic processes (see Table 1) As we go down this scale, transitive case frames are less likely to occur. The ValPaL database provides us with a broader sample of verbs and languages. For each verb meaning used by Tsunoda as an example, Table 4 includes the proportion whose basic coding frame is transitive among the 35 languages of the ValPaL sample. For each equivalent Spanish verb, the table indicates

Table 3. Mean, standard deviation, and median proportion of verbs ascribed to each Halliday's type whose coding pattern has at least two arguments and is transitive

Process type	N	ValPaL trans			ADESSE trans		
		mean	sd	median	mean	sd	median
Material	58	0.83	0.28	0.98	0.65	0.36	0.85
Mental	12	0.80	0.19	0.85	0.75	0.37	0.95
Relational	1	1.00	NA	1.00	0.98	NA	0.98
Verbal	4	0.83	0.22	0.90	0.77	0.25	0.84
Other	1	0.76	NA	0.76	0.87	NA	0.87

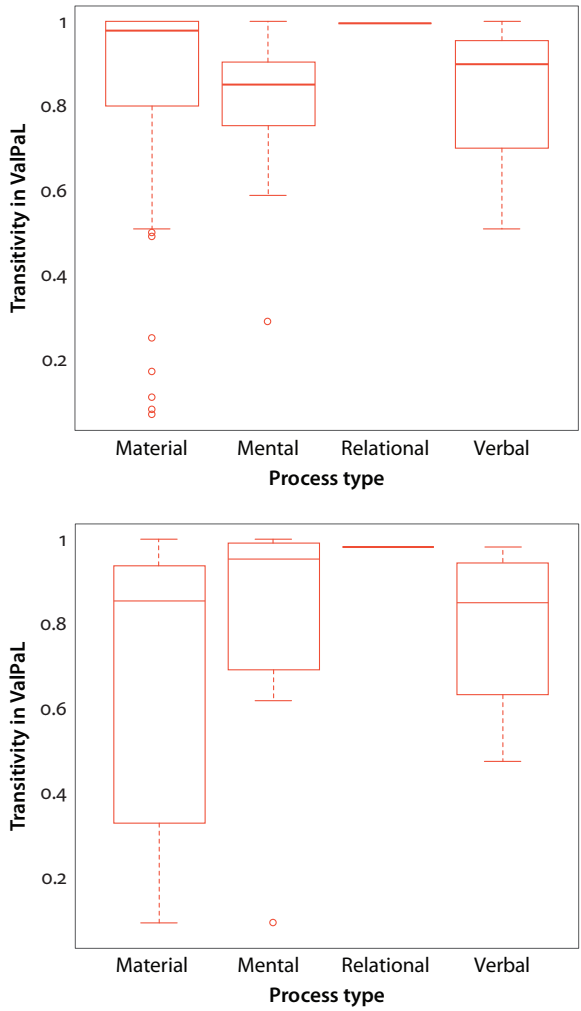

Figure 7. Boxplot of process type (~Halliday) and transitivity of two-participant patterns of 77 verb meanings in ValPaL (top) and ADESSE (bottom)

the proportion of the transitive pattern among the total set of uses with two or more arguments in the ADESSE corpus.

To see if these transitivity indices are a specific property of the verb meanings used as examples, rather than a property of the class, I have distributed the sample of ValPaL meanings among Tsunoda's types (see Appendix). Only 36 verbs have been classified without difficulty, and 41 verb meanings have remained unclassified. The results are shown in Table 5.

Table 4. Transitivity scale of two-place predicates (Tsunoda 1985: 388), and the proportion of transitive constructions in VaLPaL and ADESSE for each verb example

Type	**1 [direct effect]**		**2 [perception]**		**3 [pursuit]**	**4 [knowledge]**	**5 [feeling]**	**6 [relation]**
Subtype	1A	1B	2A	2B				
ValPaL TR	KILL (100%) BREAK (100%)	HIT (98%) EAT (95%)	SEE (92%) HEAR (84%)	LOOK (74%)	SEARCH (89%)	KNOW (88%)	WANT (83%) LIKE (77%) FEAR (59%)	–
ADESSE TR	*matar* (94%) *romper* (81%)	*pegar* (0%) *golpear* (76%) *comer* (45%)	*ver* (93%) *oír* (88%)	*mirar* (73%)	*buscar* (96%)	*saber* (99%)	*querer* (90%) *gustar* (1%) *temer* (88%)	*tener* (99%) *faltar* (0%)

Table 5. Mean, standard deviation, and median proportion of verbs ascribed to each Tsunoda's type whose coding pattern has at least two arguments and is transitive

Tsunoda's type		**N**	**ValPaL**			**ADESSE**		
			mean	**sd**	**median**	**mean**	**sd**	**median**
1A	Effective-A	15	1.00	0.01	1.00	0.76	0.29	0.87
1B	Effective-B	8	0.95	0.06	0.98	0.76	0.33	0.88
2A	Perception-A	4	0.91	0.07	0.89	0.98	0.02	0.99
2B	Perception-B	1	0.74	NA	0.74	0.76	NA	0.76
3	Pursuit	2	0.83	0.09	0.83	0.96	0.04	0.96
4	Knowledge	2	0.74	0.21	0.74	0.84	0.14	0.84
5	Feeling	4	0.80	0.17	0.80	0.70	0.47	0.90

ValPaL data conform fairly well to the highest steps of Tsunoda's hierarchy: effective verbs, similar to those meaning 'kill' and 'break', are almost all transitive in all languages of the sample, whereas in the ADESSE database the corpus data continue to show a higher transitivity of the first group of perception verbs than the effective verb meanings of this sample. The relative position of other steps in the scale is much less clear both in the ADESSE data and in the ValPaL data

Malchukov (2005) argues that the verb-type hierarchy proposed by Tsunoda conflates two different dimensions: a sub-hierarchy of decreased patienthood on the part of the P argument, and another sub-hierarchy that additionally involves decreased agentivity on the part of the A participant. As an alternative, he proposes a new, two dimensional hierarchy as represented in Figure 8, that includes two verb types absent in Tsunoda's hierarchy (in parentheses).

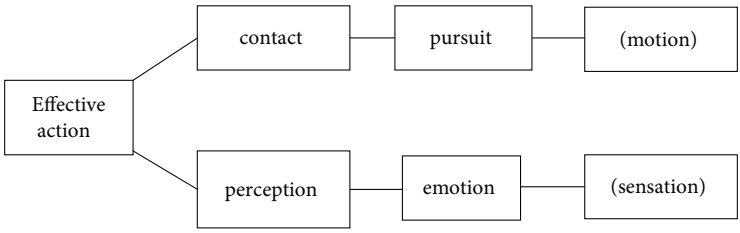

Figure 8. Two-dimensional verb type hierarchy (Malchukov 2005: 81)

The first dimension of Malchukov's hierarchy is similar to the affection hierarchy of Beavers (2011: 358–359), although the specific meanings included in each step are different. Croft assumes both hierarchies with the following comments:

> The prototypical simple verb lexicalization would then possess a single completed directed change that is the endpoint of a genuine transmission of force. Deviation from the prototype leads to a greater likelihood of realization of the participant as a (Subsequent) Oblique rather than an Object, although Object realization remains possible for a participant lacking all of these properties. (Croft 2012: 318)

For each step, Malchukov is able to show that there is some verb in some language that is more transitive to the left than to the right of the scale. The question is to prove that the hierarchy continues to be valid for a representative sample of verbs and languages. Table 6 gives the results for ValPaL verb meanings that could be classified in one of Malchukov's types.

Table 6. Malchukov's verb-type hierarchy and transitivity of ValPaL verb meanings in ValPaL and ADESSE

Type	N	ValPaL			ADESSE		
		mean	sd	median	mean	sd	median
Effective	19	0.99	0.02	1.00	0.79	0.27	0.88
Contact	5	0.94	0.07	0.97	0.68	0.39	0.82
Pursuit	3	0.83	0.07	0.83	0.92	0.07	0.93
Motion	13	0.59	0.37	0.58	0.52	0.40	0.50
Perception	5	0.87	0.10	0.86	0.94	0.10	0.98
Cognition	3	0.80	0.19	0.88	0.75	0.18	0.74
Emotion	4	0.80	0.17	0.80	0.70	0.47	0.90
Sensation	1	0.29	NA	0.29	0.00	NA	0.00

The transitivity indices of ValPaL data match the double scale of Malchukov; but the ADESSE data much less so, as we can see in Figure 10.

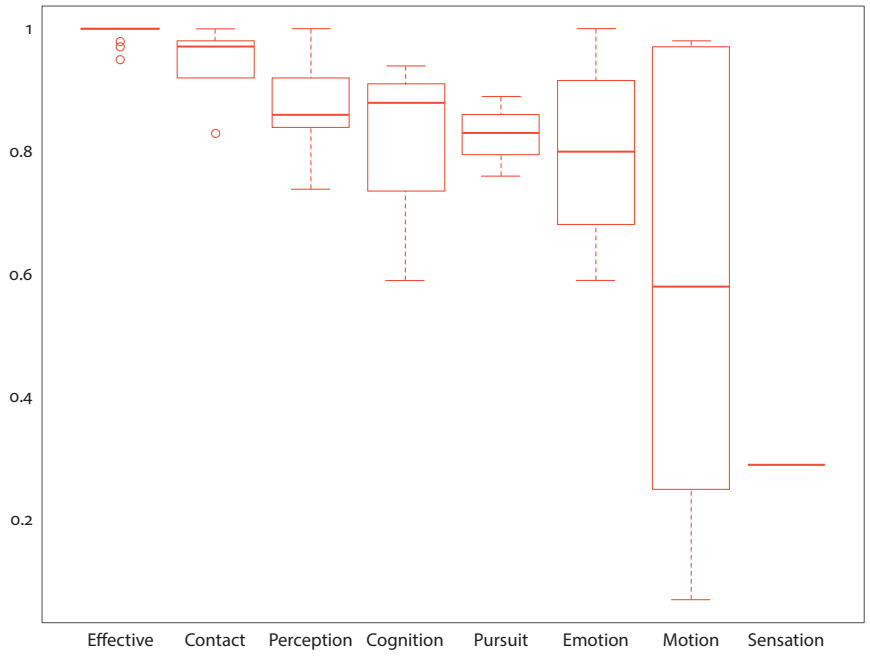

Figure 9. Malchukov's verb types and transitivity of two-participant patterns in ValPaL

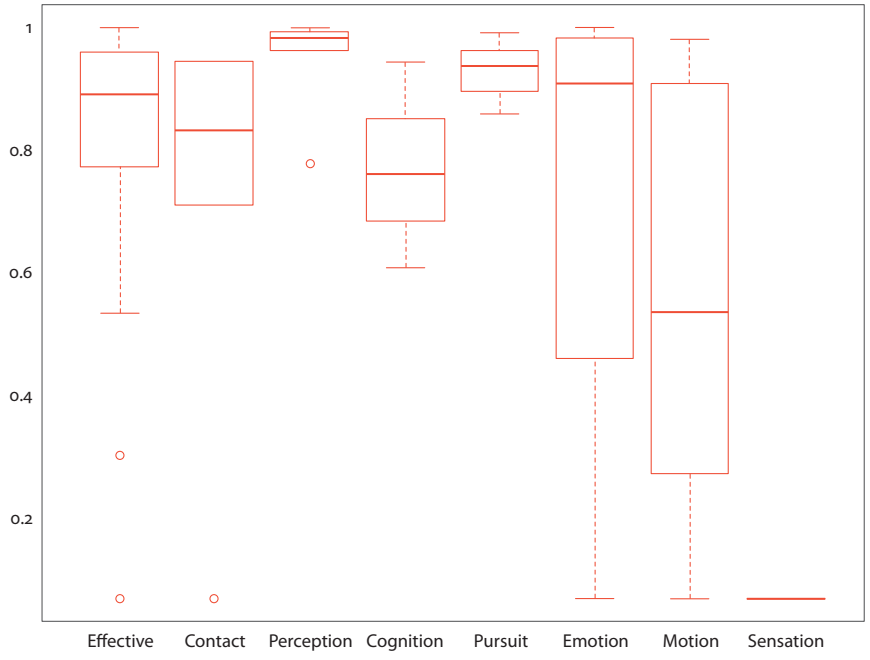

Figure 10. Malchukov's verb types and transitivity of two-participant patterns in ADESSE

In ADESSE, perception verbs (in this sample, *ver*, *oír*, *mostrar*, and *mirar*) continue to have the highest transitivity. Pursuit and emotion verbs also have a higher transitivity than expected. Among Spanish verbs of emotion, we can highlight the intransitivity of *gustar* in contrast to the high transitivity of *querer* and *temer* – both with the experiencer as subject – and the causative *asustar* with the experiencer as object.

6. Conclusions

Using corpus-based and typological quantitative data, we can conclude that there is an imperfect correlation between corpus data and typological data, but both kinds of data show that there is some relationship between semantic process type and syntactic transitivity. Typological data from ValPaL seem to confirm that the distribution of transitive syntactic patterns among the basic verbs of a sample of languages fit to a great extent the hierarchies of verb types proposed by Tsunoda and Malchukov. These are probabilistic scales applicable to the inventory of verbs and constructions, not their use in discourse.

Both typological data and corpus data confirm that effective material processes show the highest transitivity indices, above other material processes, namely contact or motion. Both in typological data and even more in corpus data, verbs of perception ('see', 'hear') show high indices of transitivity, above other mental processes and above many material processes. Taken as a whole, there are no substantial differences between material processes and mental processes in the Spanish corpus. If we look at corpus data constructions with two or more arguments, then neither process type (macroclass) nor degree of affection or dynamicity seem to be especially relevant. Many static predications (possession, perception, knowledge, etc.) are systematically expressed by means of transitive constructions. However, there are significant differences among subtypes within each conceptual domain.

The discrepancies between typological data based on the inventory of verbs and constructions, and corpus data on the syntactic constructions used with each verb call for an explanation. Goldberg's hypothesis is that "the high frequency of particular verbs in particular constructions facilitates children's unconsciously establishing a correlation between the meaning of a particular verb in a constructional pattern and the pattern itself, giving rise to an association between meaning and form" (Goldberg 2006: 79). Some authors have claimed that the basic transitive verbs in the acquisition process are not exactly those corresponding to high semantic transitivity (in Hopper and Thompson's sense). According to Ninio (1999), the starting transitive verbs in the acquisition process belong to a group of high-frequency favorites, in particular *want* and *make*/*do*, but also *give*, *take*, *find*, *eat*, *drink*, *see*, *hear* and so on; i.e., this includes concrete actions but also perception, volition and other processes. The common meaning is that these verbs describe the most significant actions that a human being can perform on a separate, autonomous object: inclusion in, and exclusion from,

the personal (pp. 644–645). With those verbs neither participant is cancellable, and this is in contrast to verbs like *push* or *kick* that can be alternatively conceptualized as agentive intransitive events and verbs like *break* or *open* that can also be conceptualized as patientive intransitive events (p. 646). All this is in line with the high transitivity of perception and volition verbs that I have found in corpus data, and confirms that a usage-based approach may give a particular picture of transitivity (Vázquez Rozas 2007), different from that provided by an inventory of verb meanings in a sample of languages. The association between semantic transitivity (Agt-Pat) and syntactic transitivity (Subj + Obj or A + P), although partially confirmed, only accounts for a part of the extent and variation of syntactic transitivity.

In the future, it would be desirable to increase the availability of typological databases with a larger and more varied set of verb meanings and languages, and syntactically and/or semantically annotated corpora of typologically diverse languages.

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Appendix

ValPaL meanings, Spanish equivalents, proposed process types, and transitivity in clauses with two or more arguments

Meaning	Spanish verb	ADESSE class	Tsunoda type	Malchukov type	Halliday type	trans ValPaL	trans ADESSE
APPEAR	*aparecer*	Existence	NA	NA	Material	0.17	0.00
ASK FOR	*pedir*	Command	NA	NA	Verbal	0.89	0.98
BEAT	*pegar*	Contact	Effective-B	Contact	Material	0.97	0.00
BOIL	*hervir*	Modification	Effective-A	Effective	Material	1.00	0.50
BREAK	*romper*	Modification	Effective-A	Effective	Material	1.00	0.82
BRING	*traer*	Displacement	NA	Motion	Material	0.97	0.98
BUILD	*construir*	Creation	Effective-A	Effective	Material	1.00	0.89
BURN	*arder*	Change	Effective-A	Effective	Material	1.00	0.00
CARRY	*llevar*	Displacement	NA	Motion	Material	0.98	0.93
CLIMB	*trepar*	Displacement	NA	Motion	Material	0.58	0.27
COOK	*cocinar*	Change	Effective-A	Effective	Material	0.97	1.00
COVER	*tapar*	Location	NA	NA	Material	1.00	0.90
CRY	*llorar*	Physiology	NA	NA	Material	0.67	0.22
CUT	*cortar*	Modification	Effective-A	Effective	Material	1.00	0.87
DIE	*morir*	Life	NA	NA	Material	NA	0.07
DIG	*cavar*	Change	NA	Effective	Material	0.95	1.00
DRESS	*vestir*	Body-care	NA	NA	Material	0.97	0.29
EAT	*comer*	Consumption	Effective-B	Effective	Material	0.95	0.99
FALL	*caer*	Displacement	NA	Motion	Material	0.25	0.00
FEAR	*temer*	Feeling	Feeling	Emotion	Material	0.59	0.96
FEEL PAIN	*doler*	Feeling	NA	Sensation	Mental	0.29	0.00
FILL	*llenar*	Location	NA	Effective	Material	1.00	0.88
FOLLOW	*seguir*	Displacement	Pursuit	Pursuit	Material	0.76	0.93
FRIGHTEN	*asustar*	Feeling	Feeling	Emotion	Material	1.00	0.84
GET	*recibir*	Acquisition	NA	NA	Material	0.87	0.98
GIVE	*dar*	Transfer	NA	NA	Material	1.00	0.92
GO	*ir*	Displacement	NA	Motion	Material	0.07	0.00
GRIND	*moler*	Modification	Effective-A	Effective	Material	1.00	1.00
HEAR	*oír*	Perception	PerceptionA	Perception	Mental	0.84	0.99
HELP	*ayudar*	Induction	NA	NA	NA	0.76	0.87
HIDE	*esconder*	Location	Effective-B	NA	Material	1.00	0.66
HIT	*golpear*	Contact	Effective-B	Contact	Material	0.98	0.82
HUG	*abrazar*	Contact	Effective-B	Contact	Material	0.92	0.69
JUMP	*saltar*	Displacement	NA	Motion	Material	0.11	0.22
KILL	*matar*	Life	Effective-A	Effective	Material	1.00	0.97
KNOW	*conocer*	Knowledge	Knowledge	Cognition	Mental	0.88	0.94
LAUGH	*reír*	Physiology	NA	NA	Material	0.80	0.10

(*continued*)

(*continued*)

Meaning	Spanish verb	ADESSE class	Tsunoda type	Malchukov type	Halliday type	trans ValPaL	trans ADESSE
LEAVE	*abandonar*	Displacement	NA	Motion	Material	0.49	0.98
LIKE	*gustar*	Feeling	Feeling	Emotion	Mental	0.77	0.00
LIVE	*vivir*	Life	NA	NA	Material	0.08	0.00
LOAD	*cargar*	Location	NA	NA	Material	1.00	0.67
LOOK	*mirar*	Perception	Perception-B	Perception	Mental	0.74	0.76
MAKE	*hacer*	Creation	Effective-A	Effective	Material	1.00	0.93
MEET	*encontrar*	Perception	NA	Pursuit	Material	0.83	0.85
NAME	*llamar*	Naming	NA	NA	Relational	1.00	0.98
PEEL	*pelar*	Modification	Effective-A	Effective	Material	1.00	0.80
PLAY	*jugar*	Activity	NA	NA	Material	0.80	0.33
POUR	*verter*	Location	NA	Effective	Material	1.00	0.71
PUSH	*empujar*	Displacement	Effective-B	Contact	Material	1.00	0.94
PUT	*poner*	Location	NA	Motion	Material	0.98	0.90
ROLL	*rodar*	Displacement	NA	Motion	Material	0.78	0.50
RUN	*correr*	Displacement	NA	Motion	Material	0.50	0.22
SAY	*decir*	Communication	NA	NA	Verbal	1.00	0.77
SEARCH FOR	*buscar*	Perception	Pursuit	Pursuit	Mental	0.89	0.99
SEE	*ver*	Perception	Perception-A	Perception	Mental	0.92	0.96
SEND	*enviar*	Displacement	NA	Motion	Material	0.97	0.89
SHAVE	*afeitar*	Body-care	Effective-A	Effective	Material	1.00	0.25
SHOUT AT	*gritar*	Communication	NA	NA	Verbal	0.51	0.42
SHOW	*mostrar*	Perception	Perception-A	Perception	Mental	1.00	0.98
SING	*cantar*	Sound-emission	NA	NA	Material	1.00	0.89
SINK	*hundir(se)*	Location	Effective-A	Effective	Material	1.00	0.69
SIT	*sentar(se)*	Posture	NA	Motion	Material	0.07	0.09
SMELL	*oler*	Perception	Perception-A	Perception	Mental	0.86	1.00
STEAL	*robar*	Acquisition	NA	NA	Material	0.97	0.93
TAKE	*coger*	Control	NA	NA	Material	1.00	0.97
TALK	*hablar*	Communication	NA	NA	Material	0.51	0.14
TEACH	*enseñar*	Knowledge	NA	Cognition	Mental	0.94	0.58
TEAR	*arrancar*	Displacement	Effective-A	Effective	Material	1.00	0.85
TELL	*contar*	Communication	NA	NA	Verbal	0.91	0.90
THINK	*pensar*	Cognition	Knowledge	Cognition	Mental	0.59	0.74
THROW	*tirar*	Displacement	NA	Motion	Material	0.98	0.78
TIE	*atar*	Union	Effective-B	NA	Material	0.98	1.00
TOUCH	*tocar*	Contact	Effective-B	Contact	Material	0.83	0.94
WANT	*querer*	Desire	Feeling	Emotion	Mental	0.83	1.00
WASH	*lavar*	Body-care	Effective-A	Effective	Material	0.98	0.91
WIPE	*limpiar*	Modification	Effective-A	Effective	Material	1.00	0.94