# The Frame Semantics of the Verbs
# *Tocar* and *Touch* across Spanish and English

**Pilar Rosario Velásquez**

**San Francisco State University**

ENG 895 Squib submitted in partial fulfillment
of the requirement for the degree M.A. English (Linguistics)

Spring 2016

Supervising Committee:

| | |
|---|---|
| Troi Carleton | Professor, Linguistics |
| Jenny Lederer | Professor, Linguistics |

**Abstract**

This paper shows how the Theory of Frame Semantics developed by Fillmore (1982) can help explain polysemy structures across Spanish and English through a fine-grained lexical semantic analysis of the differences and similarities of frames evoked by the verbs t*ocar* and *touc*h across both languages. The main findings show that two out of the five senses analyzed exhibit complete polysemy overlap while the other three were found to exhibit divergent polysemy structures across Spanish and English. These findings suggest that the senses of the verb *tocar* in Spanish can be placed along a continuum, where complete overlap of *tocar* and *touch* is found on one end of the continuum, and divergence between other senses of *tocar* and their English equivalents are found at the other end.

## 1. INTRODUCTION

In recent decades, computational lexicography research has focused on developing lexical tools, such as databases, in order to assist human and machine translation as well as the instruction of foreign languages (Boas, 2001). Two of the main problems encountered in the development of such tools are diverging polysemy structures (Boas, 2001) and translation equivalence (Salkie, 2002). In attempting to reduce the effects of these problems, the present frame-based analysis of the verbs *tocar* and *touch* shows how the use of the theory of Frame Semantics (Fillmore 1982; Fillmore & Atkins, 1994) and semantic frames (*FrameNet*) help explain polysemy structures across Spanish and English.

In order to conduct a semantic analysis from a frame perspective, it is necessary to take into consideration the difference between (1) how people use *cognitive frames* to make sense of their experiences, regardless of whether those experiences are conveyed through language or through some other means, and (2) Frame Semantics as the study of how people relate *linguistic forms,* such as words, fixed phrases, and grammatical patterns with *frames. Frames* are cognitive structures that mostly define the process of understanding linguistic forms as part of the knowledge of a language (Fillmore and Baker, 2001). As Johnson, et al (2003) explain, a *frame* is an abstract conceptual schema of an event, state of affairs, or circumstance. It is an essential element that structures the way people understand and remember experiences, and how they make sense of the way they perceive such experiences. Semantic frames evoke internal knowledge, and this knowledge is not only associated with words but also with cultural values. In Frame Semantics, words are defined in relation to their background frame and not just in relation to other words.

Along these lines, it is also important to understand the concept of *prototype,* which is defined as the most central member of a category. For example, in the case of a bird that may be described as a creature with certain features, such as feathers, bleak, and the ability to fly, a robin would be considered more prototypical of a bird than a penguin (Lakoff, 1987). Prototypes are considered culture specific. Thus, this example is valid for the American culture, but it might not be considered this way somewhere else in the middle of the jungle.

Using the theory of Frame Semantics (Fillmore, 1982) as a framework to define polysemy and the syntactic structures of the verbs *tocar* and *touch,* in this paper I analyze the semantic frames that the verbs *tocar* and *touch* evoke across Spanish and English. This cross-linguistic research on the verb *tocar* originates as a contribution to the Spanish *FrameNet* database, in which the verb *tocar* has not been included yet. I argue that the use of the theory of Frame Semantics and semantic frames help explain polysemy structures across Spanish and English. The research questions for this study are:

- Which semantic frames do the verbs *tocar* and *touch* evoke?
- Which senses of these verbs overlap across Spanish and English?
- Which senses of these verbs diverge across Spanish and English?

In order to respond to these research questions, I discuss the Manipulation and Impact frames, which *tocar* and *touch* evoke in both languages, and the Cause_to_make_noise frame, which *tocar* and its English equivalents evoke in two other senses[1] of *tocar.* These specific frames are examined because they were found in the data to be the frames most frequently evoked by both the verbs *tocar* and *touch.*

The results of the analysis show that the verbs *tocar* and *touch* do not exhibit complete overlapping polysemy structures in the five senses examined in this paper. Two of these senses have complete overlap across languages while the other three senses were found to exhibit divergent polysemy structures across Spanish and English. These findings suggest that the senses of the verb *tocar* in Spanish can be placed along a continuum, where complete

---

[1] This analysis does not include any metaphorical sense of the verb *tocar.*

overlap of *tocar* and *touch* is on one end of the continuum, and divergence between other senses of *tocar* and their English equivalents are found at the other end. The results of this research support Boas' (2001) and Salkie's (2002) claims that diverging polysemy structures and translation equivalence pose a challenge in the development of cross-linguistic databases.

This paper is organized as follows: In Section 2, I review relevant literature on the theory of frame semantics, English and Spanish *FrameNet*, and polysemy structures across languages. In Section 3, I describe my methodology in regard of data collection. In Section 4, I present my data and analysis of the verbs *tocar* and *touch*. In Section 5, I provide a discussion of my findings and their implications.

## 2.  THEORETICAL BACKGROUND AND PREVIOUS RESEARCH

### 2.1 Frame Semantics

Frame Semantics is a research program developed by Charles Fillmore, which underlines the connection between language and experience (Petruck, 1996)[2]. Fillmore (Fillmore 1982; Fillmore & Atkins, 1994) claims that in order to understand the meaning of a word, one must have knowledge of the semantic frame that underlies its usage (Boas, 2001). A semantic frame is a system of concepts connected in such a way that to understand one concept, it is necessary to understand the whole system (Petruck, 1996). Semantic frames can be used as a cognitive structuring device that captures the necessary background knowledge of a word to understand its meaning, and how it is used in a language (Boas, 2001). Accordingly, people reach for their knowledge built on experience to understand a word, a clause, a sentence, or a group of sentences, which may evoke a frame or a group of frames.

Each semantic frame consists of two types of Frame Elements (henceforth FEs): Core Elements, which are specific to the frame in question, and Non-Core Elements, which may appear as part of that frame but may also occur in other frames (Petruck 1996). Core Elements are essential concepts to the understanding of a Lexical Unit (Henceforth LU)[3] and its frame, while non-core elements provide additional information to a given frame but are not always critical to the understanding and interpretation of meaning (Fillmore & Baker, 2009).

---

[2] Petruck (1996) provides a detailed study of the main concepts that underlie Frame Semantics.
[3] A lexical unit is a single word in one of its senses.

To illustrate the notion of frames consider the below examples in which the LUs *compliant*, *follow*, and *adhere* evoke the Compliance frame. The FEs are marked in brackets, and their respective labels are included in subscript.

a. [Patients <Protagonist>] were [*compliant* <Act>] [with their treatment <Norm>].

b. [Women <Protagonist>] *follow* [the rules <Norm>] [more frequently <Manner>] than men.

c. [Joe <Protagonist>] *adhered* [to the law <Norm>] while living in [Spain <place>]

As described in Johnson et al. (2003), the Compliance frame portrays a type of situation that includes the Core FEs Protagonist (person whose behavior is in or out of compliance with the norm), Act (action that is judged to be in or out of compliance with the norms), Norm (rule that ought to guide a person's behavior), and State of Affairs (situation that may violate a law or rule)[4]. The FEs coincide with broader semantic roles such as Agent, Patient, and Instrument, but are defined as situation-specific semantic roles[5]. In order to understand the meaning of the LUs included in the Compliance frame, and to know what takes place in a compliance scenario, an understanding all the FEs in this frame is required. Verbs that evoke the Compliance frame are *adhere, breach, break, complaint, compliance, comply, follow, violation, and play by the rules.* Nouns that also evoke this frame are *adherence, compliance, and violation,* among others

A full frame semantic description of LUs that belong to the Compliance frame involve information about the FEs that are included in the underlying frame, and how those FEs are syntactically realized (Boas. 2001). For example, the lexical entry for the verb *comply* includes the following information: the FE Protagonist has to be realized as a Noun Phrase (henceforth NP) in subject position, the FE Norm has to be realized as Prepositional Phrase (henceforth PP) in postverbal position, and the FE Manner has to be realized as an adverbial phrase (henceforth AdvP), which may optionally occur in pre or postverbal position. This is illustrated in the following example:

---

[4] https://framenet2.icsi.berkeley.edu/fnReports/data/frameIndex.xml?frame=Compliance

[5] Frame Elements differ from semantic roles since they are specific to the frame in which they are used to describe participants in certain types of scenarios.

Comply _Compliance_   [ Protagonist     Norm      Manner ]
                                   NP           PP        AdvP
                                _Women_    _with the law_   _frequently_

The semantic and syntactic information about LUs in terms of Frame Semantics descriptions help create inventories of LUs according to the kinds of frames to which they belong (Boas. 2001).

### 2.1.1 *FrameNet*

*FrameNet* is an online database of English LUs described in terms of Frame Semantics and developed at the International Computer Science Institute in Berkeley, California. The *FrameNet* project aim is to build a lexical database using annotated examples that show the meaning and usage of each LU and to provide information about alternative forms of expressing concepts in the same conceptual field (Fillmore, 2001). *FrameNet*'s database provides a wealth of semantic and syntactic information for several thousand English verbs, nouns, and adjectives. Each lexical entry provides a link to the definition of the frame to which the LU belongs, definitions of FEs, and examples of prototypical instances of FEs.

### 2.1.2 Spanish *FrameNet*

The Spanish *FrameNet* Project (Subirats and Petruck, 2003; Subirats and Sato 2004, Ellsworth et al. 2006) is an online database of Spanish LUs based on Frame Semantics (Fillmore, 1982) and supported by corpus evidence. The project is being developed by Carlos Subirats at the Autonomous University of Barcelona (Spain), and it is implemented in collaboration with the International Computer Science Institute (Berkeley, CA) and with the cooperation of the *FrameNet* Project. The 'starter lexicon' contains around 1,000 LUs over a vast scope of linguistic domains, which include entities, nouns, verbs, adjectives, adverbs, and prepositions. The ultimate goal of the project is to deliver a corpus database that will include valences of each sense of a word (http://spanishfn.org).

At this point, Spanish FrameNet (henceforth SFN) only provides lexical entries that parallel the English *FrameNet* descriptions, and the frames that have been included are so far cross-linguistically valid (Subirats & Sato, 2004).

### 2.2 Polysemy

Alsina and DeCesaris (2002) explain polysemy as one word with several meanings. In order to address the issues that polysemy poses in communication, lexicographers have worked on how to best take into consideration the different meanings that a word can carry (Leacok & Ravin, 2000). A vast variety of dictionaries that list polysemous words where sub-senses are grouped together with their respective definitions are available. (Béjoint, 2000). However, Atkins (1994) states that the comparison of definitions across dictionaries is difficult due to their different organization of word senses. For example, Fillmore and Atkins (1994) arrived to the conclusion that the ten different print dictionaries that they reviewed for their study of the verb *risk* only agreed on Sense 1 '*risk your life*', but not on Sense 2 '*risk falling/a fall)*' or Sense 3 '*risk climbing the cliff*' (pg. 353).

2.2.1 Overlapping Polysemy

Beyond the issues of dealing with polysemy in one single language, a more complicated problem arises when taking into consideration polysemy across languages. In the literature on polysemy across languages, Alsina and DeCesaris (2002) show an overlapping polysemy in their study of the adjective *cold* in comparison with its Spanish and Catalan equivalents *frío* and *fred*. After studying the different degrees of polysemy presented by the three adjectives, the researches came to the conclusion that they exhibit complete overlapping polysemy structures. This kind of polysemy poses the least problems across languages, but it is uncommon.

2.2.2 Diverging Polysemy

On the other hand, diverging polysemy structures across languages are very common. They take place when two languages use different means to express a given meaning (Boas 2001). For example, Fillmore and Atkins (2000) show that the English verb *crawl* and the French verb *ramper* present semantic overlap when they describe insects' and invertebrates' motion, and humans' purposed crouching movement. However, they differ widely in their other senses. The verb *crawl* can be used to describe vehicles that move very slowly while *rouler au pas,* which describes movement at walking pace or slowly, has to be used to describe slow-moving vehicles, instead of *ramper.* Likewise, *crawl* can be

used to describe the motion of an insect on someone's skin while *grouiller* has to be used to express the same concept, instead of *ramper*.

The type of case illustrated with this example is what Dorr (1990) calls 'divergence' in machine translation. In this specific case, the equivalent translation of the senses of *crawl* other than the basic sense (insects' motion) is conveyed by the verbs *rouler au pas* and *grouiller* in French, as seen in Chart 1.

| Chart 1: Contrastive Study of English verb *to crawl* and French verb *ramper* (Fillmore & Atkins (2000) | | | |
|---|---|---|---|
| English Verb | French Equivalent | Sense | Polysemy Type |
| Crawl | Ramper | Motion of insects | Overlapping |
| Crawl | Rouler au pas | Slow-moving vehicles | Diverging |
| Crawl | Groullier | Creatures' teeming | Diverging |

Altenberg and Granger (2002) claim that the different types of polysemy across languages can be placed along a continuum. On one end of the continuum, complete overlapping of word senses can be placed, and on the other end there can be found no correspondence between word senses.


3. **METHODOLOGY**

For the purpose of this analysis, a total of a thousand sentences were reviewed. The data includes examples of the verbs *tocar* and *touch* evoking the Manipulation and Impact frames, and examples of other three senses of the verb *tocar* and their English equivalents evoking the Impact and Cause_to_Make_Noise frames. The present analysis uses the conceptual information of the English *FrameNet.* Thus, *FrameNet* is used to provide definitions of the frames and the descriptions of the Core and Non-Core FEs in a way that shows their semantic and syntactic structures in the described examples. In addition, as the Spanish *FrameNet* Project has not included the verb *tocar* in its database yet, I chose -from the preliminary data- five senses of the verb *tocar* that show the patterns of accurate usage of this verb in Spanish.

The Spanish data was collected from the Corpus Data of the Real Academia Española (CREA)[6]. One hundred sentences per each of the five senses of the verb *tocar* were reviewed. The English data was collected from the Corpus of Contemporary American English (COCA)[7]. One hundred sentences of the verb *touch* in its senses evoking manipulation and impact were reviewed. Also, a hundred sentences per each of the English equivalents of the other three senses of the verb *tocar* were reviewed.

Other senses of the verb *tocar* that were less frequently used in the data, such as set phrases, idioms or idiosyncratic usage, such as *tocar la pelota* (touch the ball with the foot) in soccer, were not taken into consideration.

## 4. DATA PRESENTATION AND ANALYSIS

The Spanish verb *tocar* is highly polysemous. The Real Academia Española (RAE) provides 28 different senses[8]. In the present analysis, I only focus on the five most frequent senses that were present in the data, and they happen to match five of the senses provided by the RAE's dictionary.

The most canonical examples are listed below to illustrate each of the five senses examined in the present analysis:

*(1) Ejercitar el sentido del tacto /* Exercise the sense of touch
  Example:
> a. *Juan le tocó el cabello con los dedos*
> b. John touched her hair with his fingers

*(2) Golpear algo /* To hit or bump something
  Example:
> a. *La pelota de tenis tocó la red*
> b. The tennis ball touched the net
>
> c. *La vecina toca la puerta*
> b. The neighbor knocks on the door

---

(3) Avisar o llamar con una campana u otro instrumento / Warn or call using a bell or other instrument
Example:
> a. *Toque el timbre antes de entrar*
> b. Ring the doorbell before entering

*(4) Hacer sonar según arte cualquier instrumento /* To make sound with a musical instrument
Example:
> a.*Pedro toca la trompeta*
> b. Peter plays the trumpet

4.1 Manipulation Frame: Overlapping Polysemy

The basic type of situation described below by the Spanish verb *tocar* in example (1a) is essentially conveyed by its English equivalent *touch* in (1b).

(1)    a.    *Juan le <u>tocó</u>    el   cabello con   los   dedos*
            Juan  touched  the hair      with the fingers
       b.   John <u>touched</u> her hair with his fingers

This sense of the verbs *tocar* and *touch* shows that both are instances of manipulation in which a person (Agent) manipulates something (Entity) with a body part. Using *FrameNet*'s terminology, the core FEs that belong to the Manipulation frame are identified as follows:

- The FE element Agent is a person, or mechanical object, or other inanimate object that manipulates something, i.e. *Juan* in (1a) and *John* in (1b).
- The FE Entity is the object that is manipulated by the Agent, i.e. *el cabello* in (1a) and *her hair* in (1b).
- The FE Body part of Agent is the part of the body used to manipulate the Entity, i.e. *los dedos* in (1a) and *his fingers* in (1b).
- The Non-core Elements of the Manipulation frame are not included in this analysis[9] because they are almost always the same across frames.

Example (1) illustrates the verb *tocar* and its English equivalent *touch* evoking the manipulation frame, expressed in terms of similar lexical and semantic realizations.

---

[9] Non-Core Elements of the Manipulation Frame: Place, purpose, duration, manner, time, instrument, means, result, depictive, explanation, locus, iteration. For a complete survey see *FrameNet.*

The information about the distribution of the Core FEs of the Manipulation frame as they are realized by *tocar* and *touch* in example (1) is shown in partial sets of frame role assignments in Chart 2.

| Chart 2: Partial[10] frame role assignments of the manipulation sense of *tocar* and *touch* | | | |
|---|---|---|---|
| a. <u>tocar</u> Manipulation | [ Agent<br>NP<br>*Juan* | Entity<br>NP<br>*el cabello* | Body Part of Agent ]<br>PP<br>*con los dedos* |
| b. <u>touch</u> Manipulation | [ Agent<br>NP<br>*John* | Entity<br>NP<br>*her hair* | Body Part of Agent ]<br>PP<br>*with his fingers* |

The comparison of the partial frame role assignments in (1a) and (1b) shows that this sense of both the verbs *tocar* and *touch* evoke the MANIPULATION frame and provides information about the syntactic realization of the three Core FEs Agent, Entity, and Body Part of Agent. Whereas the Agent and the Entity are realized as NPs, and the Body Part of Agent is realized as a PP in both instances.

Chart (1) also illustrates how the individual Spanish and English verbs instantiate each of the FEs. Each frame semantic description of the verbs *tocar* and *touch* and the FEs on the underlying Manipulation frame show the mapping between the FEs of the Manipulation frame and their syntactic realizations in both Spanish and English. The comparison of the mapping properties of the core FEs of the Manipulation frame and the verbs *tocar* and *touch* illustrate that both verbs have similar mapping properties. They map the Agent in subject position as a preverbal NP, the Entity in object position as a postverbal NP, and the Body Part of Agent also as a postverbal PP. This comparison shows that *tocar* and *touch* exhibit lexical and semantic overlap in this sense.

---

[10] It only includes Core FEs.

A different sense evoked by the verbs *tocar* and *touch* is impact. The difference between the manipulation sense and the impact sense is that while manipulation involves handling something, impact involves hitting something with force, as seen in the following section.

4.2 Impact Frame: Overlapping Polysemy

Another type of situation described by the Spanish verb *tocar* is seen below in example (2a), which is conveyed by its English equivalent *touch* in (2b). This sense of the verbs *tocar* and *touch* shows that both are instances of impact in which a person (Agent) causes something (Impactor) to make sudden contact with something else (Impactee). The following examples illustrate the verb *tocar* and its English equivalent *touch* evoking the impact frame, expressed in terms of similar lexical and semantic realizations.

(2)    a.  *La  pelota de tenis <u>tocó</u>     la  red*
          The    tennis ball     touched the net
        b.  The tennis ball <u>touched</u> the net

Adopting *FrameNet* terminology, and taking into consideration that some central elements of a frame do not need to be overtly stated in order to be taken into consideration, as claimed by Fillmore & Baker (2009), the core FEs that belong to the Impact frame are identified as follows:

- The FE Agent is a person that performs the action, who is not overtly expressed in examples (2a) and (2b), i.e. *el tenista* in (2a) and *the tennis player* in (2b).
- The FE Impactor is the entity that hits the Impactee, (i.e. *la pelota de tenis* in (2a) and *the tennis ball* in (2b).
- The FE <u>Impactee</u> is the entity which is hit by the Impactor, i.e. *la red* in (2a) and *the net* in (2b).
- Non-core Elements of the Impact frame are not included in this analysis[11].

---

[11] Non-Core Elements of- the Impact Frame: Manner, time, speed, place, purpose, frequency, means, force, result, periods of iteration, explanation, depictive. For a complete survey see *FrameNet*.

The information about the distribution of the Core FEs of the Impact frame as they are realized by *tocar* and *touch* in (2a) and (2b) is shown in partial sets of frame role assignments in Chart 3.

| Chart 3: Partial frame role assignments of the impact sense of *tocar* and *touch* | | |
| --- | --- | --- |
| a. <u>tocar</u> <sub>Impact</sub> | [ Impactor<br>NP<br>*la pelota de tenis* | Impactee ]<br>NP<br>*la red* |
| b. <u>touch</u> <sub>Impact</sub> | [ Impactor<br>NP<br>*the tennis ball* | Impactee ]<br>NP<br>*the net* |

The comparison of the partial frame role assignments in (2a) and (2b) shows that both verbs *tocar* and *touch* evoke the Impact frame and provides information about the syntactic realization of the two overtly expressed Core FEs Impactor and Impactee. Whereas the Impactor and the Impactee are realized as NPs.

Chart (2) illustrates how the individual Spanish and English verbs instantiate each of the FEs. Each frame semantic description of the verbs *tocar* and *touch* and the FEs on the underlying Impact frame show the mapping between the FEs of the Impact frame and their syntactic realizations in both Spanish and English. The comparison of the mapping properties of the FEs of the Impact frame and the verbs *tocar* and *touch* illustrates that both verbs have similar mapping properties. In other words, they map the Impactor in subject position as a preverbal NP and the Impactee in object position as a postverbal NP. This chart demonstrates that the Core Elements of the Impact frame are realized in identical ways by both the verbs *tocar* and *touch*.

As seen, the analysis shows complete polysemy overlapping in the two senses that the verb *tocar* is conveyed by its English equivalent *touch*. Along these lines, Altenberg and Granger (2002) argue that in order to determine the translation of a LU as 'equivalent' in a stricter sense, the procedure of 'back translation' can be used. This means that the utterance in the target language can be translated back into the source language without showing relevant differences. On the other hand, Kzreszowski (1990) proposes to rely on recurrent

translation patterns. This implies resorting to a quantitative notion of translation equivalence, which means that the frequency of a translation provides it more relevance. A third approach combines the idea of back translation and the quantitative notion of equivalence in order to calculate what is called 'mutual correspondence' (or translatability) of two LUs in a bidirectional translation corpus (Altenberg, 1999). This means that if LU *x* in language A is always translated by *y* in language B and, conversely, LU *y* in language B is always translated by *x* in language A, they will have a 100% mutual correspondence. If they are never translated by each other, they will have a 0% mutual correspondence (Altenberg and Granger, 2002).

Accordingly, the verbs *tocar* and *touch* in these senses that evoke the Manipulation and Impact frames exhibit a 100% mutual correspondence; *tocar* is always translated as *touch* in English, and *touch* is always translated as *tocar* in Spanish.

As Fillmore and Atkins (2000) and Boas (2005) argue, overlapping polysemy poses very few problems across languages but, unfortunately, is very rare. In the following sections, I present cases in which other senses of the verb *tocar* exhibit diverging polysemy structures from *touch*. Then, since the other senses of the verb *tocar* examined in the present study are not translated by touch, they exhibit 0% mutual correspondence.

4.3 Impact Frame: Diverging Polysemy Structures

A different type of situation described by the verb *tocar* is illustrated below in (2c) along with its English equivalent *knock* in (2d):

(2)   c. La vecina      <u>toca</u>   **la  puerta** despacio
        The neighbor touches the door     softly[12]
      d. The neighbor <u>knocks</u> **on the door** softly

As seen in the above examples, the equivalent translation of this impact sense associated with *tocar* in (2c) is not conveyed by the English verb *touch*. Instead, English offers the verb *knock* in order to express the same semantic notion.  Using *FrameNet* terminology, the FEs of this frame are identified as follows:

---

[12] Incorrect translation.

- The FE Agent is the person who performs the action, i.e. *la vecina* in (2c) and *the neighbor* in (2d).
- The FE Impactor, which is not explicitly expressed in the above examples, is the entity that hits the Impactee, i.e. *la mano* in (2c) and *the hand* in (2d).
- The FE Impactee is the entity which is hit by the Impactor, i.e. *la puerta* in (2c) and *the door* in (2d).
- The Non-core FE Manner describes the way in which the Impactor affects the Impactee.

The information about the distribution of the FEs of the Impact frame as they are realized by *tocar* and *knock* in (2c) and (2d) is shown in partial sets of frame role assignments in Chart 4.

| Chart 4: Partial frame role assignments of the impact sense of *tocar* and *knock* |
|---|

c.   tocar <sub>Impact</sub>     [ Agent        Impactee      Manner ]
                              NP            NP            AdvP
                          *la vecina*     *la puerta*    *despacio*

d.   knock <sub>Impact</sub>     [ Agent        Impactee      Manner ]
                              NP            PP            AdvP
                          *the neighbor*  *(on) the door*  *softly*

The comparison of this impact sense associated with *tocar* in (2c) and *knock* in (2d) shows that even though they both present an impact sense, they do not exhibit syntactic overlap. As Dorr (1990) and Heid (1994) state, both verbs express a similar semantic notion, but the action is expressed in terms of different lexical realizations. This example shows that when comparing similarities and differences between verbs, the concept of semantic frames offers a helpful way to compare and contrast the distribution of semantic concepts among different lexical units. It also illustrates how across languages, the action attached to different lexical structures can evoke the same semantic notion and frame.

15

**4.4** Cause_to_make_noise **Frame**

Another sense of the verb *tocar,* which involves using an object that makes noise in order to call or warn, is exemplified in (3a) and conveyed by its English equivalent *ring* in (3b) below.

(3)  a. *Pedro <u>toca</u>    el  timbre   <u>antes  de entrar</u>*
        Peter   touches the doorbell before entering[13]
     b. Peter <u>rings</u> the doorbell <u>before entering</u>

Since the English verb *touch* is not associated with a make noise sense, English offers the verb *ring* in order to express the same semantic concept. This sense of the verb *tocar* and its English equivalent *ring* used in (3) are instances of making noise in which a person (Agent) manipulates an entity (Sound maker) to emit a sound (*FrameNet*). Using this type of nomenclature, the core FEs that belong to the Cause_to_make_noise frame are identified as follows:

- The core FE Agent is a person or group of persons that manipulate a Sound Maker so that it makes a sound, i.e. *Pedro* in (3a) and *Peter* in (3b).

- The core FE Sound Maker is the object that makes the noise as a result of the action of the Agent, i.e. *el timbre* in (3a) and *the doorbell* in (3b).

- The Non-core FE time describes when the action takes place[14], i.e. *antes de entrar* in (3a) and *before entering* in (3b). This Non-core FE has been included to give an idea how this kind of FE can be realized in a frame.

Chart 5 shows the information about the distribution of the FEs of the Cause_to_make_noise frame as they are realized by *tocar* and *ring* in example (3).

---

[13] Incorrect translation
[14] Non-Core Frame Elements of the Cause_to_make_noise Frame: Manner, place, purpose, frequency, means, specific iterations, location of protagonist, purpose, depictive, explanation. For a complete survey see *FrameNet.*

| Chart 5: Partial frame role assignments of the impact sense of *'tocar'* and *ring* | | | |
|---|---|---|---|
| a.   <u>tocar</u> <sub>Cause_to_make noise</sub> | [ Agent<br>NP<br>*Pedro* | Sound maker<br>NP<br>*el timbre* | Time ]<br>PP<br>*antes de entrar* |
| b.   <u>ring</u> <sub>Cause_to_make_noise</sub> | [ Agent<br>NP<br>*Peter* | Sound maker<br>NP<br>*the doorbell* | Time ]<br>PP<br>*before entering* |

This section demonstrates how the FEs of the Cause_to_make_noise frame are realized in similar ways by the verbs *tocar* and *ring*. The comparison of the partial frame role assignments in examples (3a) and (3b) shows that both the verbs *tocar* and *ring* evoke the Cause_to_make_noise frame and provides information about the syntactic realizations of the FEs Agent, Sound Maker and Time. With both verbs, the Agent and the Sound Maker are realized as NPs, and the Time is realized as a PP.

An identical situation as exemplified by the verbs *tocar* and *ring* above, occurs when the verb *tocar* describes someone playing a musical instrument. Since the English verb *touch* is not associated with the playing a musical instrument sense, English offers the verb *play* to convey the same semantic concept. Example (4) illustrates the verb *tocar* and its English equivalent *play* associated with the make sound with a musical instrument sense. These actions are expressed in terms of different lexical realizations but a similar semantic notion.

(4)   a. *Pedro <u>toca</u>   la   trompeta*
         Pedro touches the trumpet[15]
      b. Peter <u>plays</u> the trumpet

In this sense, the verb *touch* and its English equivalent *play* also evoke the Cause_to_make_noise frame. A chart illustrating the partial sets of simplified frame semantic descriptions of *tocar* and *play* would show the same results obtained in Chart 5. This sense of the verb *tocar* and its English equivalent *play* also display a divergent polysemy structure because both verbs belong to different polysemy networks.

---

[15] Incorrect translation.

## 5. DISCUSSION

Grounded on the cognitive semantic principle that language is based on our understanding and experience of the world, Frame Semantics helps us to make the connection between the lexicon that we use in a language and our conceptual system because it makes those connections explicit. Likewise, semantic frames are fundamental to our understanding of experiences and culture. Thus, having a better understanding of their nature can aid in numerous aspects of life, such as improved cultural communication and relationships, improved second language acquisition, as well as provide insight into how the human brain works to categorize and understand the world.

The present study shows the importance of Frame Semantics in order to understand polysemy structures by explaining the divergence and the convergence of LUs at the conceptual level. In Section 4, a frame-based analysis of the verbs *tocar* and *touch* across Spanish and English is discussed. The main findings of the analysis show that the type of polysemy network exhibited by the verb *tocar* in Spanish is not reflected by the polysemy network of the verb *touch* in English. The small sample of the verbs *tocar* and *touch* examined in this analysis shows that complete overlapping polysemy structures are restricted to two out of five semantic extensions, as illustrated in Chart 6.

| Chart 6: Comparison of Polysemy Networks of Verbs *tocar* and *touch* | | | | |
|---|---|---|---|---|
| Spanish Verb | English Equivalent | Sense | Frame | Polysemy Type |
| **Tocar** | **Touch** | **Manipulation** | **Manipulation** | **Overlapping** |
| **Tocar** | **Touch** | **Cause Impact** | **Impact** | **Overlapping** |
| Tocar | Knock | Cause Impact | Impact | Diverging |
| Tocar | Ring | Make noise | Cause_to_make_noise | Diverging |
| Tocar | Play | Make noise | Cause_to_make_noise | Diverging |

The senses in which the verbs *tocar* and *touch* exhibit diverging polysemy structures illustrate that the kind of polysemy that a LU displays in the source language is not always mirrored by the same kind of polysemy network of the equivalent in the target language (Boas, 2005). In this case, *tocar* evokes in Spanish more semantic extensions than *touch* evokes in English.

The data reinforces Boas' (2001) and Salkie's (2002) claims that polysemy and translation equivalence pose a challenge in the development of cross-linguistic databases. Thus, a fine-grained lexical semantic analysis of frame elements like the present study can help lessen the challenge posed in the development of lexicographic resources for human and machine translation. This type of analysis not only includes more explicit descriptions of the different senses of a given LU, but also captures the background knowledge necessary to understand the meaning of a LU. This kind of information allows the mapping of LU senses to the most equivalent translation across languages.

Capturing the background knowledge of a LU can help solve issues that human translators encounter when consulting dictionaries since they list a vast amount of translation equivalents, but do not determine which one is the best fitting in a particular instance. It could also aid in the development of machine translation tools if computers are programmed to recognize the specific frame that a lexical unit is evoking.

How could a machine translation tool know when *tocar* should be translated as *play* and when it should be translated as *touch* or *knock* or *ring*? It would be possible only if it knew what the typical type of fillers are for each individual frame. For example, if the machine translation tool processes that in the expression *tocar la trompeta*, *trompeta* is a typical filler for the Cause_To_Make_Noise_ frame and not for the Impact frame, statistically it would be more likely to recognize this expression as someone talking about an instrument making noise. Therefore, it would directly translate this expression into English as *play the trumpet* and not *touch the trumpet*

Also, since frames can be used as a semantic structuring device to illustrate how FEs are syntactically realized by different parts of speech, they could be used as a structure to demonstrate their relationships to second language acquisition students. This kind of instructional material will help students understand much more clearly how we arrive at different senses of a LU. For example, instead of just receiving idiomatic instruction without any explanation, a typical practice currently, a student learning Spanish will understand why the expression *knock on the door* is translated as *tocar la puerta.*

## 6. CONCLUSION

This cross-linguistic research on the verb *tocar* originates as a contribution to the Spanish *FrameNet* database, in which this verb has not been included yet. The theory of Frame Semantics (Fillmore, 1982) and semantic frames (*FrameNet*) have been used as a structuring device that displays the background knowledge of this LU, and how it is used across English and Spanish. It has also been shown that Frame Semantics can help explain different polysemy structures across Spanish and English.

The main findings of the present frame-based cross-linguistic analysis of the verbs *tocar* and *touch* show that two out of the five senses analyzed in this study exhibit complete polysemy overlap while the other three senses were found to exhibit divergent polysemy across Spanish and English. The findings also suggest that the senses of the verb *tocar* in Spanish can be placed along a continuum. On one end of the continuum, complete overlap of *tocar* and *touch* can be placed. On the other end, divergence there can be found between other senses of *tocar*, which do not translate as *touch*.

**References**

Alsina V. & J. DeCesaris (2002). Bilingual Lexicography, Overlapping Polysemy, and Corpus Use. In B. Atenberg & S. Granger (Eds), *Lexis in Contrast: Corpus-Based Approaches* (pp. 215-230). Amsterdam: John Benjamins.

Altenberg, B. and S. Granger (2002). Recent trends in cross-linguistic lexical studies. In B. Atenberg & S. Granger (Eds), *Lexis in Contrast: Corpus-Based Approaches* (pp. 3-48). Amsterdam: John Benjamins.

Atkins B. (1994). Analyzing the verbs of seeing: A frame semantic approach to corpus lexicography. *Proceedings of the 20th Annual Meeting of the Berkeley Linguistics Society.* Berkeley: Berkeley.

Boas, H. (2005b). Semantic frames as interlingual representations for multilingual lexical databases. *International Journal of Lexicography* 18(4), 445-478.

Boas, H. (2001). Frame semantics as a framework for describing polysemy and syntactic structures of English and German motion verbs in contrastive computational lexicography. In P. Rayson, A. Wilson, T. McEnery, A. Hardie & S. Khoja (Eds), *Proceedings of Corpus Linguistics* (pp. 64-73). Lancaster, UK: Lancaster University Press.

Béjoint, H. (2000). *Modern Lexicography*. Oxford: Oxford University Press.

Dobrzyńska, T. (1995). Translating metaphor: Problems of meaning. *Journal of Pragmatics* 24(6), 595-604.

Dorr, B. (1990). Solving Thematic Divergences in Machine Translation. In *Proceedings of the 28th Annual Conference of the Association of Computational Linguistics,* University of Pittsburgh.

Ellsworth, M., K. Ohara, C. Subirats & T, Schmidt (2006). *Frame-semantic analysis of motion scenarios in English, German, Spanish, and Japanese.* Presentation at the 4th International Conference on Construction Grammar, Tokyo, Japan.

Fillmore, C. (1982). Frame Semantics. In Linguistics Society of Korea (Ed), *Linguistics in the morning calm* (pp. 111-138). Seoul: Hanshin.

Fillmore, C. & B. Atkins (2000). Describing Polysemy: The Case of 'Crawl.' In Y. Ravin & C. Laecock (Eds), *Polysemy* (pp. 91-110). Oxford: Oxford University Press.

Fillmore, C. & B. Atkins (1994). Starting where the dictionaries stop: The challenge for computational lexicography. In B. Atkins & A. Zampolli (Eds), *Compuational Approaches to the Lexicon* (pp. 349-393). Oxford: Oxford University Press.

Fillmore, C. & B. Atkins (1992). Toward a frame-based lexicon: The semantics of RISK and its neighbors. In A. Lehrer & E. Kittay (Eds), *Frame, fields, and contrasts: New essays in semantic and lexical organization* (pp. 75-102). Hillsdale: Erlbaum.

Fillmore, C. & C. Baker (2009). A Frame approach to Semantic Analysis. *International Journal of Lexicography* 15(2), 313-339.

Fillmore, C. & C. Baker (2001). Frame Semantics for Text Understanding. In *Proceedings of WordNet and Other Lexical Resources Workshop, NAACL,* University of Pittsburgh.

Johnson, C., M. Petruck, C. Baker, M. Ellsworth, J. Ruppenhofer & C. Fillmore (2003). *FrameNet: Theory and Practice.* Technical Report. Berkeley: International Computer Science Institute.

Lakoff, G. (1987). *Women, Fire and Dangerous Things.* Chicago: University of Chicago Press.

Leacok, C. & Y. Ravin (2000). *Polysemy.* Oxford: Oxford University Press.

Petruck, M. (1996). Frame Semantics. In J-O Östman, J. Bommaert & C. Bulcaen (Eds), *Handbook of Pragmatics* (pp. 1-13). Amsterdam/Philadelphia: Benjamins,

Salkie, R. (2002). Two types of translation equivalence. In B. Atenberg & S. Granger (Eds), *Lexis in Contrast: Corpus-Based Approaches* (pp. 51-72). Amsterdam: John Benjamins.

Subirats, C. (2007).       In J. Cuartero & M. Emsel (Eds), *Vernetzunge.*

Subirats, C. & H. Sato (2004). *Spanish FrameNet and FrameSQL.* Presentation at the workshop on Building Lexical Resources from Semantically Annotated Corpora, Lisbon.

Subirats, C. & M. Petruck (2003). *Surprise: Spanish FrameNet.* Presentation at the workshop on Frame Semantics, International Congress of Linguistics, Prague.