

Growing Up Different

Activity 1: Grades 9-12 Familiar Faces



As you learned in "[Breaking the Shell](#)" some forms of autism interfere with the ability to recognize and respond to familiar faces. Scientists don't know why this ability is affected, and they disagree about how a normal brain processes, distinguishes and identifies faces. Most, however, think that the ability to identify faces is a complex process that is based upon a holistic view that arises from the precise placement and shape of various key features such as eyes and mouths.

In this activity, you will create a mixed-up face with the mouth and eyes flipped upside down. Viewed in its normal orientation, the image alterations are easy and quickly discerned. However, when the orientation is altered, changes in appearance are lost as the brain falsely processes what your eyes are viewing.

Students should appreciate that no disability should be the target of joking or prejudice. Before performing this activity, discuss the concept of disability and the real and everyday challenges faced by those with physical or mental constraints. Discuss what it must be like to live with a disability.

Remind students that people with autism do not see other people's faces upside-down. The activity that they are about to perform simulates a type of confusion that the "normal" brain experiences when trying to process topsy-turvy facial cues. This experience is not meant to represent any disability but instead should be used as a platform from which to discuss the intricacies of facial recognition.

OBJECTIVE

This activity page will offer:

- an experience in identifying faces in terms of context
- an activity in the science of optical illusions
- an arena for critical thinking analysis and extensions

MATERIALS

- Discarded fashion or entertainment magazines
- Scissors
- Tape

PROCEDURE

Part 1-Constructing the Target Face

1. Obtain a fashion magazine or other rich source of disposable headshots.
2. Flip through the pages and identify a large headshot in which the model faces directly into the camera lens.
3. Use scissors to carefully remove this image from the magazine.
4. Identify three rectangular perimeters: one around the mouth and one around each eye. Be sure to include the entire feature within each rectangle.
5. Use your scissors to carefully cut out each of the three rectangles while keeping the rest of the face as intact as possible.
6. Rotate all of the rectangular cutouts 180 degrees.
7. Position each of the cutouts upside down back into the space from which they were cut. Try to match these rectangles up as neatly possibly, without allowing space to show around the edges. Place a strip of tape on the back of the page to secure the three inserts within the face.

PROCEDURE

Part 2 - Testing Subjects

1. Identify 5 people (family and friends outside of class) who are not aware of this activity. Keep all subjects unaware of the upcoming experience.
2. Test each subject individually. Ask them to sit down in a location that other subjects cannot observe. Rotate the headshot so that the image "stands on its head" (the eyes and mouth, however, will appear rightside-up).
3. Show the upside-down headshot to your subject. Have them describe the whole image in terms of what they see. Ask: Is the person in this photo happy? Sad? Does anything appear strange about this image? Record their responses, noting whether they describe the face as upside-

- down or rightside-up.
4. After the subject has commented on the headshot, rotate it to its upright position. Have the subject describe what they see and record their response.
 5. Repeat the activity with the same subject and discuss how the appearance of the person in the photo changes through the rotation. If there is a change, at what point does this occur?

QUESTIONS

1. Why was it important to keep the subjects unaware of the activity?
2. How many subjects did not observe the flipped-over features during their initial trial?
3. Once they were made aware of the effect, were the subjects still "tricked" by the image?

EXTENSIONS

On Your Own

Develop a strategy for inquiry to determine the rotational angle at which we no longer perceive distortions. At what point do we interpret a distorted facial image, such as the one used here, to be simply upside-down?

Integrate what you have observed in this activity in your experimental design. What observation might be used to help identify when this "flipping point" occurs? With your instructor's approval, perform this activity on a new set of subjects.

Fashion First

Think about it. Why were fashion and entertainment magazines suggested for this activity? What other print or electronic media might offer an equivalent source of appropriate photographs or images for this activity?

Famous Faces

Do you think that someone would more likely be fooled by the "tweaked" and inverted headshot of a famous and familiar face? Why or why not? Develop a strategy of inquiry that would test this question. With your instructor's approval, perform this activity on a new set of subjects.

Art Connection

Work in a team to create a giant wall mural that displays dozens of flipped faces and facial parts. You will need to pin each "tweaked" image to a bulletin board or paste it to a large sheet of paper backing. Include images of famous people taken from all sorts of discarded magazines. You may want to flip the mural around on a daily schedule.

Digital Connection

Make your own distorted face. Use a digital camera to capture your headshot. Work alone or with someone familiar with a basic computer graphics program like Photoshop. Import the headshot and highlight a rectangular block that encompasses one of the features to be flipped. Use the menu option to rotate this highlighted region 180 degrees. After you've flipped both eyes and mouth, print your photo.

Web Connection

[Mother Is Just Another Face In The Crowd To Autistic Children](http://www.sciencedaily.com/releases/2001/04/010418072256.htm)

<http://www.sciencedaily.com/releases/2001/04/010418072256.htm>

ScienceDaily online magazine article that discuss autism and face recognition

[A Sensory Adventure- Optical Illusion](http://www.illusionworks.com/html/jump_page.html)

http://www.illusionworks.com/html/jump_page.html

One of the richest sites of optical illusion and processing tricks

[Me, Myself and I](http://www.drkoop.com/news/stories/2001/jan/hs/18_self.html)

http://www.drkoop.com/news/stories/2001/jan/hs/18_self.html

An article on self-recognition based upon a mirrored image

[Physical Causes of Face Blindness](http://www.choisser.com/faceblind/about.html)

<http://www.choisser.com/faceblind/about.html>

An online book about "face blindness"

The activities in this guide were contributed by Michael DiSpezio, a Massachusetts-based science writer and author of "Critical Thinking Puzzles" and "Awesome Experiments in Light & Sound" (Sterling Publishing Co., NY).

Academic Advisors for this Guide:

Corrine Lowen, Science Department, Wayland Public Schools, Wayland, MA

Suzanne Panico, Science Teacher Mentor, Cambridge Public Schools, Cambridge, MA

Anne E. Jones, Science Department, Wayland Middle School, Wayland, MA



Growing Up Different

Activity 1: Grades 9-12 Familiar Faces



PROCEDURE

Part 2 - Testing Subjects

1. Identify 5 people (family and friends outside of class) who are not aware of this activity. Keep all subjects unaware of the upcoming experience.
2. Test each subject individually. Ask them to sit down in a location that other subjects cannot observe. Rotate the headshot so that the image "stands on its head" (the eyes and mouth, however, will appear rightside-up).
3. Show the upside-down headshot to your subject. Have them describe the whole image in terms of what they see. Ask: Is the person in this photo happy? Sad? Does anything appear strange about this image? Record their responses, noting whether they describe the face as upside-down or rightside-up.
4. After the subject has commented on the headshot, rotate it to its upright position. Have the subject describe what they see and record their response.
5. Repeat the activity with the same subject and discuss how the appearance of the person in the photo changes through the rotation. If there is a change, at what point does this occur?

(At a certain point the image no longer appears to be a rightside-up person (with distorted facial features) that is undergoing major tilting. Our conception of it "jumps" to an upside-down image that tilts upwards, and the distortions are lost.)

QUESTIONS

1. Why was it important to keep the subjects unaware of the activity?
(You wanted to make sure that the initial response was not influenced by what they "expected" to see.)
2. How many subjects did not observe the flipped-over features during their initial trial?
(Most will have missed the inconsistencies in the image.)
3. Once they were made aware of the effect, were the subjects still "tricked" by the image?
(Answers will vary.)