

# Looking A Little Spotty\*

## Facial Resolve

by Eric Muller

### Introduction:

Produce an image of a face with the minimal amount of information. See how well our brain can resolve and recognize it. Do this by digitally processing an image via half-toning.

Definition:

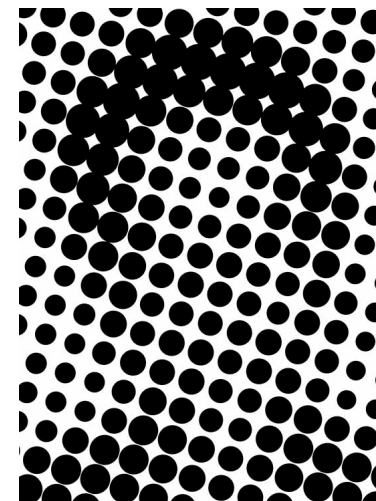
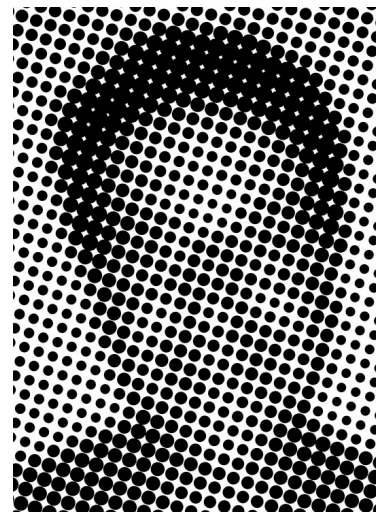
**Halftone** is the reprographic technique that simulates continuous tone imagery through the use of dots, varying either in size, in shape or in spacing, thus generating a gradient like effect.<sup>1</sup>

### Materials:

- Digital Graphics program that can halftone an image:
  - Computer with graphic program
  - An online program (search for online graphics programs- many are free)
  - Many apps are available that can process an image
- A Digital Camera
- Method of presentation (various)
  - Printer: Print the image on paper (recommended)
  - Computer projector or screen

### To do and notice:

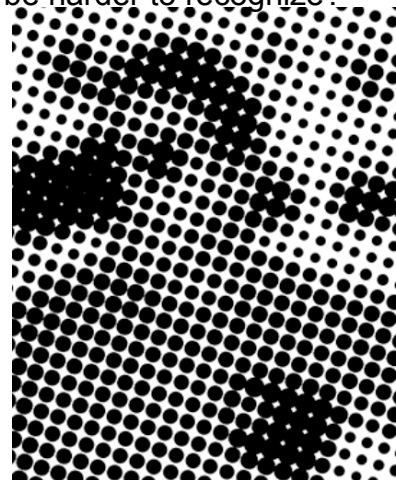
1. Take a digital picture of some one's face.
2. Load it in a digital processing program.
3. It might be necessary to convert your picture to a black and white image (also known as Gray scale).
4. Find the effect called: Halftone.
5. Most programs will let you digitally manipulate the image in a variety of ways:
  - Try changing and experimenting with the following variables:
    - i. Size of dots
    - ii. Spacing of dots
    - iii. Size of image
    - iv. Angle of dots
6. Print (recommended) or show the image via a projection system.
7. Present your image as a "reveal"- make it a surprise. Then have others view the image from different perspectives.
  - a. View close up
  - b. Further away



**Optional:**

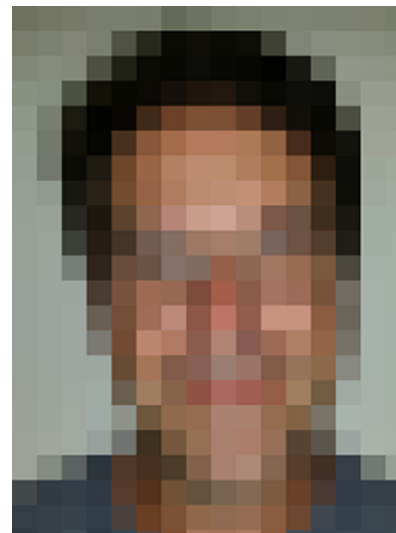
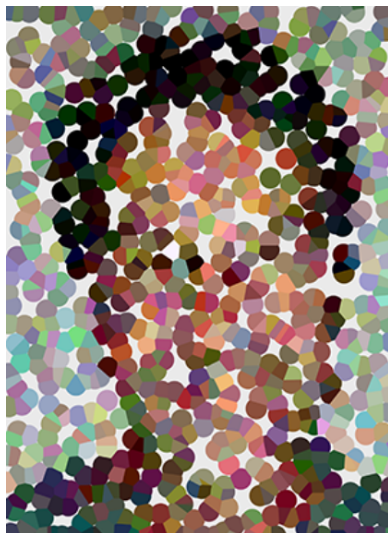
Try to collect data about how others perceive the image.

- A. At what distance can other perceive:
  - a. That it's a face
  - b. When they recognize whose face it is
- B. What dot size breaks the ability to recognize anything?
- C. What other factors effect the ability to recognize the halftoned image.
  - a. Are friends or popular images easier to recognize than strangers
  - b. Will a plain or "busy" background change how easily recognizable the image is?
  - c. Will glasses or a hat help or hurt facial recognition.
  - d. Will a face viewed from the side or angle be harder to recognize?

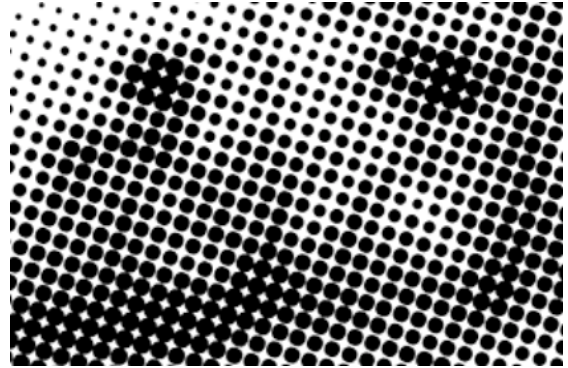


Face with mugs (Mug shot)

- D. Try other pixilation filters:
  - a. This filter is called, "Pointillize"
  - b. This filter is called, "Mozaic"

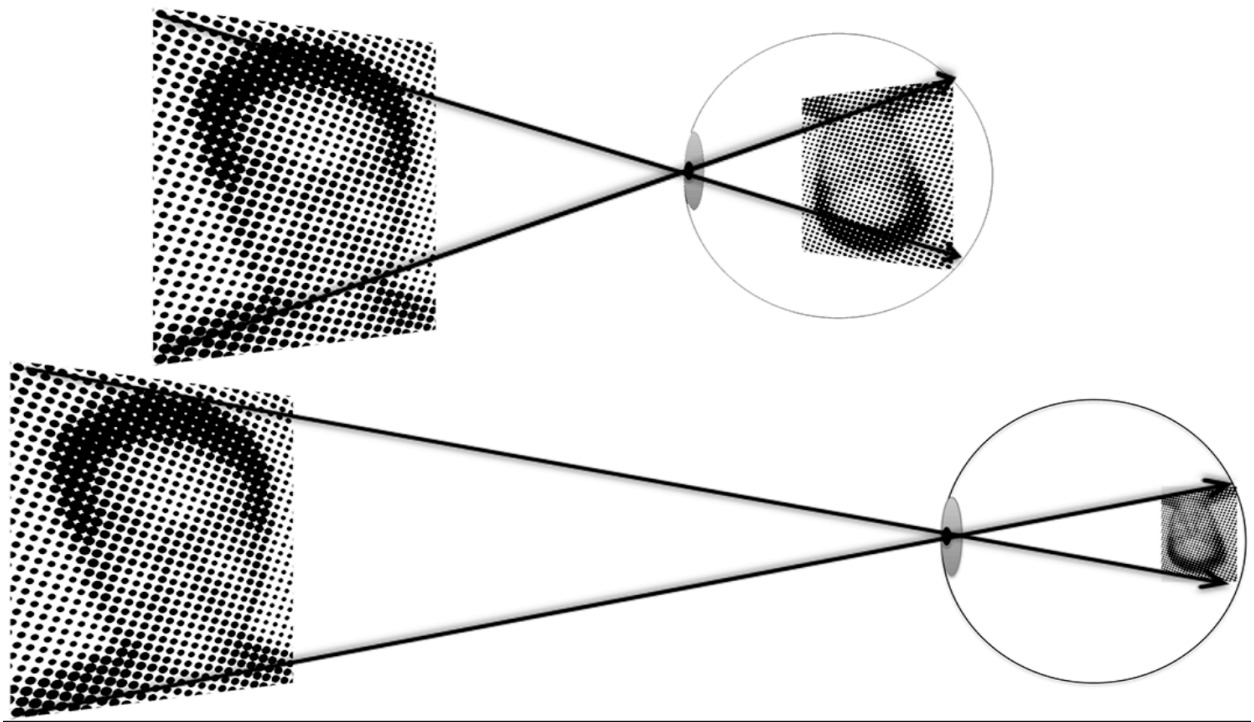


- E. Try images other than a face. Can you tell what it is?



### What's going on?

This activity involves your eyes, brains and geometry. Your brain tries to recognize patterns. A pattern that looks like a face is very important to you and possibly your survival....it's a high priority.



Up close, the spots are projected onto the back of your eye (the retina) and may look, well, like a bunch of spots. However, as you move away from the picture, the image projected onto the back of the eye gets smaller. Although, the image gets smaller, the concentration of visual information (density) goes up. It is projected onto the light and color sensitive receptors of your central retina, called the fovea. Also, because of the limited "resolving-power" of your eyes, you become less able to distinguish between adjacent spots; your eye perceives

shades of gray, rather than spots and blank spaces. Because of this, your eye brain system is better able to resolve this pixelated image of a face as you move away from it.

**Additional resources:**

[http://www.exploratorium.edu/snacks/jacques\\_cousteau/](http://www.exploratorium.edu/snacks/jacques_cousteau/)

Credit:

<sup>1</sup> Definition from Wikipedia <http://en.wikipedia.org/wiki/Halftone>

Image: some guy (Eric Muller)

\*and a little dotty