

# Searching for cultural influences on the body-specific association of preferred hand and emotional valence

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## Abstract

Prior research has shown that right-handers tend to associate the right side of space with positive ideas and the left side of space with negative ideas, but left-handers associate right with negative and left with positive. No effect of the standard cultural association of right with good was found superimposed on this pattern. Can cultural conventions modulate this body-specific association? Here we compared Spanish and Arab cultures, which differ in the pressure against the left and in favour of the right. In spite of clear indications that cultural pressure against the left is stronger in Arab than Spanish culture, we observed no traces of an increased tendency to associate right with good in Arab righties. So far, there is no evidence for an effect of cultural conventions on the strength of body-specific conceptual associations.

**Keywords:** conceptual metaphor; body specificity; cultural conventions; Arabic; handedness; emotional valence.

## Introduction

Many languages and cultures associate the right side with good things and the left side with bad things. This is revealed in linguistic expressions like “my right-hand man” and “he has two left feet,” or cultural conventions like patterns of sitting at tables, house and church design, burial practices and so on (McManus, 2002).

In spite of exposure to such wide and consistent cultural and linguistic patterns, Casasanto (2009) demonstrated that left-handers tend to associate left with positive ideas and right with negative ideas, whereas right-handers show the culturally-licensed mapping. Thus, each group associates good more strongly with their dominant side, a body-specific effect on conceptual structure. Because there are no cultural or linguistic conventions that link the left with good things, neither cultural nor linguistic experience can predict or explain the body-specificity in left-handers or

the difference between right- and left-handers’ judgments. Rather, bodily differences determine the direction of space-valence associations.

Interestingly, Casasanto (2009) found no evidence of a cultural influence towards good-is-right superimposed on the body-specific pattern. In fact, overall, the strength of the association between preferred side and positive evaluation was significantly stronger in left-handers than in right-handers – a trend observed consistently over five experiments. Similar results have been found in children. In right- and left-handers as young as five years old, the good-is-left mapping in lefties is already significantly stronger than the good-is-right mapping in righties (Casasanto & Henetz, 2011). The same trend was observed in spontaneous gestures (Casasanto & Jasmin, 2010). Based on these results in English and Dutch speakers, it appears that cultural conventions associating good with right play no role in establishing the conceptual mapping between left-right space and ideas of good and bad.

Yet, the left-right conventions in English and Dutch culture may not be as strong as in some other cultures. In English and Dutch, ‘left’ is associated with clumsy, but not necessarily with filthy or evil. Arab culture, however, has stronger conventions in favor of the right and against the left. In Arab culture there are taboos against the left that apply to all kinds of everyday activities. For example, Muslims should never use their left hand for eating or drinking because it represents the bad, twisted, dark and dirty. The left hand can only be used for personal hygiene or other dirty activities (Mateo, 2010; Westermack, 1926). If culture does play a role in establishing the conceptual association between left-right space and emotional evaluation, its effect should be more detectable in Arab culture than in the cultures Casasanto and colleagues have tested previously, which lack stringent taboos against the

left. Here we compared the mapping between left-right space and emotional valence in Arabs, Spaniards, and bicultural Arabs living in Spain.

### Experiment 1: Space-Valence Associations in Spaniards and Bicultural Arabs

Our first step was to replicate Casasanto's (2009) findings in Spanish right- and left-handers. This would extend prior observations to a new culture and language which had not been tested so far. Spain shares the main characteristics of Western culture with previously tested American and Dutch groups (Casasanto, 2009), but it also differs in important ways because of its Catholic roots, versus Protestant (religion has been shown to be instrumental in affecting attentional styles, see Colzato, van den Wildenberg & Hommel, 2008). In addition, the Spanish language belongs to a different linguistic family, the Romance languages (versus Germanic).

We also set out to extend prior results to bicultural participants, by including a group of Arabs living in Spain. Participants in this group were highly fluent bilinguals who had lived in Spain for many years. They came mostly from neighboring Morocco, but also from other Arab countries such as Tunisia or Mauritania. This group carried out the task in Spanish.

#### Method

**Participants.** There were a total of 53 participants, mean age 25.6 years, age range: 20-53 years. The Spanish group consisted of 29 students of the University of Granada: 9 left-handers (7 female) and 20 right-handers (6 female). All of them were native Spaniards, had never lived in an Arabic country for longer than an occasional stay and did not know any Arabic language. The Arabic group consisted of 1 left-hander (female) and 23 right-handers (10 female). They were recruited by means of advertisements placed both within and outside the university. Linguistic and family information of three participants was lost due to a computer problem. For the remaining participants, their average number of years in Spain was 5.7 (range 1-15). Sixteen of them were originally from Morocco, one from Senegal, one from Tunisia, one from Mauritania, and two were born in Europe to Arab families. All of them but one were native or highly fluent speakers of at least one Arabic language (mostly Standard Arabic and Moroccan Darija). All of them were also native or highly fluent in at least one European language (mostly Spanish or French) and all of them were fluent in Spanish. None of them had any problem in understanding the instructions or communicating with the experimenter in Spanish.

**Procedure.** We used a Spanish version of Experiment 3 from Casasanto (2009). The participants were presented with a sheet depicting a cartoon character seen from above with a box on the left and another on the right (see Figure

1). They were told that the character (named Bob or Mohamed, according to the participant's culture) was planning a trip to the zoo and that he loves zebras and thinks they are good but hates pandas and thinks they are bad (or vice versa, as animal-to-valence assignment was counterbalanced). Participants were instructed to place the good animal in the box corresponding to good things, and the bad animal in the box corresponding to bad things. Responses were given orally and without visual support from the diagram sheet, to prevent manual responses (e.g., pointing). After completing this task, the participants answered five debriefing questions: the first two questions were fillers ("Are you studying Spanish or French?" and "If you had to choose, would you say that today it will be rainy or sunny?"), followed by one relevant debriefing question ("Why do you think you placed the good animal in the box that you did?"). After one more filler question ("If you had to choose between keeping animals in the zoo or letting them stay free, what would you choose?"), there was a final debriefing question ("Do you think that the side of your dominant hand might have influenced your decision to place the good animal in the box that you chose?"). After the questions, the participants were asked to report their handedness.

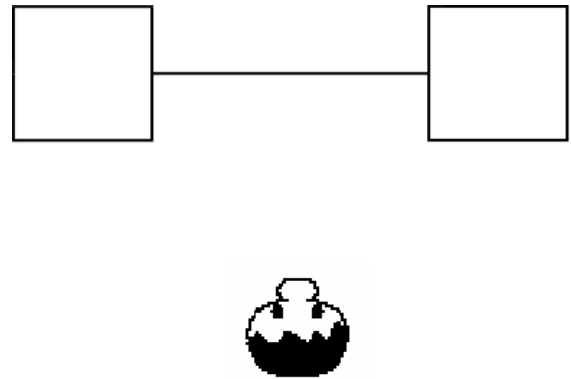


Figure 1: The diagram sheet presented to participants. The diagram was removed from view before participants responded, necessitating an oral rather than a manual response.

#### Results and Discussion

The final debriefing question was used to filter out those participants that suspected a relation between handedness and their choice of location for the good and bad animals (2 Spaniards and 3 Arabs, all of them right-handed). All analyses were run on the remaining participants.

In the Spanish group, a majority of left-handers placed the good animal in the box on the left of the character (7 out of 9, 77.7%), whereas a majority of right-handers placed the good animal in the box on the right (12 out of 18, 66.6%;  $p = 0.04$  by *Fisher's Exact Test*<sup>1</sup>; see Figure 2).

<sup>1</sup> All reported *Fisher's Exact Tests* were two-tailed.

Thus, there were significant differences between right- and left-handers in their space-valence associations: the majority of participants placed the good animal in the box on their dominant side.

As we found only one Arabic lefty, we only compared the Spanish and Arabic right-handed groups. We did not find differences between them (12 out of 18, 66.6% vs. 17 out of 20, 85%,  $p = 0.26$  by *Fisher's Exact Test*), indicating that the right-is-good association was not significantly stronger in Arabs than in Spaniards.

We note that in this sample, the majority of left-handers were women whereas the majority of right-handers were men. It is unlikely, however, that this chance association of handedness with gender accounts for the body-specific association of space with valence, given that this effect has been shown in previous studies in which gender was controlled (Casasanto & Henetz, 2011), and even in a study involving only men (Casasanto & Jasmin, 2010).

Summing up, data from the present study replicate Casasanto's (2009) body specificity findings, and suggest that cultural experience does not modulate the body-specific association between lateral space and emotional evaluation. However, the strength of conceptual mappings in the Spanish-acclulturated Arab participants may have changed as a result of their long immersion in Spanish culture and language. Would Arabs who have never lived in a Western culture show an effect of their cultural taboos?

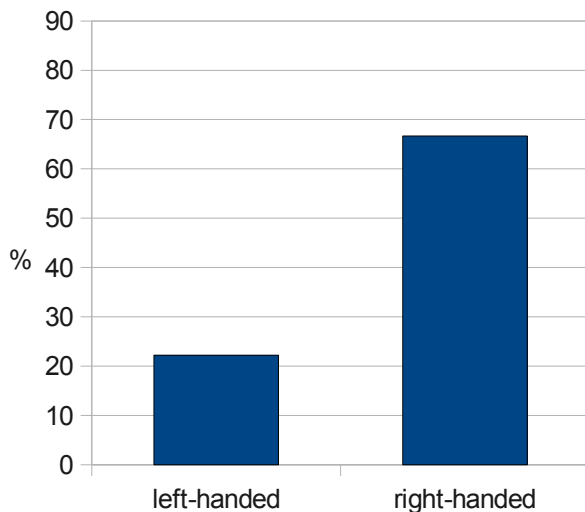


Figure 2: Percentage of good-on-the-right responses in the Spanish group as a function of handedness. Whereas the majority of right-handers implicitly associated good with right and bad with left, the majority of left-handers implicitly associated good with left and bad with right.

## Experiment 2: Space-Valence Associations in Moroccan Arabs

We went to Morocco to test an additional group of Arab participants in the same task. All participants were immersed in an Arab culture (in Morocco) and language (Darija, the local dialect of Arabic). We also improved the laterality measure, changing to a completely implicit 4-point scale (see details below).

### Method

**Participants.** Forty students (15 female; age range 19-30 years) from the University Abdelmalek Esaadi of Tetouan (Morocco) were paid for their participation. All of them were born in Morocco and had never resided in a Western country (with two exceptions: one participant was born and lived in Spain up to age 3, and another lived in Gibraltar up to age 9). All of them were either native speakers of Darija or highly fluent in this language. We failed to find any left-handers.

**Procedure.** The procedure was the same as for the prior groups, with the exception that materials were translated into Darija. The self-report of handedness was removed. Instead, we devised an implicit handedness test with four items. A ball was placed on a table in front of the participant, and s/he was asked to grab it and throw it to the experimenter. Then, a blackboard with a chalk and an eraser was placed on the table, and the participant was asked to write his name down. S/he was then asked to erase it. Finally, a cardboard tube was placed on the table and s/he was asked to grab it and look through it. The hand used to grab the ball, chalk, eraser and tube was recorded. Using the right hand was coded as +1 and using the left hand was coded as -1. Additionally, a subsample of 24 participants also responded to an oral version (in Darija) of the Edinburgh Handedness Inventory (EHI, Oldfield, 1971) after completing the implicit laterality test.

### Results and Discussion

Two participants were filtered out because they reported at debriefing that handedness was related to their response. The implicit laterality measure again revealed a total lack of left-handers. Only 7 participants out of 38 used the left hand in one item of the implicit measure. No participant used the left hand for more than one item. The EHI provided converging results in the subsample that responded to both laterality measures.

Because of the lack of lefties, we again restricted comparisons to the right-handed groups. Moroccan righties did not show significant differences from either of the prior two groups: 26 out of 38 (68.4%) of them preferred to place the good animal on the right ( $p = 1.0$ , when compared to Spaniards;  $p = 0.21$ , when compared to Spanish-acclulturated Arabs; both by *Fisher's Exact tests*; see Figure 3). Thus, even when Arabic participants were tested immersed in their culture and language, and the

whole procedure was run in the local Arabic language, we failed to find any influence of culture on the association between right and good.

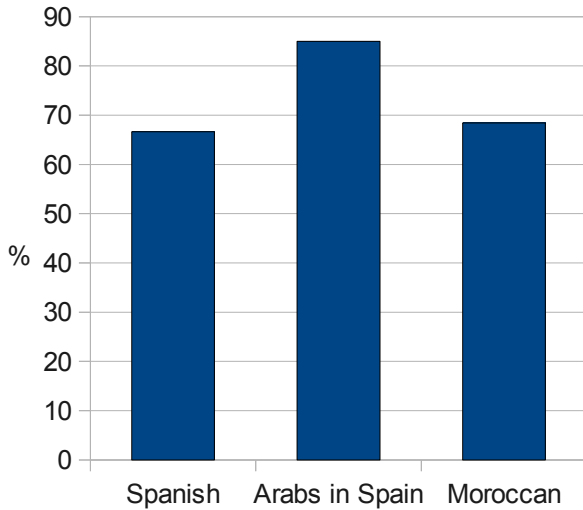


Figure 3: Percentage of good-on-the-right responses in the three right-handed groups. The strength of the implicit association between space and valence did not differ between groups.

### Analysis of debriefing data

One possibility is that, even though conventions in Arabic culture and language favor the right and disfavor the left, such conventions are “dead” metaphors and are no longer processed implicitly as active metaphorical mappings by people living in those cultures. So, we carried out a follow-up analysis of the debriefing data aimed to reveal whether an explicit association between right and good is stronger in our Arab participants than in the Spanish group. We analyzed the debriefing question: “Why do you think you placed the good animal in the box that you did?” The participants were the right-handers from the three cultural groups in Experiments 1 and 2 (N = 93). We coded the answer as 1 if the participant made an explicit reference to the culture-based association between right and good (e.g., “because good things must go on the right”, or “because the right is good”); otherwise we coded the answer as 0. We then compared the proportions between the three groups.

Across all three groups, culture predicted the rate of “right is good” responses, according to a binary logistic regression (Wald  $\chi^2 = 5.77$ ,  $df = 2$ ,  $p = 0.056$ ). The rate of “right is good” responses increased monotonically from the Spanish participants (9 out of 29, 31%), to the bicultural Arab participants in Spain (10 out of 24, 41.6%), to the Moroccan Arab participants (24 out of 40, 60%). Compared to the mono-cultural Spaniards, the mono-cultural Arabs showed nearly twice the rate of “right is

good” responses (difference = 29%, Wald  $\chi^2 = 5.46$ ,  $df = 1$ ,  $p = 0.02$ ; Figure 4).

The strength of explicit associations between right and good varies across cultures. As expected, this association was strongest in our sample of Arabs who were tested in Morocco (in Darija), and weakest in our sample of Spaniards tested in Spain (in Spanish).

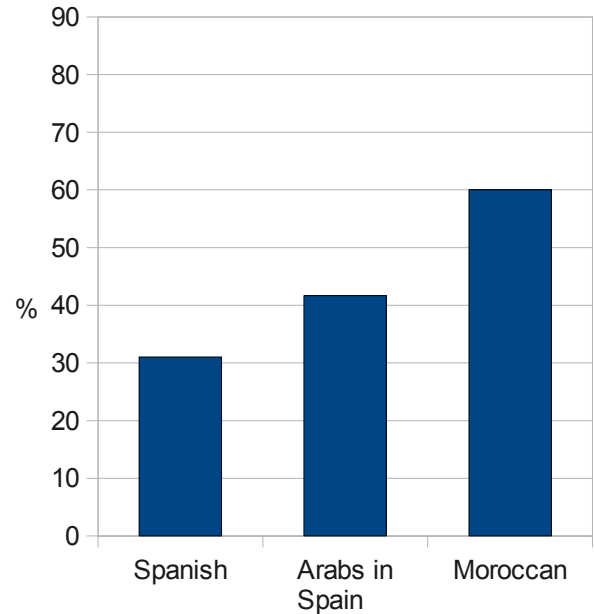


Figure 4: Percentage of answers to the debriefing question making explicit reference to the right-good association in the three groups of righties. The strength of the explicit association between space and valence differed significantly across cultures.

### General Discussion

Present results replicate the body-specific association between good things and the dominant side of space found by Casasanto (2009) in members of two new cultures (Spanish and Arab), tested in two new languages (Spanish and Darija). Consistent with earlier studies in Dutch and American participants (Casasanto, 2009; Casasanto & Jasmin, 2010; Casasanto & Henetz, 2011), we found no effect of cultural pressures to favor the right superimposed on the body-specific pattern of implicit associations. Similar implicit associations between left-right space and emotional valence were found across Spaniards tested in Spain, bicultural Arabs tested in Spain, and Arabs tested in Morocco.

Although we found hardly any left-handed Arabs, comparisons between right-handers from the three groups showed no significant differences in the implicit preference to associate good with the right side of space. An analysis of the debriefing data indicated that the Moroccan Arab group held stronger explicit beliefs about the relation between right and good than the Spanish

group. Immersion in Spanish culture appears to have reduced conscious availability of this space-valence mapping in the Spanish-acculturated Arab group to a level non-significantly different from the Spanish group.

In summary, the present data confirm that explicit associations of the right side with good things and the left side with bad things are stronger in Arab culture than in Spanish culture. However, this stronger cultural pressure did not increase Arab participants' implicit associations of right with good and left with bad. Body-specific perceptuo-motor fluency remains, so far, the sole explanation for the conceptual association of horizontal space and emotional evaluation: People associate positive things with the side of space they can act upon more fluently with their dominant hand.

Whereas the strength of explicit space-valence associations varied across cultures, the strength of implicit space-valence associations did not. Conventions in language and culture that link right with good and left with bad do not seem to have any effect on people's implicit space-valence mappings. A definitive test of this conclusion, however, will need to wait for data being collected from Arab left-handers. The difficulty of finding this kind of participant provides another hint to the strength of the taboos against the left hand in Arab culture. An alternative strategy will be to temporarily change perceptuo-motor fluency in Arab righties by means like those used by Casasanto & Chrysikou (2011), who showed that a few minutes of acting less fluently with the right hand in the lab is enough to reverse right-handed Dutch participants' implicit associations of good with right and bad with left. If culture does have an influence, Arab righties may be more resistant than Spanish righties to the effects of motor training.

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