

## 2 METHODOLOGY

The major methodological precedent of this study is the experiment reported in Hall, Ecke, Sperr, & Hayes (2004). That study was designed to address whether “similarity of phonological and/or orthographic form in an L1 or L2 cognate will lead to the initial adoption of the cognate’s grammatical properties in the learner’s assumptions of how the new word may be deployed syntactically” (Hall, et al., in prep., p. 2). Additionally, information was solicited regarding the learners’ perceptions of the typological relationship (psychotypology) that exist between Spanish, English, and German. This was done to explore if and how learners’ perceptions of these relationships could affect their choices or if other explanations are plausible, such as the L2 effect.

In the current study, French L3 learners were presented with novel French (L3) words along with their Spanish (L1) and English (L2) translation equivalents. Verbs were chosen and categorized based on their cognate status. The three conditions were: cognate with Spanish (L1), cognate with English (L2), and non-cognate (cognate with neither L1 nor L2). After an initial presentation of the words, subjects were given a test in which they chose between two sentences using the novel word with the Spanish or English frame. A repeat of the same test was given a week later, along with a post-test to determine, among other issues, psychotypological effects.

## 2.1 Subjects

The subjects initially included 65 students at a private Mexican university. They were native Spanish speakers (L1), who were advanced English speakers (L2), and were enrolled in a basic French course (L3). At the time of study, they had received approximately 20 class hours of instruction. Advanced-English status was determined through information on TOEFL scores and previous coursework that was collected during the post-test (see *post-test* under section 2.2). All testing took place in their regular classroom settings during their regular class times in five intact groups.

## 2.2 Materials

The materials involved in the experiment were the verb stimuli used in the presentation and testing phases, and the post-test used after the delayed second testing phase.

### *Stimuli*

#### Verb conditions

Subjects were presented with 45 unknown French verbs in the following cognate verb form (translation equivalent) conditions:

- 15 French verbs that have a cognate translation equivalent in Spanish but a non-cognate translation equivalent in English (called the Spanish Cognate condition, or *SpCog*);

- 15 French verbs that have a cognate translation equivalent in English but a non-cognate translation equivalent in Spanish (called the English Cognate condition, or *EngCog*);
- 15 French verbs that have non-cognate translation equivalents in both Spanish and English (called the Non-Cognate condition, or *NoCog*);

Additionally, all English and Spanish translation equivalents differed in syntactic frame (see *frame status* under section 2.2).

The stimuli also included 45 French noun distractors which differed or coincided in grammatical gender with their Spanish equivalents in the use of a definite or indefinite article. This equal number of noun distractors served to keep the subjects unaware that the focus of the study was the choice of verb frame. A complete list of the 90 experimental stimuli may be found in Appendix A. The idea of using 45 French verbs that were cognates in Spanish, English, and French (such as *adaptar/adapt/adapter*) as distractors was initially considered. It was thought to be a way to extract further insight into the subjects' choice of frame when all three verbs were cognates, in particular contrast to the non-cognate condition in which all three verbs were not cognates. Further deliberation, however, clarified that the use of only verbs in the experiment would perhaps influence the subjects' awareness of the purpose of the experiment. The possibility of the addition of the all-cognate condition to the verb conditions was

considered and rejected, as this would have increased the total number of verbs to 60 (and the total number of stimuli to 120, once the 60 distractors were included). This would have prohibitively lengthened the time of the subjects' role in the experiment.

The greatest challenge to the execution of the experiment was the development of stimuli sets. Finding verb stimuli to satisfy the various conditions and characteristics proved to be a very difficult and time-consuming task. Nouns were found through a review of a French text (Bérard, Canier & Lavenne, 1996) and a French dictionary (Rey-Debove, 1999). Verbs were selected through searches of bilingual dictionaries (Sinclair Knight & Butterfield, 2003) and a grammar text (Becherelle, 1990) that included an exhaustive inventory over 3,000 French verbs in its *Dictionnaire orthographique des verbes*. Consultation with native speakers of Spanish, English, and French was employed throughout the stimuli set development and the subsequent sentence development. Verb lists (containing the Spanish, English, and French translation equivalents) were first constructed based on the cognate status condition of the verbs (SpCog, EngCog, and NoCog). The Spanish and English translation equivalents were then examined to verify that they contained differing grammatical frame characteristics (discussed below). Preliminary sentences were developed to establish the frame use in Spanish and English, in specific contexts, and provide possible sentences to translate into French for the testing phase of the experiment.

After exhaustive research, a list of all the verbs to be used was presented to professors of the basic French courses in which the test subjects were enrolled.

The professors indicated that eight of the verbs (*arrêter, écouter, écrire, gagner, montrer, oublier, ouvrir, rencontrer*) were already known to the subjects. These verbs were replaced with verbs not known to the subjects. The objective of reaching 15 verbs for each condition was arduous but ultimately achieved. The use of fewer verbs in each condition was not a desirable option because of the potential loss of stimuli due to subject prior knowledge that was solicited in the post-test. All the verbs were checked as being unknown to the subjects through administration of a vocabulary post-test.

#### Frame status

In all of the verb conditions, the Spanish and English verbs had differing frames, due to either reflexivity or prepositional complementation. Some Spanish verbs use a reflexive pronoun (*me, te, se, nos, se*), which normally occurs pre-verbally. The selection of reflexive verbs was limited to cases in which it has a clear grammatical, rather than semantic, application. In other words, the use of the reflexive available in English (myself, yourself, him/herself, etc.) was avoided as the semantically transparent utilization. An example of the English semantic reflexive would be *The hostage freed himself* (or in Spanish *El rehén se liberó*). The action is directed to the subject or “self”.

Prepositional complementation included Spanish and English use of different translation equivalents of prepositions (such as *de* and *with*), or one language using a preposition and the other not. Examples of the frame types used in the experiment follow:

1) Use of the reflexive in Spanish only:

Siempre *me* despierto a las 5am.

'I always wake at 5am.'

2) Use of a complement preposition in Spanish *and* English:

Los fanáticos amenazan *de* muerte a los traidores.

'The fanatics threaten traitors *with* death.'

3) Use of a complement preposition in Spanish *or* English:

La junta dura tres días.

'The meeting lasts *for* 3 days.'

4) Use of both reflexive and complement preposition:

*Nos* lamentamos *por* la decisión.

'We regret the decision.'

Of the 45 stimuli verbs used, 28 differed due to reflexivity alone, 8 differed due to prepositional complementation alone, and 9 differed due to a combination of both. The actual frame status of the French verbs is irrelevant since the verbs, and thus the verb frames, were unknown to the subjects. The experiment explores the subject's choice of English or Spanish frame based on the cognate

status of the novel French verb. A complete list of frame status of the 45 verb stimuli may be found in Appendix A.

### Cognate status

Cognate status was defined as the cognate verbs having at least 50% shared phonemes in the same linear order. To perform the analysis, all the inflections were removed, such as the verb endings *-ir*, *-er*, *-ar*, etc. Only the stem of the verb was taken into account. It should be noted that the inflectional systems between Spanish and French are very close in form, and may possibly have added to the cognate perception by the subjects. Orthographic similarities were first considered during the analysis, and then phonological characteristics were taken into account. The sharing of letters and phonemes was qualified in the following way: any letters (consonants or vowels) that were an exact match were counted as +1, and a vowel that was part of the same phoneme segment of a neighboring vowel was considered a partial match and counted as +0.5. Other partial matches that were also counted as +0.5 included phonemes with similar sounds such as [s], [c] and [z], [l] and [ll], [r] and [rr], [c] and [ch], [c] and [g], [dg] and [g], and [c], [k], [ck] and [qu]. For example, *rinse* and *rincer* are compared orthographically, and then the [s] and [c] are partially matched as similar sounds but different letters, therefore receiving a +0.5.

In the Spanish cognate condition, *con-* in *congelar* was accepted as a transparent prefix and counted as one item instead of three separate letters. Similarly, in the English cognate condition, *-ate* in *hesitate* was accepted as a

transparent suffix and counted as one item. Also within the English cognate condition, the *-n* on the verb *hasten* was considered a verb ending of the noun *haste* and therefore was not counted, even though it would count as a cognate without doing this. The mean proportion of shared phonemes of the Spanish cognates was 87.9%, while the mean of the shared phonemes for the English cognates was 85.9%. A complete list of the cognate criteria analysis of the 45 verb stimuli may be found in Appendix B.

#### Final stimuli sets

The final stimuli sets of the three conditions with the differing Spanish and English frames were established. Examples of the final verb stimuli are provided in Table 1:

<u>Condition</u>	<u>L1 Spanish</u>	<u>L2 English</u>	<u>L3 French</u>
SpCog	<i>durar</i>	<i>last for</i>	<i>durer</i>
EngCog	<i>voltearse</i>	<i>turn</i>	<i>tourner</i>
NoCog	<i>acordarse de</i>	<i>remember</i>	<i>souvenir</i>

Table 1: Examples of condition and frame status of verb stimuli

French sentences for the test session were originally developed in Spanish and English to ensure that the frames were being utilized correctly in a particular

context. The sentences were developed using simple vocabulary and grammar structures with which the subjects would be familiar or could, without difficulty, deduce because of their cognates in Spanish and/or English (such as *traidores/traitors/traîtres* or *presidencia/presidency/présidence*). The sentences were subsequently translated into French by a native speaker. With regard to frame, the reflexives in French (*me, te, se, nous, vous, se*) are similar to Spanish and their use was known to the subjects. This was confirmed through review of the French textbook used by the subjects (Berger & Spicacci, 2000). The use of the reflexive was presented on the fourth page of the first unit in the textbook under the section entitled *Se présenter*. With regard to the prepositions used in the Spanish and English frames, the French equivalents were chosen (such as *de* and *en* for the Spanish *de* and *en*, *avec* for the Spanish *con* and English *with*, *pour* for the Spanish *por* and the English *for*, etc.). A complete list of test sentences used for the 90 stimuli may be found in Appendix A.

#### Form of the instrument

The stimuli for the presentation phase were randomized across groups and conditions in two ways. First, all 90 stimuli were randomized through use of the Microsoft Excel random numbers function. Second, for each of the five presentations, a block of 18 was selected and moved to the end of the presentation so that each group saw the stimuli in a different overall order. This was done to ensure the validity of the experiment in that the order of the stimuli presented to the subjects would have no effect on the outcome. The sentences

for the first testing phase were randomized in the same manner as for the presentation phase, and the order of English and Spanish options was randomized for each verb tested. The sentences for the second testing phase were pseudo-randomized in two steps: first, by taking the randomized sentences that were used in the first testing phase and changing the order so that group 1 then saw group 3's test, group 2 then saw group 4's test, and so on. Second, for each of the rearranged tests, all the even-numbered sentences were moved to make up the top half of the test and all the odd-numbered sentences were moved to make up the bottom half of the test.

Both the response sheet and the post-test questionnaire sheet (examples of which may be found in Appendix C) were printed out and subjects were given ball-point pens to respond. The presentation and testing phases were presented on Microsoft PowerPoint slides, which were projected onto a white screen. The sessions were carried out in the subjects' normal classrooms during normal class times. The length of each class was approximately 50 minutes.

The only form of identification on the testing response sheets and the post-test questionnaires was the area for the subjects to put the last four digits (of the six digits total) of their student number. By doing this, the subjects maintained their anonymity while allowing the response sheets from the first and second testing phases, as well as the post-test questionnaire, to be identified as originating from the same subject.

### *Post-test*

A follow-up post-test questionnaire (in Spanish) was developed in order to elicit information from the subjects regarding the following points:

- English verbs – their prior knowledge of the English verbs used in the experiment was solicited. Subjects marked a *yes* or *no* box next to the verb to indicate if they knew the verb before the experiment. Through this, it was documented whether the subjects knew the English verbs that were used in the stimuli;
- French verbs – their prior knowledge of the French verbs used in the experiment was solicited. Subjects marked a *yes* or *no* box next to the French verb to indicate if they had been exposed to the verb before the experiment. They provided a translation in Spanish if they marked the *yes* box. Through this, it was documented whether the subjects knew the French verbs that were used in the stimuli;
- Personal strategies – questions regarding the subjects' use of personal strategies to study the words in the learning phase and the sentences in the testing phases were posed through an open-ended question format. An additional question provided an opportunity for the subjects to express any comments they might have had regarding the study or their participation in it;

- Previous level of study of English – subjects provided their TOEFL scores, details of their previous coursework in English, and any equivalent placement results in order to confirm their advanced level of English;
- Psychotypological beliefs – the subjects provided information on their psychotypological views on how Spanish, English, and French are related through a series of five multiple-choice questions. These questions explored their perception of the three languages with regard to language similarity, language genealogy, and ease of learning.

### 2.3 Procedure

The experiment was composed of three phases. The first part was the presentation phase that was conducted during the first session with the subjects. The second part was the testing phase, which was divided into two sections. One testing phase took place immediately after the presentation phase during the first session, while the other took place in the second session with the subjects a week later. The third part of the experiment was the post-test phase that occurred after the testing phase in the second session.

#### *Presentation phase*

The first part of the experiment was a presentation phase in which the French verbs in their infinitive form (with no frame information) were shown alone

on a PowerPoint presentation slide for two seconds, then for an additional five seconds with the Spanish and English translation equivalents underneath, including the respective frame information (use of reflexive pronoun or prepositional complement) for the English and Spanish verbs. The use of a PowerPoint presentation was chosen to ensure standardized implementation of stimuli presentation procedure. In each slide (see Figures 7-10), the French verb appeared in black, lower-case, 60-point Arial font while the Spanish and English translation equivalents appeared in gray, lower-case, 48-point Arial font. The distractor nouns appeared in the same format as the verbs with the addition of the French definite article (*le* or *la*) in front of the French verb (in gray) and the Spanish and English translation equivalents with no articles. The French article was included as the grammatical gender in the noun frame.



Figure 7: Example of Spanish cognate (*SpCog*) presentation slide



Figure 8: Example of English cognate (*EngCog*) presentation slide



Figure 9: Example of Non-cognate (*NoCog*) presentation slide



Figure 10: Example of distractor noun presentation slide

Instructions in Spanish were given orally and also appeared on the screen at the beginning of the presentation, along with an example. The first slide greeted the subjects, and the second slide announced that they would be “seeing a series of words in French”. The third slide advised them that “to help them learn the words, they would be presented with their Spanish and English equivalents”. The fourth slide provided them an example of a distractor noun slide. The fifth slide instructed them “to please study the words carefully” because, as the sixth slide states, “after the presentation, there will be a testing session”. A complete listing of the instruction slides for the presentation phase may be found in Appendix D. When subjects asked the purpose of the study, the response given was that the objective was to explore the mental processes while learning a third language. Students were asked to remain silent and to not take any notes during the presentation. The average duration of this phase was approximately 12 minutes.

### *Testing phase*

The second part of the experiment consisted of a testing phase (immediately after the learning phase) in which a series of pairs of sentences in French were shown to the students for 15 seconds each. Subjects were alerted to the slide changes through an audible click. The sentences contained the experimental stimuli from the learning phase. Each slide was numbered in bold, 44-point, Arial font. In each numbered slide, the sentences appeared in bold,

italicized, 32-point, Arial font (see Figure 11). The stimuli verbs and distractor nouns were underlined in order for the subjects to be able to identify them more easily and focus on those, rather than on other parts of the sentence. The students chose the sentence (A or B) that they thought was correct and marked it on their response. The only difference between the two sentences was the frame element. One sentence used the Spanish frame and the other used the English frame. For example, for the French verb *sécher*, the slide appeared as:

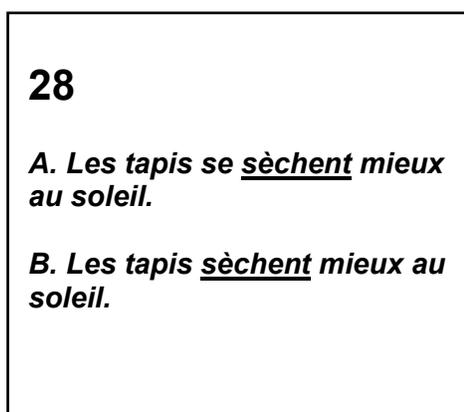


Figure 11: Example of testing phase slide

As shown in this example, the sentences varied only in the verb frame. Sentence A used the reflexive while sentence B did not. Sentence A could be translated using the Spanish frame as *Las alfombras se secan mejor al sol*. Sentence B could be translated using the English frame as *Carpets dry better in the sun*.

Instructions in Spanish were given orally and also appeared on the screen at the beginning of the testing phase. The first slide informed the subjects that

they would be “seeing pairs of sentences that included the words that they just studied”. The second slide asked them to “please indicate on the answer sheet which of the sentences (A or B) used the word correctly”. A complete listing of the instruction slides for the testing phase may be found in Appendix D. Students were asked to remain silent during the testing phase. The average duration of this phase was approximately 26 minutes.

A delayed second presentation of the testing phase took place exactly one week later in order to gauge the residual connections that may have existed. As previously noted, the stimuli were re-ordered for the delayed second testing phase.

### *Post-test phase*

Immediately following the delayed second testing phase, the third part of the experiment was conducted. It consisted of a follow-up post-test questionnaire in which the subjects provided elicited information (as described in the Materials section). Responses were recorded through checked boxes, and both multiple-choice and open-ended questions. Students were told to record their first impression and to not reflect for a long time on a particular question. The length of this phase was approximately 15 minutes. Subjects were allowed to leave the classroom after they finished the post-test. Subjects were given a can of Coke and a bag of M&M's as an expression of gratitude for their participation.

Results from the test, the delayed test, and the post-test questionnaire are discussed in the next chapter.