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Focusing on derivational-driven cognate patterns to promote vocabulary acquisition in Spanish

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ABSTRACT

EN Cognates have been heavily incorporated into second language (L2) vocabulary instruction as they share form and meaning across languages and have demonstrated an advantage for learning. The present article aims to measure the effects of explicit, cognate, derivational-driven instruction in L2 Spanish. 49 intermediate-low Spanish learners participated in the experiment and completed a pre- and post-lexical decision task in Spanish, followed by a language history questionnaire. 25 learners composed the explicit instruction group and 24 composed the control group. Results from a three-way ANOVA (2x4x2) analyzing reaction times and accuracy demonstrate that both explicit and control groups process cognates and non-cognates faster in the post-test. However, participants in the explicit instruction group process cognates less accurately and non-cognates more accurately in the post-test, which could be attributed to the activation of formal lexical features of the instruction intervention. Results are interpreted in light of the nature of L2 instruction and lexical representation.

Key words: COGNATES, DERIVATIONAL PATTERNS, VOCABULARY INSTRUCTION, EXPLICIT INSTRUCTION

ES Los cognados se han incorporado ampliamente a la enseñanza de vocabulario L2, ya que comparten forma y significado en varias lenguas y han demostrado ser una ventaja para el aprendizaje. El objetivo de este artículo es medir los efectos de la instrucción explícita de cognados y derivaciones en español como segunda lengua (L2). 49 estudiantes de español preintermedio participaron en el experimento y completaron una tarea de decisión léxica (pre y post), seguida de un cuestionario sobre su historial lingüístico. 25 alumnos formaron el grupo de instrucción explícita y 24 el grupo de control. Los resultados de ANOVA de 3 factores que analiza los tiempos de reacción y precisión demuestran que tanto el grupo de instrucción explícita como el de control procesan cognados y no-cognados más rápido en la prueba posterior; sin embargo, los participantes en el grupo de instrucción explícita procesan los cognados con menor precisión y los no cognados con mayor precisión en la prueba posterior, lo que podría atribuirse a la activación de las características léxicas formales del tipo de instrucción (explícita). Los resultados se interpretan a la luz de la naturaleza de la instrucción en la L2, así como de la representación léxica.

Palabras clave: COGNADOS, PATRONES DE DERIVACIÓN, INSTRUCCIÓN DE VOCABULARIO, INSTRUCCIÓN EXPLÍCITA

IT Le parole affini vengono proficuamente incorporate nella didattica del lessico della L2 poiché hanno uguali forma e significato in più lingue. Questo articolo esplora gli effetti dell'insegnamento esplicito basato sul processo di derivazione e sulle parole affini nello Spagnolo L2. 49 apprendenti di spagnolo di livello pre-intermedio hanno completato una prova di decisione lessicale (pre e post) in spagnolo, seguita da un questionario sull questionario sulla storia della lingua. Di questi, 25 sono stati assegnati al gruppo di insegnamento esplicito, 24 al gruppo di controllo. I risultati emersi con ANOVA a tre vie (2x4x2) per analizzare i tempi di reazione e accuratezza rivelano che entrambi i gruppi elaborano più rapidamente parole affini e non affini nel post-test. Tuttavia, nel post-test il gruppo di insegnamento esplicito compie un'elaborazione delle parole affini in modo meno accurato e delle non affini in modo più accurato. Ciò potrebbe essere attribuito all'uso di caratteristiche di lessico formale nell'insegnamento. Si interpretano i risultati alla luce della natura dell'insegnamento della L2 e della rappresentazione lessicale.

Parole chiave: FALSI AMICI, SCHEMI DERIVAZIONALI, INSEGNAMENTO DEL VOCABOLARIO, INSEGNAMENTO ESPLICITO

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1. Introduction

Previous studies on vocabulary acquisition in general have focused on vocabulary and language proficiency (Hazenberg & Hulstijn, 1996; Hu & Nation, 2000), vocabulary and lexical frequency (Coxhead, 2000; Hu & Nation, 2000; Nation, 2001), explicit versus implicit learning (Ellis, 1994), and incidental versus intentional learning (Ellis & He, 1999; Horst, Cobb, & Meara, 1998; Kelly, 1986; Qian, 1996). Although over 30 years of research in L2 vocabulary acquisition has been promoted (Bogaards & Laufer-Dvorkin, 2004), several linguistic and pedagogical-related factors that can impact vocabulary instruction and acquisition remain unexplored— for example, understanding how lexical[1] connections develop and how lexical features[2] may be decisive for L2 development (Ard & Homburg, 1983; Dressler, 2001; Hancin-Bhatt & Nagy, 1994; Nagy, 1993). As in the case of cognates, words that share form and meaning across languages, learners can make L1-L2 lexical connections if exposed to efficient teaching practices that consider shared lexical features as they may not automatically transfer from one language to another (Tréville, 1996).

The present article proposes a cognate vocabulary activity that controls for derivational structural properties, word length, and lexical frequency values. This study aims to answer the following questions: 1) What is the role of explicit instruction in the processing and acquisition of new words (cognates) in L2 Spanish? 2) Do L2 Spanish learners benefit from the English-Spanish cognate overlap during L2 lexical processing? 3) Do L2 Spanish learners benefit from explicit instruction during L2 lexical processing? The goal is to optimize lexical processing and learning through predictable word-formation patterns. Although vocabulary research has been extensively explored and cognate words remain a reasonable starting point for vocabulary teaching, further research can focus on explicitly exploring cognate instruction practices in the classroom and verifying their effectiveness.

2. Theoretical Background

2.1. Research on cognate training and awareness

Cognate awareness entails making connections among cross-linguistic cognates based on their structural (formal and semantic) relationships (Ellis, 1994). A series of empirical studies have investigated the degree of cognate awareness and the role of cognate-oriented training in different environments. Different studies have focused on reading tasks, cognate (morphological) awareness (Hipfner-Boucher, Pasquarella, Chen & Deacon, 2016), memorization, and direct instruction (Carlisle, 1988) and have shown a facilitative effect on L2 vocabulary learning. These studies included adolescent and adult bilinguals learning different languages such as Spanish, English, French, Dutch, Polish, and Arabic. Studies conducted by Hancin-Bhatt and Nagy (1994) and Nagy, García, Durgunoğlu, & Hancin-Bhatt (1993) worked with Spanish-English bilinguals and reading tasks. While Nagy et al. (1993) focused on cognate knowledge through reading and vocabulary multiple-choice tests, Hancin-Bhatt and Nagy (1994) focused on production tasks by applying lexical matching and translation tasks into L2 reading. Both studies show that participants can recognize English cognates based on their Spanish knowledge, and consequently, cross-linguistic cognate suffixation patterns facilitate lexical recognition compared to non-cognate patterns.

In addition, different cognate studies (Ard and Homburg, 1983; Cunningham and Graham, 2000; Harley, Hart, & Lapkin, 1986) also examined different language combinations, proficiency exams and achievement tests. While Ard and Homburg (1983) looked at Spanish and Arabic (L1)-English (L2) learners, Cunningham and Graham (2000) and Harley et al. (1986) focused on English-Spanish and English-French bilinguals compared to monolingual learners, respectively. Besides the language combinations, Harley et al. (1986) and Cunningham and Graham (2000) also compared traditional and immersion language learners. Ard and Homburg (1983) demonstrate that Spanish (L1) learners outperformed Arabic learners because of their ability to map Spanish-English cognates. Harley et al. (1986) and Cunningham and Graham (2000) showed that immersion learners outperformed monolinguals and traditional bilingual learners.

The studies above have reported positive outcomes associated with L2 cognate processing and learning. However, an important issue is the transparency of how classroom-based and vocabulary tasks occurred, as several studies lack such descriptions. As a result, language instructors are unable to replicate such

[1] The terms lexical items and vocabulary are used interchangeably and defined as the body of words one holds cognitively in one language.

[2] Lexical features: orthographical, phonological, and semantic characteristics of a word.

findings and deliver effective and practical L2-vocabulary lessons on the structural differences and similarities among cognates in two or more languages. The following section shows studies that examined the impact of explicit morphological instruction on cognate acquisition. Revisiting these studies demonstrates that cognate awareness is supported, but such practices are often limited to explicit or visual presentation of overlapping lexical features.

2.2. Research on cognate explicit morphological instruction

The exploration of explicit instruction in the analysis of cognate transfer and acquisition has been a subject of interest in various studies, as evidenced by the works of Caplan-Carbin (1995), Dressler, Carlo, Snow, August & White (2011), Jiménez, García, and Pearson (1996), Molnár (2010), Schmitt (1997), Tonzar, Lotto, & Job (2009), and Tréville (1996). These investigations have consistently reported positive pedagogical outcomes associated with incorporating explicit instruction in vocabulary learning. Such instructional approaches typically involve thoroughly examining explicit cognate-lexical similarities, incorporating metalanguage to elucidate cognate-lexical compositions, and decode semantic information. An integral aspect of this method is the explicit analysis of a word's grammatical classification, including its part of speech, thereby facilitating the decoding of the meaning of new cognate words in the second language (L2) through the utilization of previously acquired knowledge of cognate words in the first language (L1), exemplified by pairs such as "education" in English and "educación" in Spanish.

Caplan-Carbin (1995) observed a group of English-German bilinguals while Jiménez, García. & Pearson, (1996), and Dressler (2000, as cited in August, Carlo, Dressler & Snow 2005) observed Spanish-English bilinguals in their studies. Participants were explicitly instructed about cognates and performed better when inferring meaning from cognates while reading (Caplan-Carbin, 1995; Dressler, 2000; Jimenez et al., 1996). The authors argue that such ability is associated with systematic and phonological cognate transparency. Like Dressler (2000), Caplan-Carbin (1995) and Molnár (2010) also incorporate explicit instruction on cognates' structural similarities with Hungarian (L1)-Romanian (L2)-English (L3) trilingual speakers. Explicit instruction on the L2-L3 lexical structural similarities was beneficial, as participants outperformed the control group. Molnár (2010) affirms that cognate-based instruction prepares trilinguals to use their lexical knowledge in subsequent vocabulary acquisition. Explicit vocabulary training builds lexical connections, enhancing vocabulary acquisition. Cognate instruction can assist learners in overcoming difficulties while reading in L2 (Nagy et al., 1993).

Tonzar et al. (2009) and Tréville (1996) have also encountered positive training effects with Italian-English and English-French bilinguals undergoing vocabulary learning and recognition tasks. Results show cognates outperforming non-cognates on lexical retrieval. Tréville (1996) concludes that the presence of cognates per se does not result in automatic recognition benefits, but training allows learners to benefit from cognate structural similarities. These results support claims that L1 shapes L2 lexical acquisition (Schmitt & McCarthy, 1997), as it enables lexical mappings between languages. In addition, processing views hypothesize longer and deeper vocabulary engagement, manipulation, and examination results produce stronger retention that contributes to acquisition.

The studies above support stimulating L1-L2 lexical connections to promote L2 vocabulary acquisition and show facilitative results related to classroom practices. An issue arises as cognate awareness initiatives (Ard & Homburg, 1983; Carlisle, 1988; Cunningham & Graham, 2000; Hancin-Bhatt & Nagy, 1994; Harley et al., 1986; Nagy et al., 1993), or cognate explicit instruction practices (Caplan-Carbin, 1995; Dressler et al., 2011; Molnár, 2010; Schmitt & McCarthy, 1997; Tonzar et al., 2009; Tréville, 1996) lack a detailed description of how such pedagogical interventions (awareness or explicit training) took place in the classroom. Knowing the learners' processes engaged in and an account of the lexical choices included in the activity is essential to verify the instructional intervention's validity and reliability.

A series of studies have not revealed cognate facilitation results (Lightbown & Libben, 1984; Otwinowska-Kasztelanic, 2009; Rodriguez, 2001; Schmitt, 1997; Singleton, 2006). However, some authors advocate in favor of cognate training and awareness to compensate for the perceived lack of cognate recognition patterns. Both Lightbown and Libben (1984) and Soufra (2001) examined teenage bilinguals performing production tasks. Lightbown and Libben (1984) examined French-English bilinguals narrating a film containing cognates, and Soufra (2001; as cited in Singleton, 2006) examined English-Modern Greek bilinguals while translating. Results confirm that learners transfer language (Soufra, 2001) but sometimes fail to recognize cognates, even the most orthographically noticeable ones. Learners seem to avoid using cognates at first to prevent the risk of using false cognates, as seen in Schmitt (1997). After surveying Japanese-English bilinguals

about their vocabulary learning strategies, Schmitt (1997) observed that looking for lexical structural similarities was the last option participants selected. Lastly, Otwinowska-Kasztelanic (2009) had Polish-English bilinguals (different L2 proficiency levels) complete a survey and recognized that some learners were often unaware of morphophonological overlap between languages. These findings support previous claims from Swan (1997), who states that structural lexical similarities do not necessarily lead to L2-lexical transfer.

2.3. Lexical processes and cognate instruction

When revisiting previous research on cognate instruction, there is a general emphasis on the positive role of interlexical L1-L2 resemblance (Tréville, 1996) as well as the importance of language processing (Dressler et al., 2011; Jiménez et al., 1996), awareness (Otwinowska-Kasztelanic, 2009; Tréville, 1996), and explicit instruction (Caplan-Carbin, 1995; Dressler et al., 2011; Molnár, 2010; Tréville, 1996) in L2-vocabulary processing and acquisition. In addition, many studies seem to support a connectionist view of language learning as a theoretical framework, which claims that learning derives from the process of strengthening and weakening neural connections obtained from frequent stimuli in the input. These studies also align with the noticing hypothesis (Schmidt; 1990, 1993, 1994, 1995), which requires conscious input notice for processing and learning.

Barcroft's (2002) TOPRA model (Type of Processing – Resource Allocation) explores the interface between lexical-semantic and structural memory processes. The model states that lexical processes require form, meaning, and mapping trade-offs. These trade-offs are needed because processing sources are limited; thus, processing demands are adjusted and rearranged. For example, less memory is available for lexical-semantic processing when processing lexical form. Because cognates share form and meaning across languages, the processing load is minimal, explaining why learners can fail to recognize cognate formation lexical patterns across languages. Learners may fail to allocate memory resources to process form and meaning (Sunderman & Forcelini, 2021). Both semantic and formal processes must occur to build on a new lexical representation. Structurally oriented tasks may be the key to pushing learners to form cognate form-meaning L2 lexical mappings.

Former vocabulary instruction propositions often relied on intuitive practices presenting written lexical items and their correspondence with cross-linguistic forms or definitions. A plausible motivation for such practices is that words are generally less flexible for generalizations than linguistic units such as phonology and syntax. Cognates, however, allow for generalizations due to their formal features and have been heavily incorporated into vocabulary instruction. Because cognates demonstrate learning advantages (Schmidt, 1990, 1993, 1994, 1995), several pedagogical practices have shown how learners use their L1 cognate knowledge to build L2 vocabulary. However, as seen above, classroom-based studies often lack a detailed understanding of what factors play a role in L2 cognate acquisition.

Avoiding intuitive practices is key to maximizing vocabulary learning, as several studies show learners cannot recognize L2 cognates effortlessly and systematically. However, some studies also mention that cognate training and awareness can compensate for the lack of cognate recognition patterns. Therefore, it is fundamental to know how lexical items are processed and become acquirable in L2 and what transforms intuitive knowledge into conscious and available information so that learners can derive lexical patterns across languages.

This article presents and tests an explicit derivational-driven intervention that controls cognate formation patterns, such as derivational properties and lexical length and frequency. This proposition is theoretically based on Otwinowska-Kasztelanic's (2015) processing accounts, classified as the online association of formal and semantic units from the input. For instance, lexical processes include visually retrieving lexical features that compose a given word and retrieving means associating visual elements from a word with pre-stored lexical information from long-term memory. If learners can match semantic, orthographical, and phonological mentally represented lexical items to target words they see, then lexical processing takes place successfully. In sum, processing new words can be defined as building a mental representation in the lexicon and matching a lexical path for retrieval (Otwinowska, 2015). Barcroft's (2002) TOPRA Model also guides the present activity proposition.

This intervention exposes learners to vocabulary sets that can be processed together due to their similar structural properties. Although cognates are classified as words that share form and meaning across two or more languages, cognates can still differ based on their structural formation patterns. For example, the English-Spanish cognate words *train-tren* and *education-educación* are equally classified as cognates. However, the lexical derivational patterns in *education-educación* can help learners identify common lexical

characteristics to derive meaning from new L2 cognate encounters. In other words, not all cognates are created equal (Aguinaga-Echeverría, 2017; Schwartz, Kroll, & Diaz, 2007).

In addition to previous cognate-based studies, vocabulary instruction practices such as the input-based incremental (IBI) approach to L2 vocabulary instruction (Barcroft, 2004, 2006) have been contemplated to develop the present activity. The IBI approach considers a learner's limited processing resources. It provides comprehensible vocabulary input, allowing learners to process words in the input by promoting meaning-oriented situations, enabling them to make form-meaning connections. It also allocates sufficient time for vocabulary production, as shown to be beneficial in previous research (Barcroft, 2007; McNamara and Healy, 1995; Royer, 1973). These opportunities foster lexical connections, promoting long-lasting vocabulary acquisition. Unlike the IBI approach that focuses on words that do not share formal similarities across languages (non-cognates), the activity presented in this article focuses on cognates as they present structural and semantic overlap and use such similarities as pedagogical tools for vocabulary instruction. Previous studies such as Hancin-Bhatt & Nagy (1994) and Barcroft (2004) examined Spanish–English morphological knowledge in cognate recognition among fourth-eighth grade learners. The present study attempts to reconfirm such findings with adult learners and incorporate an explicit derivational-driven intervention to reinforce morphological and lexical patterns across languages.

3. Methods

The present study investigates the effects of explicit instruction on lexical processing and acquisition of Spanish cognates and non-cognates. In sum, this study intends to answer the following questions: What is the role of explicit instruction in the processing and acquisition of new words (cognates) in L2 Spanish? Do L2 Spanish learners benefit from the English-Spanish cognate overlap during L2 lexical processing? Do L2 Spanish learners benefit from explicit instruction during L2 lexical processing?

3.1. Participants

Forty-nine learners participated in the experiment; twenty-five composed the explicit instruction group and twenty-four the control group. Participants' ages in this group varied from 18-30 (mean age 21.5). All participants were enrolled in the third and fourth-semester Spanish semesters (second year of Spanish instruction) and Spanish for the Professions (second year of Spanish instruction) at the college level. These learners were voluntarily recruited from different classes, with a minimal level of language proficiency and L2-Spanish vocabulary knowledge, which was needed for the study's experimental tasks. In addition, as these learners are still developing their L2 skills, the effects of language instruction can be more salient.

3.2. Tasks

3.2.1. Lexical Decision Task (LDT)

All groups performed pre- and immediate post-lexical decision tasks (LDT) in Spanish as the main measure of L2 representation. In an LDT, a string of letters appears on the screen, while participants must covertly read the string of letters and decide by using a keypad if the written token is a real word in Spanish. All words presented were screen-centered, in Arial font and size 40 on a white background. During word recognition, an LDT prompts learners to engage in a lexical search that can match the visual lexical stimuli presented (Sunderman & Schwartz, 2008), and shared orthographical, phonological, and semantic aspects of the word are activated within and between languages. Accuracy and reaction times (RTs) were recorded.

For the following reasons, a lexical decision task was chosen to assess lexical processing sensitivity in online contexts. Sunderman and Schwartz (2008) state that when word recognition and competition are studied using a lexical decision task, students are prompted to search for words that fit the visual lexical stimuli given. As a result, regardless of the kind of visual or auditory exposure, all orthographical, phonological, and semantic components of the word are recovered during the lexical search (Dijkstra & Van Heuven, 2002). Because of this, words from various languages that have characteristics may trigger identical orthographical, phonological, or semantic representations during lexical retrieval, which would delay proper word identification. The lexical decision task lasted between 15–20 minutes. Figure 2 displays an excerpt from the Lexical Decision Task (LDT).

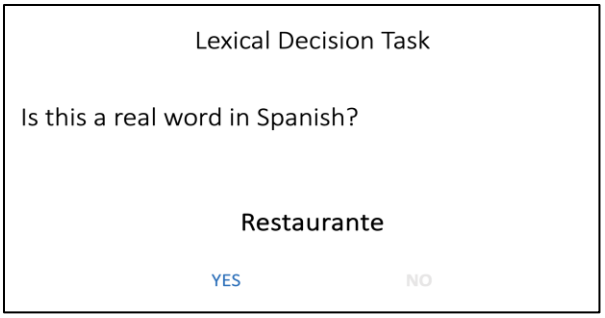

Figure 2. Excerpt from the Lexical Decision Task (LDT).

3.2.2. Language History Questionnaire (LHQ)

To determine whether their linguistic background varied significantly, a language history questionnaire (LHQ) was included as an instrument of students' proficiency as an individual measure. The questionnaire was composed of 35 questions that requested information from each participant regarding their age, gender, country of origin, native language, and language spoken at home. Besides allowing participants to self-rate their Spanish language skills (reading, writing, speaking, and listening), it also collects data regarding the number of languages each participant has been exposed to and the duration of such exposure(s). The language proficiency rating present in the questionnaire varied from a scale of 1 (least proficient) to 10 (extremely proficient). Participants consistently exposed to languages (L3) other than Spanish were excluded from the study.

3.2.3. Language Proficiency

In terms of language proficiency, self-reports in English proficiency, based on a one-way ANOVA, did not reveal a significant overall effect on English reading with less than 0.05 of the p-value among participants in each group.

In terms of language proficiency, self-reports in Spanish proficiency, based on a one-way ANOVA, did not reveal a significant overall effect on Spanish reading with less than 0.05 of the p-value among participants in each group. In sum, there were no statistical differences among the participants' self-reported English and Spanish proficiency levels among all treatment groups. As a result, no statistically significant differences among all participants' self-report proficiency allow us to compare their results. Table 1 presents the proficiency means of all participants in English and Spanish.

Table 1
Language proficiency ratings in English and Spanish

	Explicit Instruction Mean	Std Dev.	Control Mean	Std Dev.	F.	P.
English	9.36	.952	9.29	1.083	.055	.815
Spanish	4.32	1.345	4.92	1.248	2.585	.115

3.3. Task materials

A total of 405 words were included in the study. Semi-identical cognates, non-cognates, nonce cognates in Spanish, and pseudowords were included in the LDT. Only cognates were included in the treatment phase. A total of 135 words were English-Spanish cognate words, 90 non-cognate words, 90 nonce cognates, and 90 nonce words. All words included in the experiment were extracted from cognate dictionaries (Nash, 1997). In addition, cognates used by previous cognate studies (Comesaña et al., 2012; Schwartz et al., 2007) were also used as models for creating the stimuli of the present study.

All cognate words included in the experiment followed the same formation rules presented in the explicit cognate tutorial. Words included in the experiment that could be assigned a biological gender were only used once in one gender (feminine or masculine). Still, priority was given to masculine default words (e.g., *humano*). In addition, cognates whose stems allowed for different lexical derivations and/or inflections were only used once in the experiment to avoid priming/skewed processing reactions. For example, the word *difference* was excluded from the stimuli because the word *different* was already included. Although both words are cognates, only one stem representation was included.

A total of 90 non-cognate words in Spanish were included as control words in the stimuli. Non-cognate words matched in length and frequency compared to Spanish cognates and pseudo-cognates. All non-cognate words were selected from the textbook *Así Lo Veo* (Leeser, VanPatten, & Keating, 2011), which participants use in their third and fourth Spanish language level courses. All cognate and non-cognate frequency values, part of speech, and word length (based on the number of letters) were obtained from the NIM software (Guasch, Boada, Ferré & Sánchez-Casas (2013).

Lastly, a total of 90 pseudowords in Spanish were also included. All nonce words were generated from the websites Fake Word Generator (feldarkrealms.com) and soybomb.com. Fake Work Generator generates scripts based on pronounceable and frequent words derived from English, Old English, Japanese, German, and Latin. Soybomb.com generates nonce words based on a frequency list of phonemes present in legitimate English words. Nonce words were also normalized by six native Spanish speakers using a Likert Acceptance scale from 1-5. Words categorized as 1 and 2 were excluded from the stimuli. The motivation to include pseudowords is because it decreases the possibility of a lexical decision being performed based on superficial characteristics of the word formation by itself (De Groot, 2011).

All words included in the study were subdivided into three different cognate lists. All words included in List 1 matched their equivalent words in Lists 2 and 3 regarding word length, frequency, and word type (cognate, non-cognate, and nonce cognate). Word length was controlled in the experiment by matching the number of letters across the words used across two languages (English-Spanish) used in the present study. Words varied from five to 15-letter words. Regarding frequency, the cognate words included in all three lists were subdivided into 15 frequency rates ranging from 0.886 to 924.38 (frequency per million). Frequency values were obtained from the NIM software (Guasch, Boada, Ferré, & Sánchez-Casas, 2013), along with part of speech and word length regarding letter count. Out of all real words included in the experiment, a total of 104 words were classified as nouns, and 53 words were classified as adjectives. In addition, no word could receive both nominal and adjectival classification, as in the word '*positivo*' '*positive*'. No verbal or adverbial forms were included.

Table 2 below presents the word frequency distribution by cognate types included in the stimuli. In terms of word frequency, a one-way ANOVA reveals no significant difference among English words' frequency across all three lists. List 1(M = 103.59, SD = 113.10), List 2 (M = 104.72 SD = 113.35) and List 3 (M = 95.92, SD = 133.59). The frequency values in English were chosen as all participants were L1 English speakers at the beginning stages of learning L2 Spanish. Thus, participants' chances to make lexical connections can be controlled as their L1 lexical frequency was considered.

Table 2
One-way ANOVA for Word Frequency by Word List

		n	Mean Frequency	Std. Deviation
List 1	Training	45	103.59	113.10
List 2	LDT A	90	104.72	113.35
List 3	LDT B	90	95.92	133.59

In terms of word length, a one-way ANOVA reveals no significant difference among the length of words across all three lists. List 1(M= 8.22, SD= 1.66), List 2 (M= 8.29 SD= 1.87) and List 3 (M= 9.29, SD= 2.01). Table 3 summarizes the results of a one-way ANOVA for word length in each word list included in the experiment. There was not a significant difference between word length across all three lists [F (2, 402) = .027 p = .974] at the $p<0.05$ level.

Table 3
One-way ANOVA for Word Length by each Word List

		n	Mean Length	Std. Deviation
List 1	Training	45	8.22	1.66
List 2	LDT A	90	8.29	1.87
List 3	LDT B	90	9.29	2.01

3.4. Lexical structure of stimuli (cognate words)

Another key difference between previous accounts on derivational-driven cognate instruction is that the present activity focuses on controlling lexical formation patterns such as word length, frequency, and derivation status to determine cognate retention and acquisition predictability. The cognate formation patterns included are: (1) English cognates ending in consonants ('n' and 't') receive an extra vowel *'o'/ 'a'* in Spanish as in *'human', 'humano'*. Stress patterns fall on the penultimate syllable (paroxytones). (2) English cognates ending in *'ent'* receive an extra vowel 'e' in Spanish, as in '*accident', 'accidente'.* Stress patterns fall on the penultimate syllable (paroxytones). (3) English cognates ending in *'ical'* substitute *'a'* and *'l'* (al) to the vowel *'o'* in Spanish as in 'logical*', 'lógico'*. Stress patterns fall either on the penultimate syllable (paroxytones) or the antepenultimate syllable (proparoxytones). (4) English cognates ending in *'ist'* receive an extra vowel *'a'* in Spanish, as in *'capitalist', 'capitalista'*. Cognates in this category can be challenging for L2 learners because the termination 'a' is applied for both biological and grammatical genders. Thus, a *'capitalist concept*' or a *'capitalist idea'* are expressed as *'un concepto (masc) capitalista'* and *'una idea (fem) capitalista',* respectively. The stress pattern from this category falls on the penultimate syllable (paroxytones). (5) English cognates (adjectives) ending in *'ive'* replace *'e'* for *'o'* or 'a' in Spanish, as in '*decisive*'*, 'decisivo'.* Stress patterns fall on the penultimate syllable (paroxytones). (6) English cognates ending in *'ce'* replace *'e'* for *'i' and 'a'* in Spanish as in *'intelligence', 'inteligencia'.* All words in this category are grammatically feminine in Spanish, and the stress pattern falls on the penultimate syllable (paroxytones). (7) English cognates (nouns) ending in *'tion'* replace *'t'* for 'c' and add an acute accent mark over the last vowel *'o'* in Spanish as in '*condition', 'condición*'. All words in this category are grammatically feminine in Spanish. (8) English cognates (adjectives) ending in *'ous'* exclude *'u'* and add *'o'* or *'a'* in Spanish as in *'delicious', 'delicioso'.* Stress patterns fall on the penultimate syllable (paroxytones). (9) English cognates (nouns) ending in *'ty'* replace *'t*' and *'y*' (*ty*) for *'dad'* in Spanish as in *'identity*', *'identidad'* and are grammatically feminine in Spanish*.* The stress pattern found in this category falls on the penultimate syllable (paroxytones). (10) English cognates (nouns and adjectives) ending in *'ary'* will replace *'y'* for '*i*' and *'o' (io) or* 'i' and *'a' (ia)* in Spanish as in *'legendary', 'legendario'*. The stress pattern falls on the penultimate syllable (paroxytones). (11) English cognates (nouns) ending in *'gy'* replace *'y'* for '*i*' and *'a' (ia)* in Spanish as in 'biology'*, 'biologia'.* All words in this category are grammatically feminine in Spanish, and the stress pattern changes from the antepenultimate syllable in English to the penultimate syllable in Spanish. Lastly, in condition (12), English cognates (nouns and adjectives) are often identical. Cognates in this category usually end in *'al', 'ble', 'ar'* or *'or'* as in *'mental', 'sociable', 'rectangular, 'and 'motor',* respectively. Gender assignment varies among "identical" cognates as they depend on the part of speech, and the stress pattern also shifts. For cognates ending in *'al','ar'* or *'or',* the stress in English falls under the second or penultimate syllable and on the last syllable in Spanish as in 'local' /'loʊkəl/, /lo'kal/; similar, /'sɪmələr/, /simi'lar/ and 'terror' /'terər/, /te'ɾor/. For cognates ending in *'ble',* the stress in English falls under the last syllable and on the penultimate syllable in Spanish as in 'flexible'/'fleksəbəl/, / flek'siβle/. Some words in this category vary in stem in one letter, usually resulting from deleting one extra consonant as in '*different', 'diferente'* or the insertion of the vowel 'e' as in 'special' *'especial'*. Consonant deletion from English to Spanish occurs with the consonants *'f' and 'l'.*

Regarding lexical stress patterns and diacritics, Spanish words in which stress falls in the antepenultimate or third syllable (proparoxytones) carry an acute accent mark over the syllabic nucleus as in 'logical*', 'lógico'*. The accentuation patterns found in these cognates also change between languages. Lastly, all words from categories 1, 3, 5, 8, 10, and 12 are subject to the biological gender of the leading noun or subject pronoun in Spanish, in the case of adjectives. Table 4 displays all formal cognate patterns, examples, and differences in stress patterns.

Table 4
Cognate tutorial sample categorization words

Suffixation correspondence		Sample cognate		Word stress		Grammatical gender	Part of speech
English	Spanish	English	Spanish	English	Spanish	Spanish	
consonant	o, a	compact	compacto	**1**. 2	1.**2**.3	flexible	adj
ent	e	president	presidente	**1**. 2. 3	1.2.**3**.4	flexible	noun/ adj
ical	ico	classical	clásico	**1**. 2. 3	**1**.2.3	flexible	adj
ist	ista	activist	activista	**1**. 2. 3	1.2.**3**.4	flexible	noun
ive	ivo	alternative	alternativo	1. **2**.3.4	1.2.3.**4**.5	flexible	adj
ce	cia	relevance	relevancia	**1**. 2. 3	1.2.**3**.4	feminine	noun
tion	ción	edition	edición	1. **2**. 3	1.2.**3**	feminine	noun
ous	oso	delicious	delicioso	1. **2**. 3	1.2.3.**4**.5	flexible	adj
ty	dad	identity	Identidad	1.**2**. 3.4	1.2.3.**4**	feminine	noun
ry	rio	contrary	contrario	**1**.2.3	1.**2**.3	flexible	noun/ adj
gy	gia	biology	biología	1.**2**.3.4	1.2.**3**.4	feminine	noun
Frequent Identical spelling		central	central	**1**.2	1.**2**	flexible	noun/adj

3.5. Procedure

After taking the pretest (LDT), participants from the explicit instruction group (experimental group), watched an online tutorial to explicitly present overlapping lexical formation patterns among semi-identical cognates in English and Spanish. The goal of cognate-based explicit vocabulary instruction was to push learners to pay attention to the shared lexical features among cognates to make form-meaning connections and benefit from overlapping morphophonological features during cognate processing. The tutorial was based on the cognate-derivational patterns that English and Spanish share, which overlap between these languages.

The tutorial was streamed via computer. Participants watched the tutorial individually at a laboratory and were allowed to pause it and take notes during this phase. The tutorial was expository only, and no debates on its content were carried out afterward. The cognate-explicit tutorial has been designed for intermediate-low L2 consecutive learners of Spanish whose L1 is English. It targeted learners taking regular Spanish classes for three semesters or more. Participants watched an online tutorial on orthographical features/ lexical suffixation in English with its corresponding cognate in Spanish. The tutorial was presented as an animated video that lasted five minutes. The tutorial was visually presented, and no audio accompanied the animated and visual content. The tutorial started with a brief introduction defining cognates. Following the cognate definition, it presented twelve different rule-driven cognate categories that learners could follow to recognize and/or generate real cognates in Spanish. After presenting all 12 cognate rules, participants saw a chart containing all previously presented lexical rules. To counteract the effects of priming, participants only saw one instance of each cognate word per treatment or task. Figure 2 displays an excerpt from the video tutorial.

Figure 2. Excerpt from cognate tutorial

After watching the tutorial, participants also performed a Lexical Decision Task (post LDT). Participants' overall length of instruction ranged from 20 to 25 minutes. The control group watched a fictional show in Spanish with unrelated content between pre-and post-LDTs. Unlike the explicit instruction group, which watched a video focusing on derivational-driven lexical patterns of cognate composition and was invited

to ask questions about the video and pause/ take notes, the control group only watched a video with the same duration as the instructional intervention. The content of the unrelated video was carefully analyzed to ensure that no intentional input was provided to the control group that could directly affect the participants' post-test.

4. Results

To compare the performance of the control and experiment groups before and after treatment, the variance was analyzed to measure reaction times and accuracy when processing different types of words: cognates, non-cognates, nonce cognates, and nonce words. The key is manipulating different types of lexical overlap to measure its impact on word processes.

4.1. Reaction times

In terms of reaction times or how fast participants processed different types of words, a three-way ANOVA (2x4x2) was conducted. To ensure true cognitive processing measures were used and consequently were not affected by exceptionally fast or slow responses, data was trimmed in the following manner. Reaction times faster than 300ms or slower than 5000ms were excluded since they were considered outliers. Means for each condition were calculated for both target cognate types and matched controls for each participant. Next, standard deviations were found for each participant's mean. Reaction times above or below 2.5 standard deviations of the participant's means were also excluded from the data.

The variables included in the analysis were word type (cognates, non-cognates, nonce cognates, nonce words), test (pre and post), and instruction (explicit instruction and control). The results revealed no three-way interactions among any of the variables (word type, test, and treatment) [p-value=.793]. No significant two-way interactions between word types and test [p-value=.615] nor word type and treatment were found [p-value=.885]. Similarly, no two-way interactions were detected between the test (pre/post) and treatment (instruction vs. control) [p-value=.562]. For single effects, there was no effect between treatment types (instruction vs. control) [p-value=.144].

An effect was found between tests (pre/post) [p-value<.001]. In general terms, participants process all word types faster in the post-test than in the pre-test. Cognates are processed faster in the post-test (Mean=2228, SD=252) than in the pre-test, (Mean=2337, SD=205) [p-value<.001]. Non-cognates are processed faster in the post-test (Mean=1966, SD=214) than in the pre-test (Mean=2088, SD=216) [p-value<.001]. Nonce cognates are processed faster in the post-test (Mean=2628, SD=583) than in the pre-test (Mean=2892, SD=598) [p-value<.001]. Nonce words are processed faster in the post-test (Mean=2439, SD=624) in comparison to the pre-test (Mean=2616, SD=507)[p-value=.004].

When focusing on between word processing, an effect was found for word types [p-value<.001]. Participants process non-cognates (Mean=2024, SD=224) faster than cognates, (Mean=2283, SD=236) regardless of the group intervention (instruction/control). Results show that both groups processed non-cognates (Mean=2024, SD=224) faster than cognates (Mean=2283, SD=236). Nonce words (Mean=2528, SD=573) are processed faster than nonce cognates (Mean=2761, SD=603) and are processed slower than cognates (Mean=2283, SD=236), and nonce cognates are processed slower than non-cognates (Mean=2024, SD=224). Nonce words (Mean=2528, SD=573) are processed faster (Mean=2528, SD=573) than nonce cognates by both groups.

Table 5
Comparison of processing effects by word type (RTs)

Faster	Slower
Non-cognates (writer/escritor)	> Cognates (compact/compacto)
Non-cognates (writer/escritor)	> Nonce words (axsec)
Cognates (compact/compacto)	> Nonce cognates (elementa)
Cognates(compact/compacto)	> Nonce words (axsec)
Non-cognates (writer/escritor)	> Nonce cognates (elementa)
Nonce words (axsec)	> Nonce cognates (elementa)

4.2 Accuracy

In terms of accuracy or how precise (correct trials) participants processed different types of words, a three-way ANOVA (2x4x2) was conducted. The variables included in the analysis were word type (cognates, non-cognates, nonce cognates, and nonce words), test (pre and post), and instruction (explicit instruction and control). The results revealed no three-way interactions between word types, treatment, and test [p-value=.259], neither does it reveal a two-way interaction between test x instruction [p-value=.801]. However, it does reveal two-way interactions between word type x instruction [p-value=.002] and word type x test [p-value=<.0001]. Single effects in terms of word type were observed [p-value<.001]. There was no single effect between tests [p-value=.007]. No single effect was found between instruction types [p-value=.162].

Results show that accuracy rates seem to decrease on cognates; however, cognates are not processed significantly less accurately in the post-test (Mean=56.9, SD=047) compared to the pre-test (Mean=59.3, SD=052) [p-value=.999]. Non-cognates, on the other hand, are processed more accurately in the posttest (Mean=60.4, SD=064) compared to the pretest, (Mean=57.2, SD=040) [p-value<.001]. Similarly, nonce cognates are processed more accurately in the post-test (Mean=84.2, SD=011) compared to the pretest (Mean=77.6, SD=010) [p-value<.001]. Lastly, nonce words are not processed less accurately in the post-test (Mean=68.1, SD=056) compared to the pre-test (Mean=67.9, SD=043), [p-value=.409].

When comparing processes between word types in terms of accuracy, nonce cognates (Mean=80.9, SD=.115) are processed more accurately than cognates (Mean=58.2, SD=.051) as well as non-cognates (Mean=58.8, SD=.056). On the other hand, nonce words (Mean=68.0, SD=.051) are processed more accurately than non-cognates (Mean=58.8, SD=.056). Lastly, nonce cognates (Mean=80.9, SD=.115) are processed more accurately than nonce words (Mean=68.0, SD=.051).

Table 6
Comparison of processing effects by word type (Acc)

More Accurate		Less Accurate
Nonce Cognates (elementa)	>	Cognates (compact/compacto)
Nonce Cognates (elementa)	>	Non-cognates (writer/escritor)
Nonce words (axsec)	>	Non-cognates (writer/escritor)
Nonce Cognates (elementa)	>	Nonce words (axsec)

5. Discussion and Conclusion

The current study aimed to offer insight into the effective use of cognates throughout teaching. When looking at the effects of instruction on the processing of cognates and non-cognates in Spanish, results show cognates and non-cognates are processed significantly faster in the post-test. Results can be interpreted as one of the following regarding the effects of instruction and/or input on word processing and learning. On the one hand, it can show that formal isolated instruction (explicit) can benefit the processing of L2-Spanish real words because both cognate and non-cognate words presented faster processing times in the post-test. On the other hand, it can indicate that instruction does not strongly affect the processing of L2-Spanish real words because the control group (input only) also showed faster reaction times in the post-test. Regarding reaction times, the present results are still unable to support previous claims from Otwinowska (2009), who states that L2 cognate retrieval is possible even for beginner-level learners but only achievable if learners are trained to notice this type of vocabulary. As seen above, both the explicit instruction and control groups display faster reaction times in the post-test. Hence, one possible interpretation for the present results is that explicit instruction focusing on formal lexical (cognate) may have failed to demonstrate an effect in the post-test as results show they do not differ from regular L2 input (control group).

The results of the current study are partially misaligned with the cognate facilitation effect and earlier studies that have demonstrated cognates to be processed more quickly as well as more accurately than non-cognates Costa, Caramazza, & Sebastian-Galles, 2000; De Groot & Keijer, 2000; De Groot, 1992, 1993; De Groot, Dannenburg, & Van Hell, 1994; De Groot & Comijs, 1995; Dijkstra et al., 1998; Dijkstra, Grainger, & Van Heuven, 1999; Dijkstra & Van Hell, 2001; Ellis & Beaton, 1993; Kroll et al., 1998; Lemhofer & Dijkstra, 2004; Lotto & De Groot, 1998; Schelletter, 2002; Van Hell & De Groot, 1998).

The results of the current study confirm those of earlier research (Comesaña et al., 2012; Dijkstra et al., 2010), which demonstrated that cognate processes are not necessarily facilitative. When comparing processes

between word types, participants process non-cognates faster than cognates in the post-test, regardless of the group intervention. Results also show that nonce words are processed faster than nonce cognates by both groups. This seems to be a predictable pattern given that nonce words lack overlapping lexical features (semantics, orthographic, and phonological) between languages and do not activate cognitive competition for lexical retrieval. Interestingly, however, because nonce cognates are processed slower than nonce words, participants are trying to process nonce words that look like real cognates because they share some lexical features (semantics, orthographic, and phonological) with real cognates. In addition, nonce cognates are processed slower than non-cognates by both groups. As seen before, even though the lack of semantic property can allow nonce words to be processed faster, in the case of nonce cognates, it seems that the induced formal (orthographic and phonological) overlapping features with real cognates can activate real words in the bilingual brain and impose longer processing times. Similarly, comparing processes between word types for accuracy rates revealed that non-cognates and nonce cognates are processed more accurately in the post-test. The lack of overwhelming overlapping lexical features and cognitive activation (for nonce cognates) may be responsible for accurately rejecting these words as cognates in Spanish. Cognates, however, are not processed differently in the post-test. These results are undoubtedly unanticipated, given that previous research has shown the positive impact of cognate awareness (Dressler, 2001; Hancin-Bhatt & Nagy, 1994). The overlapping features between cognates do not seem enough to sustain the lexical transfer and ultimate acquisition of corresponding lexical items in L2. These findings support previous claims from Swan (1997), who states that structural lexical similarities do not necessarily lead to L2-lexical transfer. The results from the present study are surprisingly unable to support previous findings on cognate awareness (Ard & Homburg, 1983; Dressler, 2001; Hancin-Bhatt & Nagy, 1994; Nagy, 1993) and explicit instruction on the formal features cognates share (Caplan-Carbin, 1995; Dressler, 2011; Molnár, 2010; Schmitt & McCarthy, 1997; Tonzar, Lotto & Job, 2009; Tréville, 1996). Hence, previous claims by Robinson (1995), who concludes that "consciousness at the level of rule awareness facilitates learning" (p. 334).

The fact that learners did not present higher accuracy when processing cognate words in Spanish may also be related to the overall duration of explicit instruction (tutorial-based). Participants' overall length of instruction ranged from 20 to 25 minutes. To counteract the effects of priming, participants from the current study have only seen one instance of each cognate word per treatment or task. According to Elgort and Warren (2014), successful vocabulary learning requires a higher volume of lexical encounters for second-language learners who are less skilled. Instead of using a lexical judgment task, it is possible that other measurement tools (such as surveys, cloze tests, narrative, translation, and multiple-choice recognition tasks, to mention a few) could have yielded different findings. Because previous studies are showing the positive effects of implicit instruction through delayed post-tests (Benati, 2005, 2013; Benati & Batziou, 2018; Keating & Farley, 2008; Lee & Benati, 2007b; VanPatten, Farmer & Clardy, 2009; VanPatten & Fernández, 2004), it is possible to consider similar outcomes can be found with the inclusion of delayed post-tests.

When recalling the present study questions: 1) What is the role of explicit instruction in the processing and acquisition of new words (cognates) in L2 Spanish? 2) Do L2 Spanish learners benefit from the English-Spanish cognate overlap during L2 lexical processing? 3) Do L2 Spanish learners benefit from explicit instruction during L2 lexical processing? Results demonstrate that explicit instruction failed to demonstrate superior learning gains when compared to the control group results. In addition, because learners did not present higher accuracy when processing cognate words in Spanish and neither were cognates processed faster than other word types, participants did not seem to benefit from the English-Spanish cognate overlap during L2 lexical processing. Lastly, similar to results addressing question one, L2-Spanish learners did not benefit from explicit instruction during L2 lexical processing compared to regular input exposure (control group).

Future analyses involving more prolonged exposure to different types of vocabulary instruction can yield different or more robust results on the effects of instruction on vocabulary acquisition. As mentioned earlier, participants have only engaged in an immediate post-test to measure the effects of instruction on L2-vocabulary acquisition. Having included a delayed post-test could have shown different results on the impact of instruction on lexical processing and acquisition, as has been demonstrated in previous research (Benati, 2005, 2013; Benati & Batziou, 2018; Keating & Farley, 2008; Lee & Benati, 2007b; VanPatten, Farmer, & Clardy, 2009; VanPatten & Fernández, 2004).

The type of instruction applied in the present study was explicit, as it focused on bringing overt awareness to specific and predictable lexical derivational patterns that Spanish and English cognates share. Future research can compare the role of different types of instruction in cognate acquisition, such as comparing the effects of explicit and implicit instruction on cognate learning. As Rieder (2004) claims, studies on

understanding these differences in vocabulary learning and instruction are still scarce. The nature of implicit and explicit learning on L2-vocabulary remains unclear as vocabulary acquisition is often defined as *incidental*, *intentional*, *attended,* and *unattended* (Rieder, 2004). These constructs may overlap but can certainly be investigated in future studies.

The present study has exciting implications for classroom language instruction, as it can inform instructors about the types of instructions that may or may not benefit learners. Regarding promoting cognate-based language development, the results above have shown that input alone in the target language is sufficient. The presence of input in L2-Spanish will allow learners to make lexical form-meaning connections to process cognates in Spanish accurately. Hence, studies on the impact of vocabulary instruction can help instructors determine which, if any, are the most effective pedagogical interventions in the classroom. Understanding how lexical connections between languages work and how word factors such as derivational patterns, word length, and frequency can contribute to vocabulary acquisition and development success. When language instructors know how word features from different languages interact, the expectations on vocabulary processes and learning would become clearer, and better vocabulary activities could be implemented.

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ES **Doo Young Kim** es profesor titular de Estadística y Ciencia de datos en Sam Houston State University en Huntsville, Texas. Su principal interés de investigación es el Aprendizaje Estadístico con información dependiente del tiempo, y ha escrito artículos con conjuntos de datos de diversos campos de estudio. En su periodo previo a recibir su permanencia académica (tenure), desde otoño de 2018 hasta la primavera de 2023, el Dr. Kim se centró en ampliar su experiencia en investigación trabajando con personas de diferentes áreas de investigación y analizando datos de diversos campos de investigación. Por ejemplo, el Dr. Kim propuso varios modelos estadísticos eficaces para ayudar a las personas a tomar decisiones sobre asuntos relacionados con las ciencias de la salud, las ciencias ambientales, las finanzas, los deportes, etc. Desde que recibió la permanencia académica en otoño de 2023, el Dr. Kim se ha centrado más en el desarrollo de nuevas herramientas estadísticas que puedan ser eficaces en general para cualquier conjunto de datos de muchos campos de estudio. El Dr. Kim también está interesado en enseñar algoritmos de aprendizaje estadístico y programación con el lenguaje estadístico R. El Dr. Kim cree que el papel más importante de un estadístico es "Entregar la verdadera voz de la información complicada".

IT **Doo Young Kim** è professore associato di Statistica e Data Science alla Sam Houston State University a Huntsville, Texas. La sua area principale di ricerca è l'Apprendimento Statistico con informazioni time-dependent e ha scritto articoli con dataset provenienti da vari campi di ricerca. Dall'autunno del 2018 alla primavera del 2023. Kim ha ampliato il suo campo di ricerca lavorando con persone di altre discipline e analizzando dati da diversi settori. Ne è un esempio la proposta di usare modelli statistici efficaci ad aiutare le persone nei loro processi decisionali in materia di scienze della salute, scienze dell'ambiente, finanza, sport, ecc. Da quando è strutturato, nell'autunno del 2023, im si è dedicato allo sviluppo di nuovi strumenti statistici che possono essere utilizzati in maniera efficace per l'analisi di dataset di diversi settori. Inoltre, la sua sfera di interesse include l'insegnamento di algoritmi di apprendimento statistico e programmazione con l'uso di R. Kim crede che il ruolo più importante di uno statistico sia "estrapolare la vera voce da informazioni complesse".