The Neural Basis for the Pleasure of Humor and Insight

Ori Amir¹, Irving Biederman¹,², Xiaokun Xu¹ & Zhuangjun Wang²
¹Department of Psychology, ²Neuroscience Program, University of Southern California

WHAT IS THIS? AND THIS?

A close up of a pig looking at book titles in a library.
(Hint: He has to rotate his head sideways to read the vertical titles. This is an example of an interpretation of a Droodle that is Humorous.

(‘Droodles are simple drawings that are otherwise uninterpretable without a verbal description.)

Question
Where in the brain is the neural correlate of humor? Is it shared with the locus of activation when we appreciate the joy of insight of a creative solution?

An fMRI Experiment Assessing the Neural Loci of the Pleasure of Humor and Insight

15 subjects viewed 200 droodles (100 humorous and 100 insightful). Half the droodles were followed by interpretive descriptions, the other half with physical descriptions. The order as well as the description type was balanced.

Results

A. Humorous vs. control

B. Insightful vs. control

Droodles with an interpretive description averaged longer viewing time than those followed by a mundane description.

Regions activated by Humorous droodles only

Regions were activated by Humorous, but not Insightful, droodles:

a) the left Amygdala, b) the right temporal pole, and c) the bilateral Orbitofrontal Cortex (OFC). These regions were also more activated for Humorous droodles that were rated as “Funny” compared to those rated as “A Little Funny” (see figure on right). These areas may thus constitute the “funny bone of the brain.”

Discussion & Conclusions

Humor, Insight and Perceptual pleasure

• The parahippocampal gyrus, LOC and striatum, that underwent markedly greater activation by humorous droodles (compared to control “mundane” descriptions) were largely the same areas activated by scenes and shapes that people prefer viewing. Insight droodles produced less activation in these areas.

• These later ventral pathway regions have higher densities of µ-opioid receptors then earlier visual areas (figure on right), and greater activation in these regions has previously been shown to correlate with perceptual pleasure.

• Both insightful and humorous droodles produced bilateral activation of the Striatum which may be related to the reward of experiencing humor or insight.

Stimuli

2 types of droodles x 2 types of descriptions = 4 conditions

Image Type

A humorous droodle is typically a juxtaposition of partial or影视 views of two entities that would normally not be associated with each other, pig library or chef-left.

An interpretive description of an insightful droodle is typically an expanded or partial view of a single object.

Interpretive Description

Provides a humorous or insightful interpretation of the droodle.

Physical Description

Describes the droodle’s physical appearance without conveying humor or insight.

Humorous Droodles

1. Multitask a visual/pie

2. Whales are not only... but also a dragon

3. The mailbox is a blossom

4. The judge is the judge

5. This is a cloud

Insightful Droodles

1. More is a visual/eye

2. Colorful Gate at the bottom of the road

3. A highway for grasshoppers

4. The big orange ball

5. A ship arriving too late to save a drowning witch

Interpretive Descriptions

A. Humorous vs. control

B. Insightful vs. control

OFC – Orbitofrontal Cortex

LOC – Lateral Occipital Complex

PHG – Parahippocampal Gyrus

TP – Temporal Pole

C. Additional Regions:

• The interpretation offers a new perspective on the visual stimuli. This is an example of an interpretation of a droodle that is Humorous.

Additional Droodles. Enjoy!

A. A ship arriving too late to save a drowning witch

B. An early bird catching a very strong worm

C. A highway for grasshoppers

D. Germs avoiding a friend who caught antibiotics


Abbreviations:

SfN – Society for Neuroscience

http://geon.usc.edu/