

# Abstract Concepts - Relation to Handedness

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## Abstract

Left-Handed or right Handed? Does this preference make an impact on the way we think? By the body-specificity hypothesis, people who interact differently with the world make different decisions based on their interaction. Abstract concepts such as *good* or *bad* are mapped differently in the brain for each of us depending upon our handedness. In the following experiments to prove the body-specificity hypothesis, relation between handedness and the mental representation of abstract concepts (e.g. intelligent, evil, happy, attractive) is studied. It is expected that right handers will assign concepts with positive valence to the right and the opposite for left handers. This will rebuke the theory that this association is linguistic as most languages ascribe *good* to the *right* and *bad* to the *left*.

## Introduction

It is now established that any decision made is not always rational. Human judgment and thoughts are cognitively biased. According to theories of embodied cognition, thoughts comprise mental simulations of bodily experiences. If this is true, it means that people with different kinds of bodily interactions must interact differently.

There are many examples wherein body features change our mental representations of concepts and objects. For example, if thinking about objects involves mentally simulating their colors then mental representations of apples should be qualitatively different between individuals with red– green color blindness and individuals with normal vision. If this is true, then any action which is performed using a dominant hand will have different representations in our brains (e.g, Throwing a ball, writing a letter, etc,.).

So how is this body-specificity related to the mental representation of more abstract concepts, like *goodness*, *badness*, *intelligent*? Like many abstract concepts, these notions carry either positive or negative emotional valence. Several lines of research have suggested important links between valence and perception and action in physical space.

In most of the languages, metaphorical expressions tend to associate positive and negative valence with the top and bottom (respectively) of vertical space. This association is reasoned with the correlation between physical experiences and emotional states. Another view of this association is due to correlation in linguistic experience.

Five experiments tested associations between valence and horizontal space in right- and left-handed individuals, to determine whether these mappings are universal or body-specific. If they are universal, either due to invariant properties of the human brain and mind or to pervasive patterns in language and culture, then both right- and left-handers should preferentially associate good with right and bad with left. Alternatively, if they are body-specific, then right- and left-handers should show opposite patterns, each group associating good things more strongly with their dominant side and bad things with their non-dominant side.

## Experiments

- Diagramming the Good and the Bad :-** Subjects are required to perform a diagram task, in which they draw one animal in each of two boxes located either to the left and right of a cartoon figure (in the horizontal condition) or above and below a cartoon figure (in the vertical condition). Instructions indicate that the cartoon likes certain animals and dislikes some animals. Participants were instructed to draw a good animal in the box they thought best represented good things and a bad animal in the box that best represented bad things. However, it was not stated that a particular box corresponded to either good or bad.

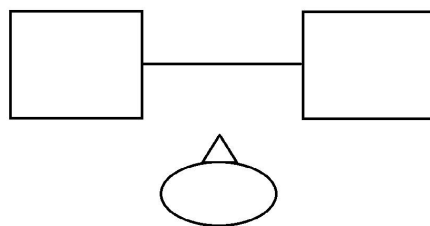


Figure 1a

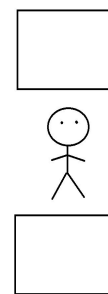


Figure 1b

- Body-Specific Judgments of Aliens' Attributes :-** Participants are instructed to judge the character of a fribble by circling the appropriate one. The fribbles are visually similar figures which are clearly distinguishable. The alien figures are obtained from [www.tarrlab.org](http://www.tarrlab.org), created by Michael J. Tarr, Brown University. Fribbles were arranged in two columns, one on each side of a list of questions printed in a center column. This arrangement placed the members of each Fribble pair on opposite sides of the page without calling attention to their spatial arrangement.



Which Fribble looks  
*less happy?*



Figure 2

## Methodology

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Volunteers (men) of the age group 18-21 participated in the study. Participants were required to fill out a questionnaire on paper. A sample of the questionnaire is shown below. The total size of the sample was 40. Of the 40 test subjects, 6 were dominantly left-handed and the rest were right-handed (there were no ambidextrous people). The questionnaire took approximately 5 minutes to complete. Ocular dominance was tested using Miles test.

**Miles Test :** The subject is requested to use their hands and make an opening through which they will see a distant object with both their eyes open. One after the other, each eye is closed using an opaque object in front of that eye. The subject will be able to see the object only with their dominant eye open.



*Figure 3. Miles test to check ocular dominance*

## Modifications

1. To make sure that the assignment of a particular side to positive valence was not prejudiced by the type of figure on that side, the sides of the alien figures was flipped i.e., figure on the left was moved to the right and that on the right to the left.
2. For half of the participants, a test of handedness was done using the Edinburgh questionnaire before the second task was performed

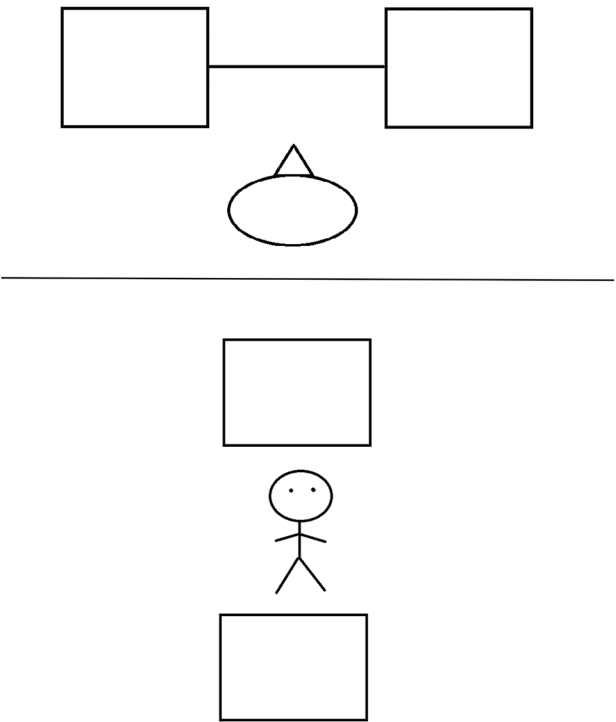
# Questionnaire

## SE 367A Course project

1. The following pages contain few tasks which will require 1-2 min of your time to complete

### Task I

- The next page shows a cartoon character (say Donald) who intends to go to the zoo.
- However, Donald likes few animals and dislikes some.
- For example Donald **likes giraffes** but **dislikes zebras**.
- You are required to draw these animals (crudely) in the boxes provided on the next page
- The drawing need not be accurate nor artistic. It should be just enough to distinguish the giraffe from the zebra
- Draw the giraffe in the boxes which you think represents good things and the zebra in the boxes which represents bad things
- Draw in both the vertical and horizontal cases



### TASK II

1. In the next page you shall be shown a set of random alien figures called fribbles.
2. You are required to judge the qualities of these figures and circle them.



Which Fribble looks  
*more intelligent?*



Which Fribble looks  
*less happy?*



Which fribble looks  
*more attractive?*

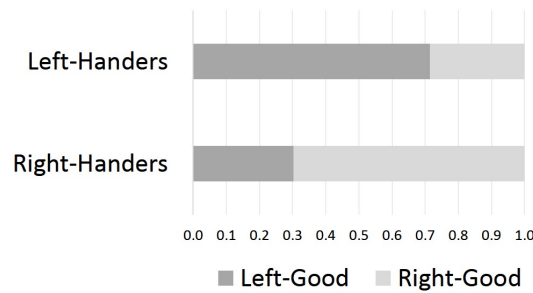


Which fribble looks  
*more evil?*



## Results and Discussion

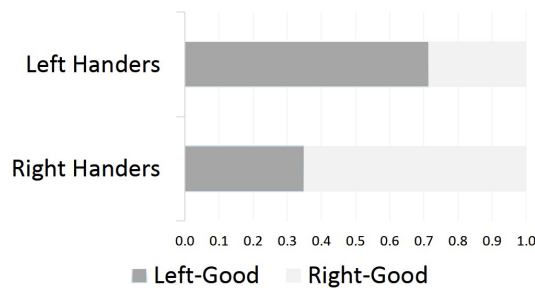
The following results are obtained .



*Figure4: Results from Task 1,Lateral Specificty*



*Figure5 : Results of Task 1 , Vertical specificity*



*Figure 6 : Task II, Judgements on aliens' attributes*

- **Task 1** :- In the first task out of 33 right handers, 23 opted the right box to draw the *good* animal. Among the left handers, 5 out of 7 chose the left box as the *good* one. This works out to an average of 70% preference of the dominant hand side to be associated with concepts of positive valence
- **Task II** :- In this task, for 33 right handers i.e, out of 132 cases, in 86 the fribble on the right was assigned positive valence. The knowledge of the participant that he is being tested related to handedness does not make any difference to the reading. A similar observation is obtained for left handers
- There is no clear relation between ocular dominance and the association of abstract concepts. The relation found in these experiments may be taken as statistical deviations.

## Conclusions and Future Work

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Five experiments demonstrated associations between horizontal space and the mental representation of abstract concepts with positive and negative emotional valence. These associations differed between right- and left-handers. Right-handers were more likely than left-handers to associate right with positive ideas and left with negative ideas. Left-handers were more likely than right-handers to associate left with positive ideas and right with negative ideas. By contrast, both left- and right-handers showed the same preference to associate good things with up and bad things with down. This pattern of results was predicted on the basis of the body-specificity hypothesis and demonstrates that people with different bodies (in this case, right- and left-handers) form correspondingly different mental representations, even in highly abstract conceptual domains.

The correlation is not found with ocular dominance. This may be explained by noting that ocular dominance is not fixed for an individual and can change easily.

### Future Work

More data has to be obtained to concretely establish the body-specificity hypothesis. It can be argued that the usage of hands to draw may bias the preference of the participant to the dominant hand. To check this issue, the participant may be made to point out the appropriate option,

As the body hypothesis is tested for abstract concepts, it remains to be tested the body-specific decisions in real life circumstances. For example, given the job of hiring an executive, would a recruiter choose to hire the candidates arranged on the left or right of a page.

## References

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