

Funnel, MG, Corballis, PM and Gazzaniga, MS. (1999). A deficit in perceptual matching in the left hemisphere of a callosotomy patient. Neuropsychologia , 37(1999), 1143-1154.

## ABSTRACT

Differences in brain hemispheres widely demonstrated. Asymmetries exist including visuo spatial abilities. Evidence has been demonstrated but the basis is unclear.

Purpose: Investigate hypothesis that left hemisphere capable of sophisticated visual processing.” However, presents cruder representation than right hemisphere.

Implications: Pattern recognition belongs to both hemispheres, but right is “further specialized for processing spatial information”

Findings: Visual processing in left hemisphere is concentrated on pattern recognition “at the expense of spatial information. **Language Connections - Page 2.**

## I. INTRODUCTION/BACKGROUND

A. Functional aspects of both hemispheres and asymmetries are described:

1. Most obvious is fine motor control and comprehension of language (left.)
2. Others show lateralization to one or the other sides, especially visuo-spatial work.  
-Right, however, no “satisfying account” given for the basis in perceptual and cognitive functions.
3. Some degree of analysis required in both sides to allow for “higher level processing of sensory information.” Evidence of callosotomy patients supports contention that “both hemispheres are capable of reasonably sophisticated visual analyses to support ... higher level cognitive functions.”

B. Hypothesis: Right hemisphere “specialized for processing spatial information.”

1. Other experiments offer no clear conclusions on hemisphere spatial specialization.
2. Experiment includes presentation of simultaneous images to see if they are “mirror-images.”

## II Study and Findings

A. Study patients’ ability to detect mirror image reversals, colored images of everyday objects: bicycle, glasses, etc. No semantic requirement was included.

1. Subject: a 45 year-old male with callosotomy.
2. Subject to see whether both, simultaneously presented, images were the same.

B. Results (using chi-square analysis)

1. There was a bias to respond no in the right visual field/left hemisphere.
2. Accuracy was different “for \stimuli presented to the two visual fields.”
3. Hypothesis was confirmed.
4. Testing continued with 7 more experiments using various kinds of stimuli and presenting various levels of “same” and “different” stimuli to each hemisphere.

C. Overall results/Discussion: Subject showed 21% higher accuracy for left visual field presentations (right hemisphere) than for right visual field (left hemisphere.) 91%/70%.

#### D. Conclusions

1. Right hemisphere “encodes the global configuration while the left preferentially encodes the local features of the stimulus.
2. Kosslyn’s hypothesis: left encodes “position and orientation of objects crudely while the right hemisphere encodes spatial relations metrically.” Left hemisphere may not include orientation information and do poorer with matching objects.
3. Left’s crude representation may be due to the function of the “left brain interpreter.” It tried to make sense of stimuli and events “and tends to represent information in a symbolic, or categorical manner.” So, it could interfere with the left’s ability to maintain an accurate representation of the stimuli.

**Language Connection 1.** Patterns, such as cultural shapes, could be explored for specific characteristics (left brain) after first seeing a whole scene in which the shapes may or may not be visible or highlighted. Students shown cultural vignettes and shapes pulled out (as structure and vocabulary and pulled out) for further analysis, identification, meaningful applications.

2. Since the right hemisphere is specialized for encoding global configurations of visuo-spatial information, establishing a cultural episode in which new language is introduced provides an opportunity for the learner to create a rich visual image on which to draw when the left hemisphere is concentrating on the patterning of new structures or utilizing new vocabulary in statements about the cultural scene already presented.