Bergin, A. (2020): CONTAINMENT and CONTACT image schemas in Spanish-English bilingual children's speech: A case study. *Cultura, Lenguaje y Representación,* Vol. XXIII, 25–45
ISSN 1697-7750 · e-ISSN 2340-4981
DOI: http://dx.doi.org/10.6035/clr.2020.23.2

CONTAINMENT and CONTACT image schemas in Spanish-English bilingual children's speech: A case study

Esquemas de imagen de CONTENIDO y CONTACTO en discurso de niños bilingües de español-inglés: un estudio de caso

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Artículo recibido el / *Article received*: 2019-11-01
Artículo aceptado el / *Article accepted*: 2020-02-25

ABSTRACT: English necessitates a linguistic distinction when coding for spatial relations that Spanish does not necessarily make: that of differentiating between CONTAINMENT and CONTACT. Image schemas of CONTAINMENT and CONTACT are evoked when using language to distinguish between these two spatial relations. The speech of Spanish-English simultaneous bilingual children, aged four and seven, was studied to find out to what degree they are linguistically able to evoke these two different image schemas and thus make this distinction when speaking in English. 32 situations of CONTAINMENT and CONTACT were focused on and the children were prompted to describe them using *in*, *out*, *on* and *off*. The four-year-old showed a much lower command at coding for CONTACT linguistically in English than the seven-year-old. The seven-year-old was able to produce all the kinds of spatial relations at a much higher rate of accuracy though his use of *out*, for lack of CONTAINMENT, presented his greatest challenge.

Key words: bilingual, CONTACT, CONTAINMENT, image schemas, spatial relations.

RESUMEN: Al contrario de lo que ocurre en español, en inglés es necesario marcar lingüísticamente la diferencia entre las relaciones espaciales RECIPIENTE y CONTACTO. Los esquemas de imagen de RECIPIENTE y CONTACTO se pueden evocar cuando el lenguaje se utiliza para distinguir entre estas dos relaciones espaciales. En el estudio que aquí presentamos, realizado sobre niños bilingües simultáneos de español-inglés de 4 y 7 años, comprobamos la capacidad y el grado para evocar estos dos esquemas, y por lo tanto, expresar esta distinción cuando hablan en inglés. El estudio se centró en 32 situaciones de RECIPIENTE y CONTACTO en las que se les pedía a los niños que las describieran utilizando las preposiciones *in*, *out*, *on* y *off*. El niño informante de 7 años mostró mucho mayor dominio lingüístico en inglés en la codificación de CONTACTO que el niño de 4 años. El niño de 7 años fue capaz de producir todo tipo de relaciones espaciales en inglés con mayor ratio de precisión, aunque su mayor reto lo encontramos en el uso de la preposición *out*.

DOI: http://dx.doi.org/10.6035/clr.2020.23.2

Palabras clave: bilingüe, CONTACTO, esquemas de imagen, RECIPIENTE, relaciones espaciales.

1. INTRODUCCIÓN

Language provides an interesting window into our minds. How people use language continues to fascinate researchers, from language acquisition to language attrition. If we were to compare the amount of existing research into monolingual language use, as compared to research into bilingual or multilingual language use, the former much outweighs the latter. However, this has been changing over the last few decades as the academic world is ever increasingly interested in bilinguals. Over half the world's population is estimated to be bilingual, making research into bilinguals a pertinent issue (Tucker, 1999). What is more, understanding bilingualism would provide us with more insight into human cognition in general (Wierzbicka, 2011).

Usually research is done on successive bilinguals, meaning people who learned a second language as older children, teenagers and, above all, adults. The amount of literature on second language acquisition is enormous as compared to that on simultaneous bilinguals, who have been exposed to and used two first languages since birth (for definitions of successive and simultaneous bilinguals see Pavlenko, 2014: 21; Yip, 2013).

Studying the speech of bilingual people can give us an understanding of how their two languages are influencing one another. When it comes to describing spatial relations, languages differ in which relationships are commonly expressed and how this speech is encoded. This begs the question: to what degree are bilinguals able to attend to a difference specified in one of their languages when it is not commonly specified in their other language? In the case of relationships of CONTAINMENT and CONTACT, English makes a distinction between *in* and *on*, while in Spanish *en* can suffice to express either, without the need to specify which type of relationship is being expressed.

CONTAINMENT and CONTACT are two kinds of image schemas. Johnson (1987) defines image schemas as "embodied patterns of meaningfully organized experience" and "we couldn't begin to understand out experience" in life without them. Image schemas are expressed in speech, though the image schemas typically expressed varies from one language to another.

The Sapir-Whorfian hypothesis, named for Edward Sapir and Benjamin Whorf, and also known as linguistic relativity, predates both abovementioned linguists by millennia. However, Whorf ([1940] 1956) summed it up by stating that speakers of different languages "are not equivalent as observers but must arrive at somewhat different views of the world".

This article looks into the issue of Spanish-English simultaneous bilingual children using language to express these image schemas in English and to what degree they are apt to differentiate between two relationships which are not necessarily differentiated in Spanish, their stronger language.

2. THEORETICAL FRAMEWORK

2.1. COGNITIVE LINGUISTICS AND EMBODIMENT

As some academics, notably Leonard Talmy, Ronald Langacker and George Lakoff, in the 20th century felt unsatisfied with the lines of research and explanations

provided by generative linguistics, they created the field of Cognitive Linguistics (Evans, 2011; Evans & Green, 2006). Turning away from using grammar rules to explain language, they instead focused on other approaches such as usage-based approaches, studying the way people actually talk (Langacker, 1991: 265). In usage-based theory, a person shows their knowledge of language by means of their use of language (Evans, Bergen & Zinken, 2007).

Embodiment is another tenet of Cognitive Linguistics. This is the idea that we understand our world, reality and surroundings by means of our human body (Johnson, 1987: xiv). Our cognition is built upon the fact that we have a body and experience things through our body and its senses (Varela, Thompson & Rosch, 1993: 173). Forces that work upon us or that we inflict upon other things or people represent the embodied experience we have as humans, upon which, in turn, we understand our own reality (Johnson, 1987). According to Tyler and Evans (2003: 31) "meaning is itself embodied". Embodiment brings about conceptual structure and from there, brings about meaning (Evans & Green, 2006: 178). A fundamental part of embodied cognition is image schemas.

2.2. IMAGE SCHEMAS OF CONTAINMENT AND SURFACE

An image schema is a "recurrent pattern, shape, and regularity" that is "dynamic", (Johnson, 1987: 29). Image schemas «structure our understanding and reasoning», (Johnson, 1987: 101). They are the foundation upon which we can organize our knowledge (Oakley, 2007). We acquire our image schemas via all our senses long before we can express them linguistically (Evans & Green, 2006).

The CONTAINMENT image schema has been the subject of extensive research (Dewell, 2005). *In* and *out* are the linguistic units used to denote CONTAINMENT and lack thereof (Evans & Green, 2006). In order for a trajector to be contained within a landmark, some aspects are inherent: there is an element of protection by the landmark (as in the landmark having certain control over the trajector), the trajector has at least some limited movement and a degree of fixed location and anything within the trajector is necessarily also within the landmark (Johnson, 1987: 22). Furthermore, the trajector, smaller in size than its container, has defined boundaries as does the landmark, though there may be paths leading in and out of the landmark (Navarro i Ferrando, 2000).

In contrast to CONTAINMENT, the image schema of CONTACT, also referred to as SUPPORT, has received far less attention in the literature (Peña, 2008). A CONTACT schema requires some kind of two-dimensional bounded area (Peña, 2008) usually when the trajector is above the landmark and exerting some physical force upon it (Hedblom, Kutz, Mossakowski & Neuhaus, 2017). *On* and *off* represent the spatial relation of two objects touching and separated. This includes the trajector being on a supported surface and taken off a surface.

Even babies understand these image schemas of CONTAINMENT and CONTACT through their everyday experiences and observations (Mandler, 2005), e.g. taking things in and out of containers and putting things on and taking things off of other objects. The lexical units used to express these image schemas are acquired at an early age (Bowerman & Choi, 2003). *In* and *on* are among the first words an English-speaking child learns (Mandler, 2004: 250) and produces (Clark, 1973).

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2.3. LANGUAGE AND COGNITION

Every foreign language learner has grappled with the fact that languages express different ideas and occurrences. In English, most spatial relations are expressed by means of prepositions, but these same ideas can be expressed in a range of different ways in other languages (Hickman, 2010). Furthermore, people understand a much wider range of concepts than those that their language specifies linguistically (Radden, 1992).

This begs the question as to whether the spatial relations typically expressed and differentiated between in a language affect the cognition, or the worldview, of the speakers of that language, of which Whorf ([1940]1956) was so sure. This has been studied by testing speakers of one language and comparing them to speakers of a different language expressing the same ideas or events (e.g. Choi & Bowerman, 1991). For instance, studies comparing English speakers to Korean speakers, who distinguish between tight and loose fit via verbs rather than containment and support via prepositions, have shown that even toddlers are most attuned to the spatial relationships that are typically expressed in speech in the language they speak (Choi, McDonough, Bowerman & Mandler, 1999).

However, many scholars reject the Sapir-Whorfian hypothesis and prescribe to universalism, defending the idea that schemas and concepts are universal and precede language within the mind (Goddard, Wierzbicka & Dirven, 2004). Some experiments have provided evidence to support the idea of universalism (e.g. Li & Gleitman, 2002). So, is the idea of language influencing thought "wrong, all wrong" (Pinker, 1994: 55) or is the mind "influenced by the language spoken" (Levinson, Kita, Haun & Rasch, 2002)?

Slobin (1991) found a way to meet these two groups of scholars in the middle with his thinking for speaking hypothesis. This hypothesis states that language can influence thought when a person is formulating their ideas into speech. Evidence to support this hypothesis has been provided in experiments comparing German and French speakers as well as comparing English, German and Arabic speakers (Gerwien & von Stutterheim, 2018; von Stutterheim & Nüse, 2003). After comparing German speakers and French speakers describing the same video clips, it was concluded that "language use leads to language-specific processing routines, as evidenced in the distribution of attention allocation" (Gerwien & von Stutterheim, 2018: 235). Also, English speakers and Spanish speakers asked to retell a story they observed in picture form focus on different aspects of the same occurrences, with English speakers paying more attention to the manner in which an event took place whereas Spanish speakers directed their attention to the location, and changes of location, of the event (Slobin, 2003). Hence, language does not necessarily influence thought but attention is given to certain aspects when speaking in one language and others when speaking in another.

2.4. BILINGUALS AND COGNITION

Given that bilinguals outnumber monolinguals in the world (Tucker, 1999), researching bilinguals would provide greater understanding to more than half the population in the world, making it a crucial field of research. Unfortunately, much more research has been done on participants who are monolinguals than on successive bilinguals and even less so on simultaneous bilinguals (Meisel, 2010).

Bilinguals experience language differently than monolinguals (Bialystok, 2001) and are constantly having to juggle their two languages (Green, 2011). Even when one language is dominant and one is weaker, bilinguals experience two-way cross-linguistic influence (Daller, Treffers-Daller & Furman, 2011) and their language use of one

language is influenced by concepts previously learned in their other language (Jarvis, 2011). When speaking in one language, the other language is always activated (Kroll, Dussias, Bogulski & Valdes Kroff, 2012). Linguistic units that are closely related in meaning and have two separate words in only one of the two languages a bilingual speaks, like *in* and *on*, are those most likely to undergo interference (Gathercole, 2011), such as a Spanish-English bilingual attending less to the distinction between these two lexical units.

Bilinguals are liable to show in-between performance, wherein they exhibit some likenesses to each of their languages when speaking (Pavlenko, 2011). Evidence has also been found to suggest that bilingual minds are restructured as a result of bilingual language use (Park & Ziegler, 2014).

There are still many unanswered questions in regard to how bilingual cognition can be affected by the two languages regarding space in different ways (Majid, Bowerman, Kita, Haun & Levinson, 2004). The field of cognitive linguistics can offer many "fresh perspectives" on bilingual research (Evans, 2011).

In order to delve into this issue, this paper is a case study of two bilingual children whose dominant first language (Spanish) does not require linguistic differentiation between CONTAINMENT and CONTACT, whereas their weaker first language does. We aim to examine to what degree these children attend to this linguistic difference by producing appropriate language in English when prompted.

3. METHODOLOGY

To do so, 32 situations were drawn up. In each situation, the participants would be prompted to express these image schemas in English, as that is the language that necessitates linguistic differentiation between CONTAINMENT and CONTACT. A response was elicited from the participants in each situation that would access their image schema for CONTAINMENT when using *in* and *out*, and that of CONTACT when using *on* and *off*. On the list of situations were 15 examples of CONTAINMENT and 17 examples of CONTACT. These situations were selected as being accessible within the home where the children live using objects already owned by the family. As their mother, I had access to the participants, aged four and seven, with whom I interacted individually and recorded their responses. It was expected that their oral production would be more natural if done in their home where they are comfortable.

For the most part, the children were asked to observe something or watch something being done. If the child happened to be doing an activity that represented one of the situations, he was asked to say what he was doing.

When eliciting, for example, "bowl on a counter", I would take a bowl and while placing it on the counter, ask, "What am I doing with the bowl?" The child's response would be recorded as either appropriate ("putting it on the counter") or inappropriate ("in the counter"). On other occasions, I would seek a response regarding something the child was doing or should do as in "Where do we put the dirty clothes?" in order to elicit "in the hamper", or "What are you doing with your shoes?" to elicit "taking them off".

To make the experiment easier on the four-year-old, I would often state the name of the trajector and/or landmark as in "I have this shirt and this hanger. What am I doing with them?" Giving participants in studies certain words to use with elicited responses is done in some experiments (Brown & Gullberg, 2011). This was also done occasionally with the seven-year-old participant though not to the same extent.

Sometimes frustration on the part of the participant impeded data gathering, in which case I would attempt to ease the frustration first and if nothing could be done, the

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activity would stop and be continued at a later time. This happened usually when the four-year-old was either not giving responses or when he was asked to repeat an unintelligible response. The aim was to make the experience more pleasant for the participants but also in order to lessen stress that leads to cross-linguistic interference in bilingual speech (Grosjean, 2013).

Another way to ensure cooperation was to promise a reward of some kind to the participant. A reward could be getting a piece of candy or an activity like going to the park or watching TV after a data gathering session.

Again, in regard to frustration and cooperation, the data gathering sessions varied in length of time. On occasion, no results were obtained and at other times, multiple clear responses were recorded. The seven-year-old tended to produce more elicited responses much more willingly in a shorter time than compared to his younger sibling.

Data gathering was always done with the participants individually. This was in order to get a response that was not influenced by the other participant and also to avoid one sibling distracting the other from the tasks. When gathering data, there would often be short pauses in conversation as I stopped briefly to write down responses.

The children were encouraged to be more specific or use longer utterances at times, for example if a preposition was absent from the response or if the response was unintelligible. Positive reinforcement was given for a clear response containing a preposition, regardless of it being appropriate or inappropriate. If two consistent responses were recorded regarding the same kind of spatial situation, I would not ask about it again. However, if the answers were inconsistent, I would ask again on other occasions until either appropriate or inappropriate responses outnumbered the other. When the child produced an unelicited utterance regarding one of the 32 spatial relationship situations, it was also recorded. Other spontaneous examples of evoking CONTAINMENT and CONTACT schemas were also recorded.

Using a changing expression to prompt rather than a locative one tended to work better. Almost all the prompts consisted of "What am I doing with the _____?" and "Now what am I doing with the _____?" to elicit either *in* and *out*, or *on* and *off*, with the same trajector. For example, "Where is the shirt?" to elicit "in the closet" was not nearly as effective as was me putting the shirt in the closet while asking "What am I doing with the shirt?" Children's attention levels increase when motion is involved (Dewell, 2005), so few locative questions were used overall.

4. RESULTS

The results were classified as either appropriate (using the preposition in English corresponding to the image schema) or inappropriate (using an incorrect preposition that did not evoke the image schema). Results were divided into kinds of situations: situations involving toys, clothes, kitchenware and bedroom furniture and total instances of appropriateness (abbreviated to App in the tables) and inappropriateness (abbreviated to Inapp in the tables) overall were calculated, as well as the percentages of accuracy in using each preposition and appropriateness in evoking both CONTAINMENT and lack thereof and CONTACT and lack thereof.

Table 1. 7-year-old's results for activities involving toys

TOYS	IN vs OUT		ON vs OFF		
1. Put the toys in the toy bin	App: 2	Inapp: 0	4. Put the ear on Mr. Potatohead	App: 2	Inapp: 0
1.Take the toys out of the toy bin	App: 2	Inapp: 0	4. Take the ear off Mr. Potatohead	App: 2	Inapp: 0
2. Put the pieces in the box	App: 2	Inapp: 0	5. Put the car on the track	App: 2	Inapp: 1
2. Take the pieces out of the box	App: 2	Inapp: 0	5. Take the car off the track	App: 2	Inapp: 1
3. Put the toys/pieces in the bag	App: 2	Inapp: 0	Totals: In App: 100% On App:80.0% Out App: 100% Off App:80% CONTAINMENT: 100% CONTACT: 80%		
3. Take the pieces out of the bag	App: 2	Inapp: 0			

When interacting with toys (see Table 1 above), the seven-year old's only inappropriate responses evoking image schemas occurred with "putting the car on the track" and "taking the car off the track". While it is true that he hasn't had much linguistic input in English of a caregiver talking about putting a car on and taking a car off the track that would draw his attention to the CONTACT quality of this toy (Casasola, Bhagwat, Doan & Love, 2017), at seven he has had enough experience with CONTACT situations and English linguistic input in general to have made this distinction. Labeling the car as being *in* and *out* of the track shows how he is less likely to think for speaking about CONTACT when his dominant language does not necessitate linguistic differentiation between CONTACT and CONTAINMENT.

One instance that is not calculated in Table 1 above happened when playing with Mr. Potatohead (situation 4). The seven-year-old said "…then you put it in there" when I was trying to elicit "put the ear on". When I asked him to clarify, he declined to do so. It could have been that he was referring to putting the stub of the ear into the hole of the potato, in which case evoking CONTAINMENT would have been appropriate, even though the ear itself ends up having CONTACT with the potato and not inside it. As mentioned above, unclear responses were not calculated into percentages.

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Table 2. 4-year-old's results for activities involving toys

TOYS	IN vs OUT		ON vs OFF		
1. Put the toys in the toy bin	App: 3	Inapp: 0	4. Put the ear on Mr. Potatohead	App: 0	Inapp: 3
1. Take the toys out of the toy bin	App: 2	Inapp: 0	4. Take the ear off Mr. Potatohead	App: 1	Inapp: 3
2. Put the pieces in the box	App: 2	Inapp: 0	5. Put the car on the track	App: 0	Inapp: 3
2. Take the pieces out of the box	App: 2	Inapp: 0	5. Take the car off the track	App: 1	Inapp: 2
3. Put the toys/pieces in the bag	App: 3	Inapp: 0	Totals: In App: 100% On App: 0% Out App: 87.5% Off App: 28.6% CONTAINMENT: 93.8% CONTACT: 15.4%		
3. Take the pieces out of the bag	App: 3	Inapp: 1			

In dealing with toys (see Table 2 above), the four-year-old managed quite well with CONTAINMENT in general, though more appropriateness was observed with *in* than *out*. In terms of CONTACT, the results are far different. He was unable to evoke the CONTACT schema using *on* during the data gathering sessions with the toys. He also used *in* and *out* when dealing with Mr. Potatohead. As discussed above, this could have been appropriate, considering that there is a tiny hole for a stub to go into. However, given he did not distinguish linguistically between CONTAINMENT and CONTACT with the car on and off the track, it is hard to say whether Mr. Potatohead really evoked his CONTAINMENT image schema. What I infer from this is that the four-year-old was thinking for speaking using Spanish spatial distinctions.

Table 3. 7-year-old's results for activities involving clothes and costumes

CLOTHES and COSTUMES	IN vs OUT		ON vs OFF		
6. Put the clothes in the hamper	App: 3	Inapp: 0	10. Put the shirt on the hanger	App: 2	Inapp: 0
6. Take the clothes out of the hamper	App: 3	Inapp: 0	10. Take the shirt off the hanger	App: 2	Inapp: 0
7. Put the shirt in the closet	App: 2	Inapp: 2	11. Put the jacket on the hook	App: 2	Inapp: 0

7. Take the shirt out of the closet	App: 2	Inapp: 2	11. Take the jacket off the hook	App: 2	Inapp: 0
8. Put the shorts in the drawer	App: 3	Inapp: 0	12. Put your shoes on	App: 3	Inapp: 0
8. Take the shorts out of the drawer	App: 2	Inapp: 1	12. Take your shoes off	App: 2	Inapp: 0
9. Put your shoes in the shoe bin	App: 3	Inapp: 0	13. Put the glove on	App: 3	Inapp: 0
9. Take your shoes out of the shoe bin	App: 2	Inapp: 2	13. Take the glove off	App: 3	Inapp: 0
Totals: In App: 84.6% On App: 100% Out App: 64.3% Off App: 100% CONTAINMENT: 74.1% CONTACT: 100%			14. Put the mask on	App: 2	Inapp: 0
			14.Take the mask off	App: 2	Inapp: 0

What stands out most about the seven-year-old's results when dealing with clothes and costumes (see Table 3 above), is his completely appropriate use of CONTACT-evoking prepositions. Apparently, he struggled to evoke CONTAINMENT appropriately.

When eliciting "take the shoes out of the shoe bin", a rectangular plastic box in our entryway where they keep their shoes, he used *off* the shoe bin. It is true that this bin is at times overflowing so that more than removing a shoe from the boundedness of the bin, it was actually more like taking something off a pile and ceasing to have contact. Nevertheless, he did not use *on* when "put the shoes in the shoe bin" was being elicited, which does not suggest he viewed this bin as a CONTACT spatial relationship.

He also said "taking it [a shirt] off the *armario* and "taking them [shorts] off of the drawer" when *out* was being elicited. All the instances in Table 3 of inappropriate lack of CONTAINMENT are when he used *off* instead of *out*.

Table 4. 4-year-old's results for activities involving clothes and costumes

CLOTHES and COSTUMES	IN vs OUT			ON vs OFF	
6. Put the clothes in the hamper	App: 4	Inapp: 0	10. Put the shirt on the hanger	App: 1	Inapp: 2
6. Take the clothes	App: 2	Inapp: 1	10. Take	App: 2	Inapp: 0

 DOI: http://dx.doi.org/10.6035/clr.2020.23.2

out of the hamper			the shirt off the hanger		
7. Put the shirt in the closet	App: 2	Inapp: 0	11. Put the jacket on the hook	App: 0	Inapp: 2
7. Take the shirt out of the closet	App: 2	Inapp: 0	11. Take the jacket off the hook	App: 0	Inapp: 3
8. Put the shorts in the drawer	App: 2	Inapp: 0	12. Put your shoes on	App: 1	Inapp: 3
8. Take the shorts out of the drawer	App: 2	Inapp: 0	12. Take your shoes off	App: 2	Inapp: 1
9. Put your shoes in the shoe bin	App: 5	Inapp: 0	13. Put the glove on	App: 1	Inapp: 3
9. Take your shoes out of the shoe bin	App: 2	Inapp: 1	13. Take the glove off	App: 1	Inapp: 3
Totals: In App: 100% On App: 23.5% Out App: 80% Off App: 53.3% CONTAINMENT: 91.3% CONTACT: 37.5%			14. Put the mask on	App: 1	Inapp: 3
			14. Take the mask off	App: 3	App: 0

The four-year-old's results regarding clothes and costumes (see Table 4 above) show linguistic command in situations of CONTAINMENT but not in situations of CONTACT. When using *in*, all his responses were appropriate and when using *out*, most were appropriate, in accordance with research showing children's accurate use of *in* comes before *out* (Clark, 1973).

Again, like in the situations with toys, he was much stronger when expressing CONTAINMENT. Also, yet again, when talking about CONTACT, his use of *off* was more appropriate than his use of *on*.

Table 5. 7-year-old's results for activities involving kitchenware

IN THE KITCHEN/MEALS	IN vs OUT		ON vs OFF		
15. Put the cocoa in the cup	App: 4	Inapp: 0	22. Put the plate on the table	App: 3	Inapp: 1
15. Take the cocoa out of the cup	App: 2	Inapp: 1	22. Clear the plates off the table	App: 3	Inapp: 0
16. Put the grapes in the bowl	App: 3	Inapp: 0	23. Put the bread on the plate	App: 3	Inapp: 2
16. Take the grapes out of the bowl	App: 2	Inapp: 0	23. Take some bread off the plate	App: 3	Inapp: 1
17. Put the cup in the microwave	App: 2	Inapp: 0	24. Put the fork on the napkin	App: 4	Inapp: 0
17. Take the cup out of the microwave	App: 2	Inapp: 1	24. Take the fork off the napkin	App: 3	Inapp: 0
18. Put the ladle in the drawer	App: 3	Inapp: 1	25. Put the cup on the counter	App: 3	Inapp: 0
18. Take the ladle out of the drawer	App: 3	Inapp: 2	25. Take the cup off the counter	App: 3	Inapp: 0
19. Put the fork in the basket	App: 3	Inapp: 0	26. Put the pot on the stove	App: 3	Inapp: 0
19. Take the fork out of the basket	App: 3	Inapp: 1	26. Take the pot off the stove	App: 2	Inapp: 0
20. Put the milk in the fridge	App: 3	Inapp: 0	27. Put the magnet on the fridge	App: 3	Inapp: 1
20. Take the milk out of the fridge	App: 3	Inapp: 2	27. Take the magnet off the fridge	App: 2	Inapp: 0
21. Put the water in the water bottle	App: 3	Inapp: 0	28. Put the cap on the water bottle	App: 2	Inapp: 0
21. Pour the water out	App: 2	Inapp: 0	28. Take the cap off the water bottle	App: 2	Inapp: 0

Totals:
In App: 95.5% On App: 84.0%

Out App: 70.8% Off App: 94.7%

CONTAINMENT: 82.6%
CONTACT: 88.6%

When dealing with kitchenware (see Table 5 above), the seven-year-old gave the highest rate of inappropriate responses when *out* was being elicited. So though his responses were most appropriate when using *in*, overall when expressing CONTAINMENT he was not as strong as when expressing CONTACT. When a response was inappropriate, it was due to substituting *off* for *out*. This happened twice, once with a ladle and once with a whisk, when prompting him to say "taking it out of the drawer" (situation 18) and he instead said "taking it off the drawer". In these instances, while the

 DOI: http://dx.doi.org/10.6035/clr.2020.23.2

drawer was quite full leading to him perhaps having evoked CONTACT, the kitchen utensils were definitely within the boundedness of the drawer, unlike the example above of the shoes piled above the rim of the shoe bin.

Also, he showed more appropriateness when using *off*, as in evoking lack of CONTACT, than evoking CONTACT with *on*, just as his brother did when dealing with clothes.

Table 6. 4-year-old's results for activities involving kitchenware

IN THE KITCHEN/MEALS	IN vs OUT		ON vs OFF		
15. Put the cocoa in the cup	App: 3	Inapp: 0	22. Put the plate on the table	App: 0	Inapp: 2
15. Take the cocoa out of the cup	App: 2	Inapp: 0	22. Clear the plates off the table	App: 0	Inapp: 2
16. Put the grapes in the bowl	App: 4	Inapp: 0	23. Put the bread on the plate	App: 0	Inapp: 4
16. Take the grapes out of the bowl	App: 2	Inapp: 1	23. Take some bread off the plate	App: 0	Inapp: 2
17. Put the cup in the microwave	App: 1	Inapp: 2	24. Put the fork on the napkin	App: 2	Inapp: 1
17. Take the cup out of the microwave	App: 4	Inapp: 0	24. Take the fork off the napkin	App: 0	Inapp: 2
18. Put the ladle in the drawer	App: 2	Inapp: 0	25. Put the cup on the counter	App: 0	Inapp: 2
18. Take the ladle out of the drawer	App: 2	Inapp: 0	25. Take the cup off the counter	App: 0	Inapp: 2
19. Put the fork in the basket	App: 2	Inapp: 0	26. Put the pot on the stove	App: 0	Inapp: 2
19. Take the fork out of the basket	App: 2	Inapp: 0	26. Take the pot off the stove	App: 0	Inapp: 2
20. Put the milk in the fridge	App: 3	Inapp: 0	27. Put the magnet on the fridge	App: 0	Inapp: 4
20. Take the milk out of the fridge	App: 2	Inapp: 1	27. Take the magnet off the fridge	App: 1	Inapp: 3
21. Put the water in the water bottle	App: 4	Inapp: 0	28. Put the cap on the water bottle	App: 1	Inapp: 2
21. Pour the water out	App: 2	Inapp: 0	28. Take the cap off the water bottle	App: 0	Inapp: 2

Totals:	
In App: 90.5%	On App: 15.0%
Out App: 88.9%	Off App: 6.3%
CONTAINMENT: 89.7%	
CONTACT: 11.1%	

Regarding the four-year-old's results with situations involving kitchenware (see Table 6 above), not only do we yet again see that he uses prepositions that evoke CONTAINMENT more appropriately than those evoking CONTACT, but his appropriate use in English of evoking CONTACT is the lowest of any set of situations.

Situation 28 proved especially difficult for him. At times, he was not able to produce a response that could be classified as either appropriate or inappropriate. For instance, when I tried to elicit "the cap is on the bottle", once he responded "*cerrado*". And when I took the bottle cap off, he responded "*abrir*". In cases like these, we went on to talk about another situation, and I would wait until at least the following day to ask about that spatial relationship again.

Other responses that could not be considered either appropriate or inappropriate, as they lacked prepositions evoking image schemas, included "here", "put it here", "put it counter", "the counter" and "put it the stove".

Overall, his appropriate use of *off* was at the lowest rate as compared to situations with toys and clothes. Also, when dealing with toys and clothing, his appropriate use of *off* was greater than that of *on* and when dealing with kitchenware we see the opposite. Overall, when using *on* and *off* for CONTACT, he was weakest with the kitchen situations. Though not nearly as striking, his overall rate of producing appropriate CONTAINMENT expressions with *in* and *out* is also lowest compared to situations with toys and clothes.

After observing the lack of interest in the kitchenware spatial relations, if a similar experiment were to be conducted in the future, it would not contain situations with kitchenware. Part of the low appropriate use for CONTACT, and even possibly CONTAINMENT, could be due to simply a lack of interest.

Table 7. 7-year-old's results for activities involving bedroom furniture

BEDROOM FURNITURE	IN vs OUT		ON vs OFF		
29. Push the trundle bed in	App: 2	Inapp: 0	30. Put the pillows on the bed	App: 3	Inapp: 2
29. Pull the trundle bed out	App: 3	Inapp: 0	30. Take the pillows off the bed	App: 2	Inapp: 1
			31. Put the sheet on the bed	App: 4	Inapp: 0
			31. Take the sheet off the bed	App: 3	Inapp: 0

 DOI: http://dx.doi.org/10.6035/clr.2020.23.2

Totals: In App: 100% On App: 76.9% Out App: 100% Off App: 72.7% CONTAINMENT: 100% CONTACT: 75.0%	32. Put the books on the shelf	App: 3 Inapp: 1
	32. Take the books off the shelf	App: 3 Inapp: 2

In the bedroom furniture situations (see Table 7 above), there was only one instance of CONTAINMENT (situation 29) for which the seven-year-old consistently produced responses that were 100% appropriate.

"Putting pillows on the bed" and "taking books off the shelf" were situations in which he produced two inappropriate responses, his highest number in this category. However, when asked on other occasions, in the end he produced more appropriate than inappropriate responses for these spatial relations. It is worth mentioning that while putting pillows on the bed and taking them off (situation 30) proved challenging to linguistically express CONTACT, with the same landmark, his responses for putting sheets on the bed and taking them off (situation 31) were consistently appropriate.

Table 8. 4-year-old's results for activities involving bedroom furniture

BEDROOM FURNITURE	IN vs OUT		ON vs OFF		
29. Push the trundle bed in	App: 2	Inapp: 0	30. Put the pillows on the bed	App: 1	Inapp: 2
29. Pull the trundle bed out	App: 3	Inapp: 0	30. Take the pillows off the bed	App: 0	Inapp: 3
			31. Put the sheet on the bed	App: 3	Inapp: 1
			31. Take the sheet off the bed	App: 0	Inapp: 2
Totals: In App: 100% On App: 40.0% Out App: 100% Off App: 0.0% CONTAINMENT: 100% CONTACT: 22.2%			32. Put the books on the shelf	App: 0	Inapp: 3

The four-year-old showed his lowest rate of appropriateness with his use of *off* in situations 30-32 at 0% in situations involving bedroom furniture (see Table 8 above). Neither the bed as a CONTACT landmark nor the bookshelf as a CONTACT landmark

(with pillows, sheets and books as trajectors) caused him to linguistically distinguish the spatial relation from that of CONTAINMENT. He produced *out* in all his responses that would have required *off*. He also failed to produce *on* to evoke CONTACT as regards the bookshelf and a book (situation 32). In fact, one of his responses when I was eliciting "on the bookshelf" was "put it not out".

He did however, produce some appropriate language but not the elicited situations. For example, when eliciting "take the blanket off the bed", he stated "the blanket in your hand" and "the blanket on the floor", which were both appropriate at the time. So he was able to linguistically convey CONTACT with a blanket as a trajector and the floor as a landmark.

Table 9. 7-year-old's totals in terms of appropriateness

CONTAINMENT		CONTACT	
IN	OUT	ON	OFF
APP: 40/43	APP: 35/47	APP: 47/55	APP: 41/46
INAPP: 3/43	INAPP: 12/47	INAPP: 8/55	INAPP: 5/46
93.0%	74.5%	85.5%	89.1%
83.3%		87.1%	

Table 10. 4-year-old's totals in terms of appropriateness

CONTAINMENT		CONTACT	
IN	OUT	ON	OFF
APP: 42/44	APP: 34/39	APP: 11/53	APP: 11/46
INAPP: 2/44	INAPP: 5/39	INAPP: 42/53	INAPP: 35/46
95.5%	87.2%	20.8%	23.9%
91.6%		22.2%	

The differences in results between the siblings are remarkable. The seven-year-old was capable of appropriately using all four prepositions that evoke the two image schemas at a greater rate than inappropriately. He could evoke CONTAINMENT by using *in* almost always but *out* for lack of CONTAINMENT presented a greater challenge to him. He was more accurate in his use of *off* for lack of CONTACT than in his use of *on* for CONTACT. This was unexpected as I assumed not having an equivalent for *off* in Spanish would pose more of a challenge to linguistically express the spatial relationship of lack of CONTACT. Perhaps the fact that lack of CONTACT would be expressed in Spanish as a verb, *quitar (de)*, quite dissimilar phonetically from *off*, made it easier for him to avoid cross-linguistic influence. It seems that *in* and *on* were tougher for him to differentiate as they are semantically and phonologically similar, and make a distinction that only exists in one of his two languages (Gathercole, 2011).

He was most willing, cooperative and produced responses faster when dealing with toys as opposed to clothes, kitchenware and bedroom furniture. If a similar experiment were to be designed, having the landmarks and trajectors be solely toys would surely facilitate the process for everyone involved.

Regards the four-year-old, he actually proved to have a greater command of CONTAINMENT and lack of CONTAINMENT than his brother. However, he struggled to linguistically code for CONTACT and lack of CONTACT. Like other study

 DOI: http://dx.doi.org/10.6035/clr.2020.23.2

participants who are children of linguists (e.g. Celce-Murcia, 1973), he also showed frustration and uncooperativeness, at times refusing to respond, though he became more cooperative as the experiment went on. He was most reluctant to answer when *on* was being elicited, which is telling as it was the preposition with the highest rate of inappropriate production. The situations with kitchenware were the only ones in which he inappropriately used *in*. At times he even responded with the Spanish preposition *en*, and those responses could not be calculated as they do not clarify which spatial relation is being expressed.

Comparing the two siblings, it is noticeable that the younger brother showed a higher rate of linguistic appropriateness for CONTAINMENT, especially when using *out* appropriately. In contrast, the older brother was vastly more appropriate in his use of CONTACT with both *on* and *off* than was the four-year-old.

5. CONCLUSION

This case study attempted to find out to what degree two simultaneous Spanish-English bilingual children are able to code for a spatial relation in one language that is not usually linguistically coded for in their other language. Both children showed a greater command of producing language that attends to CONTAINMENT than CONTACT. The semantic and phonological similarities between *in* and *on* produce a great deal of cross-linguistic influence, seemingly more at age four than at age seven.

The difference in the two children's results in this study suggest that possibly some of the issues concerned with linguistic expression and/or coding for spatial relationships in different ways in each language are resolved between the ages of four and seven.

This qualitative case study was on a small scale with a sample of only two participants. In the future, a similar experiment could be done on a larger scale in order to gather data quantitatively and hence draw firmer conclusions.

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 DOI: http://dx.doi.org/10.6035/clr.2020.23.2

APPENDICES

Appendix 1:

TOYS IN vs OUT ON vs OFF

1. Put the toys in the toy bin /take the toys out of the toy bin	4. Put the ear on Mr. Potatohead /Take the ear off Mr. Potatohead
2. Put the pieces in the box /Take the pieces out of the box	5. Put the car on the track/Take the car off the track
3. Put the toys/pieces in the bag /Take the pieces out of the bag	

CLOTHES and COSTUMES

6. Put the clothes in the hamper /Take the clothes out of the hamper	10. Put the shirt on the hanger /Take the shirt off the hanger
7. Put the shirt in the closet /Take the shirt out of the closet	11. Put the jacket on the hook /Take the jacket off the hook
8. Put the shorts in the drawer /Take the shorts out of the drawer	12. Put your shoes on /Take your shoes off
9. Put your shoes in the shoe bin /Take your shoes out of the shoe bin	13. Put the glove on /Take the glove off
	14. Put the mask on /Take the mask off

IN THE KITCHEN/MEALS

15. Put the cocoa in the cup /Take the cocoa out of the cup	22. Put the plate on the table/Clear the plates off the table
16. Put the grapes in the bowl /Take the grapes out of the bowl	23. Put the bread on the plate /Take some bread off the plate
17. Put the cup in the microwave /Take the cup out of the microwave	24. Put the fork on the napkin /Take the fork off the napkin
18. Put the ladle in the drawer /Take the ladle out of the drawer	25. Put the cup on the counter /Take the cup off the counter
19. Put the fork in the basket /Take the fork out of the basket	26. Put the pot on the stove/Take the pot off the stove
20. Put the milk in the fridge /Take the milk out of the fridge	27. Put the magnet on the fridge/Take the magnet off the fridge
21. Put the water in the water bottle /Pour the water out	28. Put the cap on the water bottle/Take the cap off the water bottle

NEATENING UP ROOM

29. Push the trundle bed in /Pull the trundle bed out	30. Put the pillows on the bed/Take the pillows off the bed
	31. Put the sheet on the bed/Take the sheet off the bed
	32. Put the books on the shelf/Take the books off the shelf

Appendix 2: Prompts

What am I doing with the _____? What am I doing with the _____ now?
Where is/are the _____?
Where does it go?
What are you doing (with the _____)? / What did you do (with the _____)?
Where should I put this? /What should I do with this?
What do we do with this?
Where can we put that?
Where do you put the _____?
So now you/I have to…. /So now I am ….. (and the child finished the sentence)
Where do you keep your _____?
What do I do if I want to eat the _____?
How do you play? /What do we need to do to play?
What are you going to do with that?
Gesturing without speaking, e.g. for taking clothes **out** of the hamper (situation 6)
Now make a sentence with [these two objects] _____ and _____.

Sometimes preceding a prompt to clarify names of objects being used:
Here is your _____.
This is a _____ (and this is a _____).
What is this called?

In order to clarify when the response was not clear:
Where is the *car* in relation to the *track*? / What am I doing in regards to the *box*?
Is there another way to say that? / Can you say it another way?
Can you use a complete sentence?