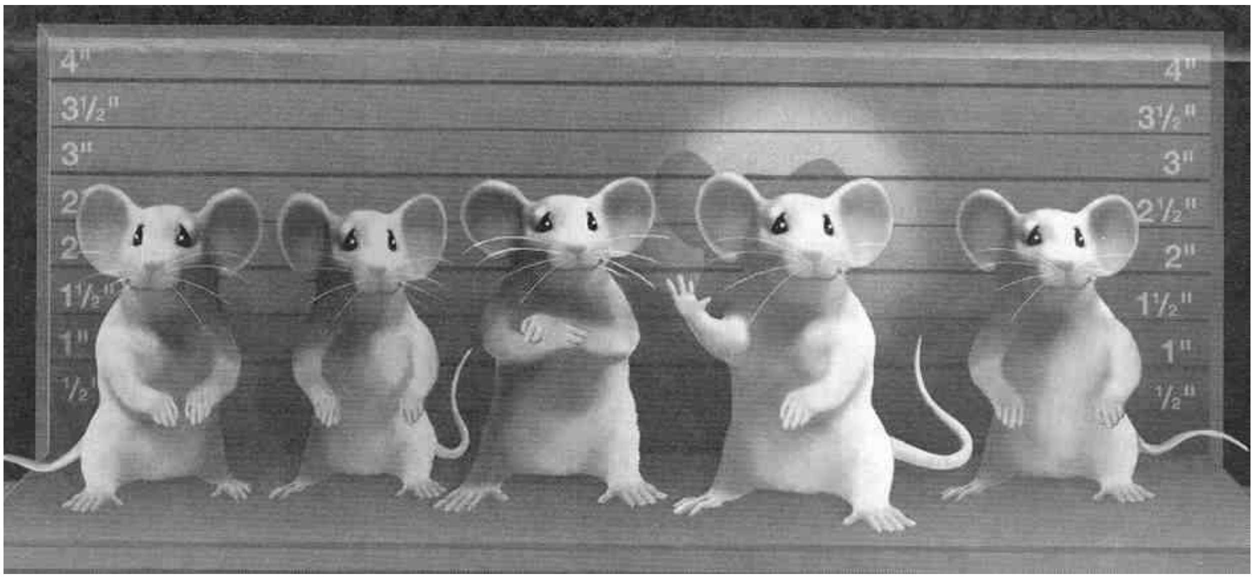
Face Misidentification Lesson Plan



Purdue University GK-12 2006-07
This material is based upon work supported by the National Science Foundation under Grant No. 0538643. Any opinions, findings, and conclusions or recommendations expressed in this material are those of the author(s) and do not necessarily reflect the views of the National Science Foundation.

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1. Overview

This unit is an approximately 20 class period lesson that enhances students' knowledge of measures of central tendency using a real world scenario of face recognition/ eyewitnesses / misidentification scenarios. This lesson also steps students through the scientific method and gives some students their first experience collecting data. Furthermore, this lesson compares data analysis performed by hand and with computers (MS Excel). Two tutorials teach students how to enter formulas and graph data with Excel.

2. Purpose

The purpose of this lesson was to use the fellow's research experiences involving face recognition to create a lesson/experiment that would allow students to see, participate in, and discuss a real world problem using skills learned in mathematics class.

This lesson was also developed with the intent so that those with limited knowledge of face recognition and related fields could use this in their classroom.

3. Objectives

The objectives for this project were to:

- Discuss real world problems and show how math can be used to solve them.
- Conduct a science experiment in math class.
- Work through the scientific method using real world problems.
- Formulate hypotheses.
- Collect data.
- Analyze data by hand using measures of central tendency.
- Discuss results by using proportions and percentages.
- Use computers to enter data.
- Introduce Microsoft Excel to students for data analysis.
- Graph data with computers (Line, bar, and scatter plots).
- Analyze data with computers.
- Interpret and discuss results.

4. Indiana Standards Met

4.1. <u>Math</u>

4.1.1. Standard 2 - Computation

Students compute with rational numbers expressed in a variety of forms. They solve problems involving ratios, proportions, and percentages.*

8.2.1 Add, subtract, multiply, and divide rational numbers (integers*, fractions, and terminating decimals) in multi-step problems.
Example: $-3.4 + 2.8 \times 5.75 = ?$, $1\frac{4}{5} + -\frac{3}{8} \times 2\frac{2}{9} = ?$, $81.04 \div 17.4 - 2.79 = ?$.

8.2.3 Use estimation techniques to decide whether answers to computations on a calculator are reasonable.
Example: Your friend uses his calculator to find 15% of $25 and gets $375. Without solving, explain why you think the answer is wrong.

4.1.2. Standard 3 - Algebra and Functions

Students solve simple linear equations and inequalities. They interpret and evaluate expressions involving integer powers. They graph and interpret functions. They understand the concepts of slope* and rate.*

8.3.8 Demonstrate an understanding of the relationships among tables, equations, verbal expressions, and graphs of linear functions.
Example: Write an equation that represents the verbal description: “the perimeter of a square is four times the side length.” Construct a table of values for this relationship and draw its graph.

4.1.3. Standard 5 - Measurement

Students convert between units of measure and use rates and scale factors to solve problems. They compute the perimeter, area, and volume of geometric objects. They investigate how perimeter, area, and volume are affected by changes of scale.

8.5.3 Solve problems involving scale factors, area, and volume using ratio and proportion.
Example: Calculate the volume and surface area of cubes with side 1 cm, 2 cm, 3 cm, etc. Make a table of your results and describe any patterns in the table.

4.1.4. Standard 6 - Data Analysis and Probability

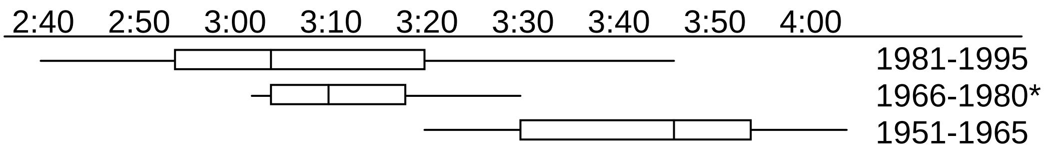
Students collect, organize, represent, and interpret relationships in data sets that have one or more variables. They determine probabilities and use them to make predictions about events.

8.6.1 Identify claims based on statistical data and, in simple cases, evaluate the reasonableness of the claims. Design a study to investigate the claim.
Example: A study shows that teenagers who use a certain brand of toothpaste have fewer cavities than those using other brands. Describe how you can test this claim in your school.

8.6.2 Identify different methods of selecting samples, analyzing the strengths and weaknesses of each method, and the possible bias in a sample or display.
Example: Describe possible bias in the following survey: A local television station has a daily call-in poll. Viewers of the morning and noon newscasts are asked to call one telephone number to answer “yes” and a different telephone number to answer “no.” The results are reported on the six-o’clock newscast.

8.6.3 Understand the meaning of, and be able to identify or compute the minimum value, the lower quartile*, the median*, the upper quartile*, the interquartile range, and the maximum value of a data set.
Example: Arrange a set of test scores in increasing order and find the lowest and highest scores, the median, and the upper and lower quartiles.

8.6.4 Analyze, interpret, and display single- and two-variable data in appropriate bar, line, and circle graphs; stem-and-leaf plots*; and box-and-whisker plots* and explain which types of display are appropriate for various data sets.
Example: The box-and-whisker plots below show winning times (hours:minutes) for the Indianapolis 500 race in selected years:



*Except 1967, 1973, 1975, and 1976.

In the years from 1951-1965, the slowest time was 3 h 57 min. Explain how the slowest time changed through the years 1951-1995. How did winning times change during that period? How did the median times change in the same period?

8.6.5 Represent two-variable data with a scatterplot* on the coordinate plane and describe how the data points are distributed. If the pattern appears to be linear, draw a line that appears to best fit the data and write the equation of that line.
Example: Survey some of the students at each grade level in your school, asking them how much time they spend on homework. Plot the grade level and time of each student as a point (grade, time) on a scatter diagram. Describe and justify any relationship between grade and time spent on homework.

4.1.5. Standard 7 - Problem Solving

Students make decisions about how to approach problems and communicate their ideas.

8.7.1 Analyze problems by identifying relationships, telling relevant from irrelevant information, identifying missing information, sequencing and prioritizing information, and observing patterns.
Example: Solve the problem: “For computers, binary numbers are great because they are simple to work with and they use just two values of voltage, magnetism, or other signal. This makes hardware easier to design and more noise resistant. Binary numbers let you represent any amount you want using just two digits: 0 and 1. The number you get when you count ten objects is written 1010. In expanded notation, this is $1 \leq 2^3 + 0 \leq 2^2 + 1 \leq 2^1 + 0 \leq 2^0$. Write the number for thirteen in the binary (base 2) system.” Decide to make an organized list.

8.7.2 Make and justify mathematical conjectures based on a general description of a mathematical question or problem.
Example: In the first example, if you have only two symbols, 0 and 1, then one object: 1, two objects: 10, three objects: 11, four objects: 100. Predict the symbol for five objects.

8.7.3 Decide when and how to divide a problem into simpler parts.
Example: In the first example, write expanded notation for the number five in base 2; begin with the fact that 5 = 4 + 1.

Students use strategies, skills, and concepts in finding and communicating solutions to problems.

8.7.4 Apply strategies and results from simpler problems to solve more complex problems. Example: In the first example, write the first five numbers in base 2 notation and look for a pattern.

8.7.5 Make and test conjectures using inductive reasoning.
Example: In the first example, predict the base 2 notation for six objects, then use expanded notation to test your prediction.

8.7.6 Express solutions clearly and logically using the appropriate mathematical terms and notation. Support solutions with evidence in both verbal and symbolic work.
Example: In the first example, explain how you will find the base two notation for thirteen objects.

8.7.7 Recognize the relative advantages of exact and approximate solutions to problems and give answers to a specified degree of accuracy.
Example: Measure the length and width of a basketball court. Use the Pythagorean Theorem to calculate the length of a diagonal. How accurately should you give your answer?

8.7.8 Select and apply appropriate methods for estimating results of rational-number computations.
Example: Use a calculator to find the cube of 15. Check your answer by finding the cubes of 10 and 20.

8.7.9 Use graphing to estimate solutions and check the estimates with analytic approaches. Example: Use a graphing calculator to draw the straight line $x + y = 10$. Use this to estimate solutions of the inequality $x + y > 10$ by testing points on each side of the line.

8.7.10 Make precise calculations and check the validity of the results in the context of the problem.
Example: In the first example, list the first thirteen numbers in base 2 notation. Use patterns or expanded notation to confirm your list.

Students determine when a solution is complete and reasonable and move beyond a particular problem by generalizing to other situations.

8.7.11 Decide whether a solution is reasonable in the context of the original situation. Example: In the basketball court example, does the accuracy of your answer depend on your initial measuring?

8.7.12 Note the method of finding the solution and show a conceptual understanding of the method by solving similar problems.
Example: In the first example, use your list of base 2 numbers to add numbers in base 2.
Explain exactly how your addition process works.

4.2. <u>Science</u>

4.2.1. Standard 1 - The Nature of Science and Technology

Students design and carry out increasingly sophisticated investigations. They understand the reason for isolating and controlling variables in an investigation. They realize that scientific

knowledge is subject to change as new evidence arises. They examine issues in the design and use of technology, including constraints, safeguards, and trade-offs.

The Scientific Enterprise

8.1.4 Explain why accurate record keeping, openness, and replication are essential for maintaining an investigator's credibility with other scientists and society.

4.2.2. Standard 2 - Scientific Thinking

Students use computers to organize and compare information. They perform calculations and determine the appropriate units for the answers. They weigh the evidence for or against an argument, as well as the logic of the conclusions.

Manipulation and Observation

8.2.3 Use proportional reasoning to solve problems.
8.2.4 Use technological devices, such as calculators and computers, to perform calculations.
8.2.5 Use computers to store and retrieve information in topical, alphabetical, numerical, and keyword files and create simple files of students' own devising.

Communication

8.2.6 Write clear, step-by-step instructions (procedural summaries) for conducting investigations, operating something, or following a procedure.
8.2.7 Participate in group discussions on scientific topics by restating or summarizing accurately what others have said, asking for clarification or elaboration, and expressing alternative positions.
8.2.8 Use tables, charts, and graphs in making arguments and claims in, for example, oral and written presentations about lab or fieldwork.

Critical Response Skills

8.2.9 Explain why arguments are invalid if based on very small samples of data, biased samples, or samples for which there was no control sample.

4.2.3. Standard 5 - The Mathematical World

Students apply mathematics in scientific contexts. Students use mathematical ideas, such as symbols, geometrical relationships, statistical relationships, and the use of key words and rules in logical reasoning, in the representation and synthesis of data.

Shapes and Symbolic Relationships

8.5.3 Demonstrate that mathematical statements can be used to describe how one quantity changes when another changes.
8.5.4 Illustrate how graphs can show a variety of possible relationships between two variables.

Reasoning and Uncertainty

8.5.9 Compare the mean*, median*, and mode* of a data set.

8.5.10 Explain how the comparison of data from two groups involves comparing both their middles and the spreads.

- * mean: the average obtained by adding the values and dividing by the number of values
- * median: the value that divides a set of data, written in order of size, into two equal parts
- * mode: the most common value in a given data set

4.2.4. Standard 7 - Common Themes

Students analyze the parts and interactions of systems to understand internal and external relationships. They investigate rates of change, cyclic changes, and changes that counterbalance one another. They use mental and physical models to reflect upon and interpret the limitations of such models.

Models and Scale

8.7.3 Use technology to assist in graphing and with simulations that compute and display results of changing factors in models.

8.7.4 Explain that as the complexity of any system increases, gaining an understanding of it depends on summaries, such as averages and ranges*, and on descriptions of typical examples of that system.

- * range: the difference between the largest and the smallest values

5. Methods

5.1. <u>Materials & Resources</u>

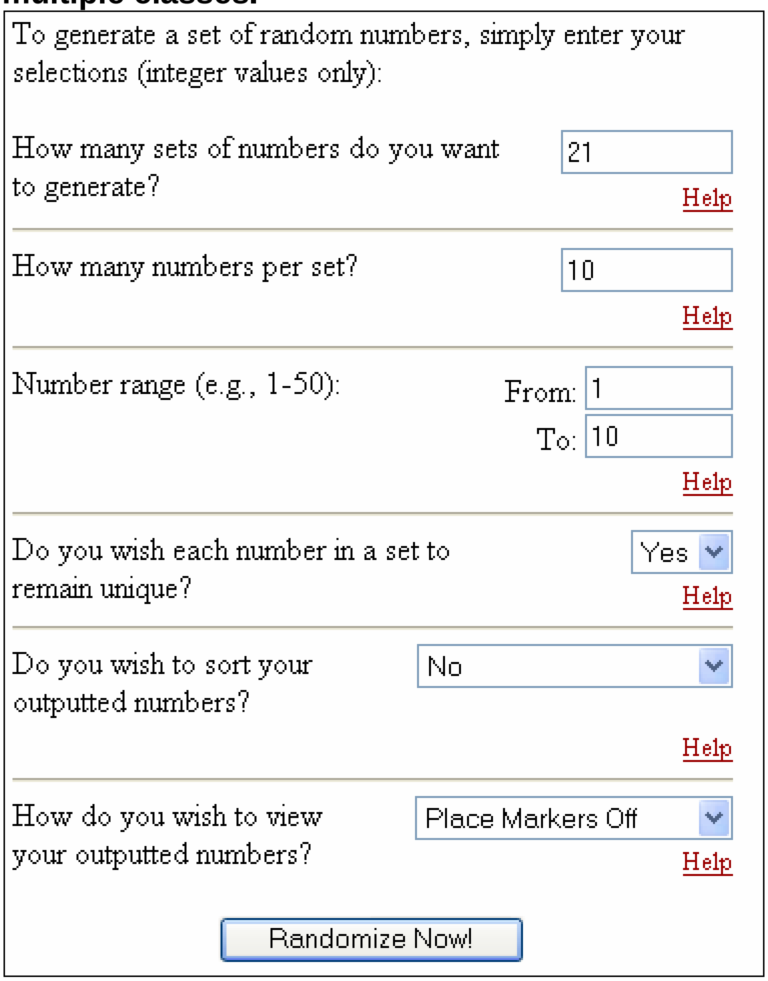
The materials required for this activity are:

- A digital camera
- Photo printing paper
- Masking tape
- Hallway/area of sufficient length to do face trials in (template uses 25, 50, 75, and 100 feet)
- Plenty of copy paper
- Clipboards for students
- Calculators
- Computers with MS Excel
- Computer with Internet access (for supplemental activities in Resources section)
- 2 teachers/assistants
- Watch/stop watch
- Overhead projector

5.2. Procedures

5.2.1. Preparation

1. Locate 10 teachers (if you choose more, you will have to modify the templates) that you would like to use for the identification activity.
2. Locate a space/hallway to conduct the face trials in.
3. Mark the area you will be using with tape so students know where to go
    - XX - Where students will be standing and holding the photos
    - 25 feet away from XX
    - 50 feet away from XX
    - 75 feet away from XX
    - 100 feet away from XX
4. Photograph the 10 teachers. The photographs should resemble a driver's license photo.
5. Print the photographs as an 8x10 (color or B&W). You may want to laminate the photos so they do not get destroyed. Mounting them on cardboard is also a good idea.
6. Go to HTTP://WWW.RANDOMIZER.ORG/INDEX.HTM. This is to randomize the order for which the pictures will be shown to students. The instructions are pretty good on the page. If you follow our activity, fill in the table as shown below. Then click on randomize now. You can download this to MS Excel. **Don't forget to repeat this if you are doing the activity for multiple classes.**



7. Next associate a photograph with a number from 1-10. This will help the data collection go smoothly and also enable you to create an answer key.

8. Print off the **data collection – recognition trials.doc** file so each student has a copy.
9. Print off Resource **10.1.1 Introduction to the Activity Handout** so that each student has a copy.
10. Reserve a computer lab for 5-7 periods given our experienced timeline and your expected timeline.

5.2.2. Introduction to the Activity (1 period)

During the first day the teacher will hand out **10.1.1 Introduction to the Activity Handout.** This handout sets the stage for the entire activity. What you and the students put into it, will be in the end what you get out. Read the handout together and then discuss the article. Ask students what they are feeling and get their thoughts.

Towards the end of the class, summarize the discussion and tell students what the plan is.

> Now that we have seen examples of misidentification…. We are going to be doing an experiment to see how well you can identify some of your teachers. You will be attempting to identify photographs of your teachers from 4 different distances: 25, 50, 75, and 100 feet. So let's see how we can do. Are there any questions?

You may also want to ask the students to all wear a white or black colored t-shirt and jeans so that everyone looks similar for the activity.

5.2.3. Data Collection (3-4 periods)

Introduce again to the students what they will be doing. Pass out the **data collection – recognition trials.doc.** Randomly select 5 students out of the class to hold the pictures. Instruct them to hold the photos in front of their face. So the same 5 students are not ONLY holding pictures you can switch helpers between the different data collection cycles. Tell students they will have approximately 3-5 seconds to identify each photo. Inform students to mark the distance they are identifying at and the trial number on their **data collection – recognition trials.doc** handout. Try to avoid starting a cycle at the end of a period as this may affect the results.

Have one assistant (teacher) stay with the students identifying faces to monitor their work. Have the other helper down with the student helpers to organize the trials (randomizing the photos and making the answer key). This assistant's job is also to make sure each photo is only shown for 3-5 seconds; otherwise the activity will take forever. Also, work out hand signals with the other teacher (thumbs up/down) to indicate students are done and can move on to the next photo.

5.2.3.1. Cycle 1 –1 Collection at the four distances

The first cycle consists of 4 identification trials: 1 at 25, 50, 75, and 100 feet. This is to establish a baseline and to show students how the activity and data collection will work.

5.2.3.2. Cycle 2 – 3 data collection trials at 25 feet

This cycle consists of 3 identification trials at 25 feet. This should go the quickest as it is the closest. Make sure to keep your helpers quiet as students identifying can hear them.

5.2.3.3. Cycle 3 – 3 data collection trials at 50 feet

This cycle consists of 3 identification trials at 50 feet.

5.2.3.4. Cycle 4 – 3 data collection trials at 75 feet

This cycle consists of 3 identification trials at 75 feet.

5.2.3.5. Cycle 5 – 3 data collection trials at 100 feet

This cycle consists of 3 identification trials at 100 feet.

5.2.4. Data Gathering

Once data is collected, each student needs to evaluate how well they did. Pass out **Data Gathering – Face Activity Parts 1-6.doc** and have them compute these values on their own. class needs to tabulate the data, so the measures of central tendency can be computed.

This can be used for evaluating how well students understand converting fractions, proportions, and percentages.

5.2.4.1. Data Gathering and Manual Data Computation

During the next two class periods the whole class will work together. First, we will tabulate our results using the handout **Data Gathering – Face Activity Part 7.doc.** Go around the room and fill in the tables for each of the distance/trial combinations. It doesn't matter which order you write the values in the tables. Also note that the creators think there was some "fibbing" that went on with the results, i.e. students that may not have performed that well changed their answers. This may be a good time to discuss data collection errors. You may also want to investigate better ways of tabulating the data.

Once the tables are complete, have the students work in class or for homework, the mean, median, and mode for each distance and trial combination.

This can be used to assess how well students have grasped mean, median, and mode.

5.2.5. Mistaken Identity Cases / Look-a-like Discussion

This is a breakpoint in the activity. Use the resource section to create this class.

5.2.6. Data Analysis and Discussion

After students have received their grades on PART 7, we can progress to analyzing and discussing our results. Hand out **Manual Data Analysis - Face Activity Parts 8.doc** and have the students complete the document. Discuss results.

5.2.7. Data Analysis with Computers

Prior to going to the computer lab, you as the instructor will have to create a master template for the students to use based off of the information in **Data Gathering – Face Activity Part 7.doc**. Please refer to the MS Excel template provided for formatting instructions. The first sheet will include 2 sheets, one for each class hour participating, and one with the combined data for all classes.

The number of class periods in the computer lab will be dependent on your students' knowledge of MS Excel.

5.2.7.1. Using Formulas

The **Excel Data Analysis – Face Activity Part 10.doc** is a 15 page tutorial that steps through the procedures needed to enter basic formulas in Excel. The formulas include: mean, median, and mode. The tutorial uses a sample dataset similar to the face data so all of the sheets included in the tutorial can be found in your students' worksheets. The tutorial is broken into 2 parts. Part 1 includes instructions on how to enter 1 mean, then one median, and then one mode. The second part contains instructions on how to use the COPY and PASTE functions to quickly finish a worksheet.

The way we went through the tutorial was step by step using a computer and an overhead projector. Our students were asking too many questions, so we instructed them on a very tight step by step level. This worked well, except for the one or two students who knew what to do. These students sat around a lot. In this case you may want to have other math activities for them to do, i.e. online math problems/games.

Once we went through how to perform one calculation, we let the students work individually and answered individual questions as they arose. When the students appeared to become overwhelmed, we stopped and went back to the overhead projector.

We did not perform any assessment at this point.

5.2.7.2. Graphing

After the students have completed the all the formulas in part 10, you will move on to Graphing in Excel. A 12 page tutorial was created and is called **Excel Data Analysis - Face Activity Part 11.doc**. This tutorial provides steps to create bar graphs, line graphs, and a line graph using multiple series of data.

The instruction was delivered in a similar fashion as the Excel formula data analysis.

Assessment was performed on a printout of the graphs only as it could be quickly graded.

5.2.8. Discussion and Final Thoughts

The last part of this unit uses Final Thoughts – Face Activity Part 12. Have students complete this during class or for homework. Allow them to use all the sheets, graphs, and materials to compose their answers.

Assessment was done on their level of understanding of what the data meant, both numberwise and graphically.

6. Scope

Depending on the size and ability of the class, your time to complete the tasks and activities will change. The creators of this lesson implemented this lesson over the course of a 9 week period. Typically 1 or 2 days a week were set aside for this activity. Students were able to pick up quite well where we left off from the prior class.

The following calendar shows when the creators of this lesson delivered the unit.

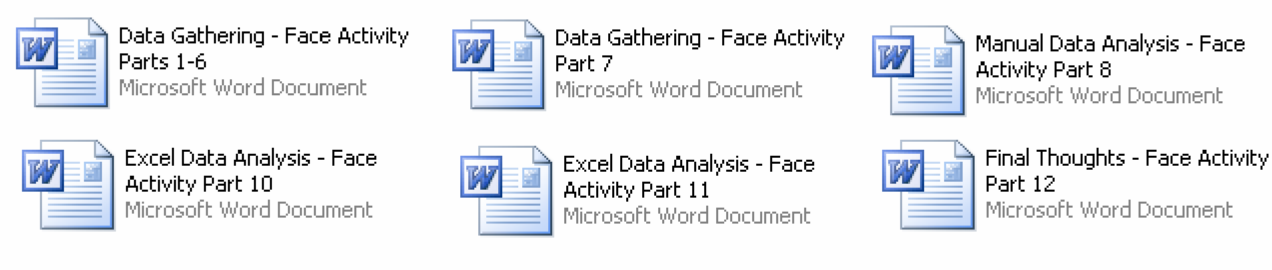
Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
October					
				13 – Read article & Introduced article	
16 – Begin data collection	17- Data collection		19 – Data collection		
23 – Data collection / data gathering	24 – Data gathering				
30 – Data gathering / computation	31- Data gathering / computation				
November					
	7 – Data analysis/ discussion/ proportions				
13 – Mistaken Identity cases (resources)	14 – Computer lab				
20 – Computer lab	21 – Computer lab				
27 – Computer lab	28 – Computer lab				
December					
	5 – Computer lab and final wrap up	6 – final wrap up			

Using our timeline, the activity should take approximately 16 – 18 fifty minute class sessions.

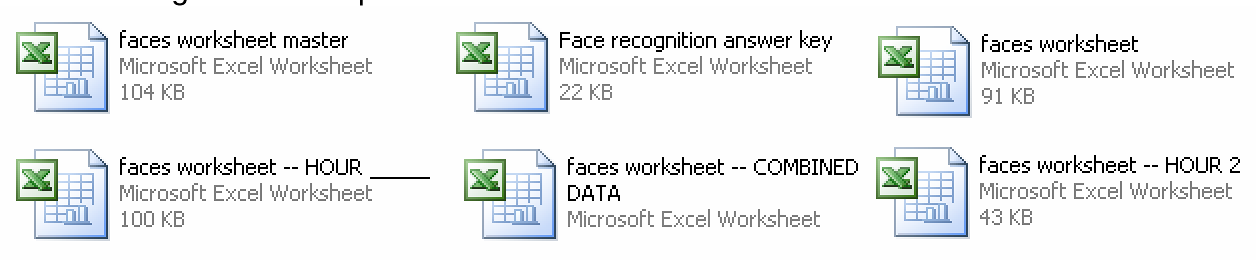
Number of 50 minute class periods	Tasks and Activities
1	Introduction to the Activity and Discussion
3-4	Data collection
1	Data gathering
2	Data gathering / Manual data computation
1	Data analysis and discussion / proportion worksheet
1	Mistaken identity cases / look-a-like discussion
5-7	MS Excel Tutorials, Computer analysis, Graphing
1	Data Analysis / Discussion / Wrap-up

7. Activities, worksheets, and templates

The following MS Word worksheets are available for use in this lesson:



The following MS Excel spreadsheets are available for use in this lesson:



The following images, documents, PDFs are available for this lesson:

2 videos for the eyewitness test:

8. Evaluation

This activity was created with no pre- and post- testing. All of the students had been working on measurement, measures of central tendency, proportions, so we had a good understanding of where they were. This activity was to apply the “math problems” to a real world scenario – connecting the math and science to the real world. In addition, most of our students had not had MS Excel experience, so anything presented would be an advantage, as well as preparation for their science fair projects.

Therefore evaluation in this lesson was based on the worksheets, handouts, and MS graphs that were completed by each student. Student assessment of graphing and data entry with MS Excel was performed using a follow-up activity that involved entering and graphing their own grades.

9. Reflection/Lessons Learned/Alterations for future use

- Identify and photograph individuals with more similarities in features
- Change distances more frequently (less time at each distance, minimize familiarity with faces)
- Develop method for obtaining truthful data from students (alleviate cheating factor)
- Brainstorm with students alternate ways to do the research/data collection (guided inquiry based component)
    - Proportions
        - Changing picture size, not distances (how are they related?)
        - Changing picture clarity (fuzzy? clear?)
    - Application
        - Extend activity to include video cameras in the building
            - What do they see? With what clarity? Is it good enough according to our findings?
    - Interdisciplinary activities
        - Writing letters to the editor/persuasive essays with findings for video cameras
        - Research famous/infamous cases of misidentification in US history
        - Language arts – Shakespeare's Twelfth Night, etc…
- Extension activity
    - Students take it further: What more can we do? What more do we want to know? Where does this lead us?
- Independent research
    - Encourage and work with students to develop related 'science fair' projects - depth and focus on the topic encouraged, now that students have decent background
- Assessment
    - Add/develop appropriate pre-/post- evaluations and assessments that will help us measure the growth of the students.

10. Resources

10.1. Face Mistaken Identity Cases / Look-a-Like with URLs

10.1.1. Introduction to the Activity Handout

False ID: Face Recognition on Trial

By Robin Lloyd, LiveScience, 14 March 2005

Two hoodlums and their posse hit the streets of Fairbanks, Alaska, on October 10, 1997, for a night of marauding that left a teenage boy dead and an older man seriously injured.

Two years later, a jury convicted the suspects solely on the basis of the linkage between the two crimes and one eyewitness who saw the defendants, at the time, beating the older man a "couple of blocks away." That distance was determined to be about 450 feet.

The defense pointed out to the jury that 450 feet is too far for a witness to accurately perceive the features that constitute a person's face. In fact, it's the same as trying to identify a person in the box seats behind home plate at Yankee Stadium when you're seated high in the center field bleachers.

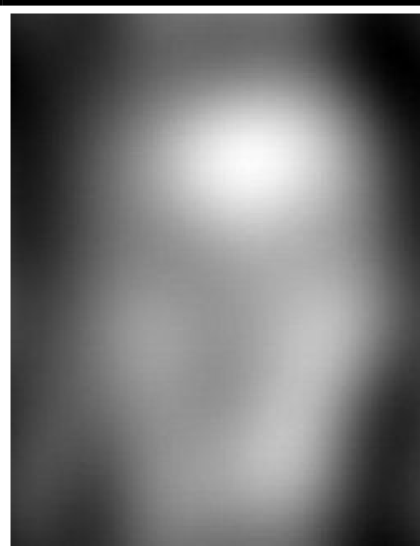
Impossible, right? Nonetheless, the jury voted to convict.

The Evidence

Julia Roberts as she would look from 5.4 feet, 43 feet and 172 feet away.

Who is this? This well-known face is seen as it would appear from 450 feet. →

Images: Geoffrey Loftus, UofW



This frustrating case inspired Geoffrey Loftus of the University of Washington and Erin Harley of the University of California, Los Angeles, to do better.

Gone in a blur

Clearly it's harder to identify faces at a distance, but exactly how much information is lost at 10 feet, versus 100 feet, versus 200 feet, and so on?

"We determined that blurriness and distance are equivalent from the visual system's perspective," Loftus said. "When you make an image smaller, you lose information in exactly the same way as happens when you keep the picture large but make it blurry."

As a result of this new research, Loftus and Harley now can use witnesses's statements that they viewed something from 120 feet, for example, and then manipulate a photograph of the item and know precisely how much to filter or blur a closer item so it carries the same amount of information.

Observers will be equally successful at identifying the distant image and the filtered closer image, Harley told *LiveScience*.

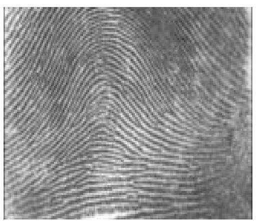
The approach is based on 20/20 vision and normal daylight. It can be adjusted for nighttime or vision variations. The results were published in a recent issue of *Psychonomic Bulletin & Review*.

How we see

To figure this all out, the researchers conducted many experiments to learn more about the how people see what is before them. The human visual system, as Harley and Loftus understand it, involves a collection of components -- including the optics of the eye and the cells that receive light -- all of which act as filters that determine which types of light stay and which are removed from all the light available to our eyes.

"Think of any filter you might use," Harley said. "For example, we put UV filters on our camera lenses to block out UV light. These camera filters simply don't let wavelengths in the UV range pass through."

Lasting Impression



Harley and Loftus determined that our brains basically apply a distance filter to objects we see, such that we see progressively coarser details as we move further and further away.

To learn the exact figures, they started with small images of Julia Roberts, Michael Jordan, Jennifer Lopez, Bill Gates and President George W. Bush. Next, the researchers made the images larger, as if one were getting closer, until subjects could identify each public figure or celebrity. They recorded the size at which each celebrity was recognized and converted this to a corresponding distance.

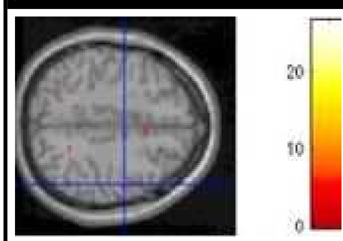
They did the same experiment starting with blurry images and slowly clarifying them until test subjects could recognize the public figures. They recorded the amount of blurring that made a face unrecognizable.

They found that the same general mathematics describe the filtering that happens in each situation. And if you want to sound scientifically credible when you spot celebrities, you should know that these experiments show that celebrity face identification remains quite reliable up to about 25 feet and then degrades gradually to zero reliability at 110 feet.

Serious consequences

When it comes to identifying criminals, the stakes, of course, are more grave. "It is becoming more apparent that there are serious problems with eyewitness testimony," Loftus said.

To Tell the Truth ...



BRAIN SCANS MIGHT BE BETTER LIE DETECTORS

"Misidentifications can occur, and the quality of memory is limited by the distance at which a witness sees a person," he said. "This research, which specifies mathematically the relation between memory quality and distance, results in our being able to present intuitive information to a jury which can help it come to the best possible decision in a case."

Beyond trials, the new research, which also works for identifying vehicles, could help in the design of sensing devices for spotting terrorists and could help determine the reliability of people identifying potential sites for weapons of mass destruction from aerial photographs.

Meanwhile, journalists investigating the conviction of the Fairbanks hoodlums discovered juror misconduct. Four jurors conducted their own side experiments on distance and facial recognition outside the courtroom, during the trial. An appeals court has ordered a new trial.

Presumably, the defense now will be able to more precisely illustrate to a jury how difficult it is to identify someone 450 feet away.

Answer: The celebrity face above is that of President Bush.

10.1.2. Case 1

Reference: WWW.SPTIMES.COM/2006/05/02/FLORIDIAN/MIRROR_IMAGE.SHTML

Mirror image

A simple case of mistaken identity becomes much more complicated when the person you most resemble is an accused terrorism supporter.

By BOB ANDELMAN
Published May 2, 2006

[Times photo illustration]
Can you tell who above is Sami Al-Arian or St. Petersburg author Bob Andelman? Many people cannot. (Andelman is on the left).

I could tell by his expression that something was bothering the man I had hired to clear some backyard brush. I couldn't follow a lot of what he said in his thick Jamaican accent, but one message kept coming through: "Sami? Sami?"

No, I said. Bob.

Finally, I produced my driver's license as proof of my true identity. He didn't seem convinced, but at least he stopped asking.

Months later, he was back to do more work: "Sami?"

Not again.

The first time it happened was in 2002. A friend saw a picture of former University of South Florida professor and alleged terrorism supporter Sami Al-Arian and did a double take because he thought it was me. He thought the resemblance was funny. I didn't.

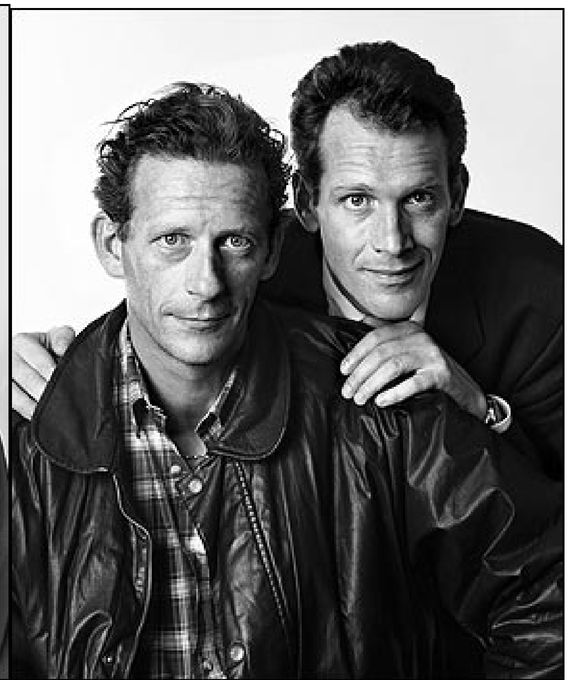
Not that time, or the second, third or 100th time.

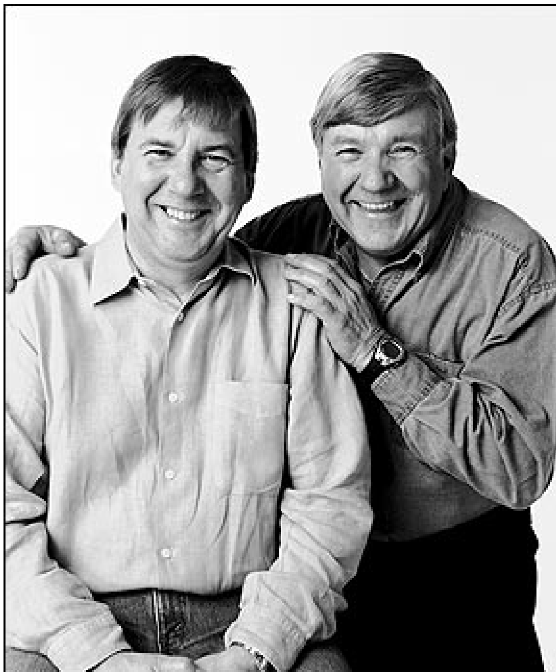
The more attention Al-Arian's case got in the media, the more often it happened. Even I could see why: The wire-rim glasses, classic bald head, the shape of the ears and, more particularly, the way we shaved our salt-and-pepper beards were all eerily similar. We're even close in age; Al-Arian is 47, I'm 46.

Al-Arian's case has affected my ability to travel freely, too. No one ever looked twice at me in an airport until Al-Arian's face started making the front page. Suddenly I was getting extra security checks, being pulled aside for extra wanding, questioning and delays. I was never strip-searched, but I always wondered if that might be coming. The hassles finally relented when I bought a pair of funky blue plastic-frame glasses that looked nothing like the wire frames and oval lenses Al-Arian and I apparently both preferred.

10.1.3. Case 2 – Photography / Look-a-Likes

Reference: HTTP://HAHA.NU/AMAZING/IM-NOT-A-LOOK-A-LIKE/




10.1.4. Case 3 – Mistaken Identity

Reference: WWW.SAINTSREPORT.COM/FORUMS/SHOWTHREAD.PHP?P=30529

A Case of Mistaken Identity

Innocent Girl Held A Week In North Platte Jail

11-10-2006, 02:11 AM

"We are horribly sorry," the cop said.

The 17-year-old girl who was wrongly locked in jail for seven days might be feeling terribly lucky.

Amanda Sylvester might still be in jail, facing criminal charges that included aiding and abetting a robbery, were it not for an anonymous tip to a Crimestopper hotline.

Her arrest and arraignment stemmed from mistaken identity, according to Lieutenant Rick Ryan of the North Platte Police Department. One of the men involved in the recent robbery of a Kwik Shop identified Sylvester through a photograph, but said he didn't know her name.

http://nebraska.statepaper.com/pages.../innocent.html

Would you have been able to tell?

Amanda Sylvester   Kayce Schildhauer

10.1.5. Case 4 – Mistaken Identity 2

Reference: WWW.RECORD-EAGLE.COM/2006/JUN/04MIXUP.HTM

Local News

06/04/2006

Mistaken identity victims shared some similar traits

Besides outward likenesses, pair had zest for life

Cerak

VanRyn

GRAND RAPIDS (AP) — They had much in common, much more than their long, blond hair: optimistic smiles, a flair for sports and a devotion to religion. And those who knew them say the two shared an uncanny knack for making a friend of anyone they met.

But in the aftermath of an accident, it was their outward similarities that led to a tragic mix-up, with one family mourning a child who was not dead, and the other nursing a child who was not their own.

Five people died on the night of April 26, when a tractor-trailer plowed into a van carrying students and workers from Taylor University, a Christian school in Indiana. Everyone thought that 19-year-old Whitney Cerak was one of them, and that Laura VanRyn, 22, survived in a coma-like state, her face swollen and bones broken.

Last week, it was revealed there had been a terrible mix-up: The young woman recovering in a hospital for the last five weeks was, in fact, Cerak.

10.1.6. Case 5 – Mistaken Identity 3

El hombre que sostenía que fue confundido con un violador sale de prisión tras 15 años

JUSTICIA

■ Ahmed Tommouhi estaba acusado de cuatro violaciones: una fue anulada por el Supremo y él mantiene que es inocente de las otras tres

BARCELONA. (Redacción.) – Ahmed Tommouhi, el hombre condenado por cuatro violaciones (una de las cuales fue revocada gracias a una prueba de ADN) salió el pasado lunes de prisión, tras cumplir quince años de pena por los otros casos, que él siempre ha mantenido que no cometió. Tommouhi, de nacionalidad marroquí, ha defendido siempre que él no es un violador, y que los procesos judiciales fueron viciados desde el inicio, y por ello jamás aceptó el indulto (que implica un reconocimiento de culpa), ni el tercer grado.

Esta historia se inicia en 1991, cuando se produjo una plaga de violaciones, ocurridas fundamentalmente en Tarragona, todas con gran violencia y agresividad. El 11 de noviembre de ese año, Ahmed Tommohui fue detenido y acusado de hasta 17 delitos de este tipo. Finalmente, fue condenado por cuatro agresiones sexuales a un total de treinta años. Junto con él fue condenado otro compatriota suyo, Abderrazak Mounib. Ambos defendieron siempre que no tenían nada que ver con lo ocurrido.

Su historia dio un nuevo giro en 1995, cuando, a raíz de una nueva serie de violaciones, fue detenido el ciudadano español Antonio García Carbonell. Merced a la prueba del ADN, se comprobó que este individuo era el autor de uno de los hechos y el Tribunal Supremo anuló la condena para ambos marroquís.

Sin embargo, quedaban las otras tres. En estas no había restos biológicos que cotejar, y por lo tanto la causa se fundamentaba en los reconocimientos efectuados por las víctimas de los asaltos. De manera que los otros tres procedimientos nunca fueron revisados.

Las investigaciones posteriores de la Guardia Civil arrojaron dudas sobre la posible autoría de las violaciones imputadas a ambos magrebíes. Tomando como referencia los informes de los agentes, la Fiscalía del Tribunal Superior de Justícia de Catalunya pidió el indulto, pero ambos se negaron a rubricar la solicitud, porque, en su opinión, ello quería decir que aceptaban su culpabilidad.

El 27 de abril de 2004, Tommohui cumplió las dos terceras partes de su pena, lo que, de acuerdo con lo que estipulaba el anterior Código Penal, tenía derecho al tercer grado. Pero tampoco lo aceptó, porque quería dejar la prisión sin haberse acogido a ningún beneficio. Quería salir como inocente. El 26 de abril de 2009 expiraba su pena, pero la Junta de Tratamiento de la prisión de Brians, donde estaba recluido, aconsejó, en su última reunión, que se le diera la condena condicional. El lunes, Ahmed Tommouhi dejó el centro penitenciario igual que entró, esgrimiendo que era inocente. Abderrazak Mounib no podrá hacerlo: murió de un infarto en la cárcel en el año 2000.●

ARCHIVO

PARECIDO FÍSICO. A la izquierda, Ahmed Tommouhi, en 1991; a la derecha, García Carbonell; ambos se parecen

10.2. Documents on Mistaken Identity Cases in the United States

10.2.1. Police can be dead certain, and wrong

Reference:
WWW.PSYCHOLOGY.IASTATE.EDU/FACULTY/GWELLS/STPETERSBURGTIMES.PDF#SEARCH='MISTAKEN%20IDENTITY%20WITNESS'

Double click on the PDF icon to open.

Adobe Acrobat 7.0
Document

10.2.2. Eyewitness Identification

Reference:
WWW.STATEACTION.ORG/PUBLICATIONS/AGENDA/2006/EYEWITNESSIDENTIFICATION.PDF#SEARCH='MISTAKEN%20IDENTITY%20WITNESS'

Double click on the PDF icon to open.

Adobe Acrobat 7.0
Document

10.2.3. Innocence Project – Understanding the causes of Eyewitness Misidentification

Reference: HTTP://WWW.INNOCENCEPROJECT.ORG/UNDERSTAND/EYEWITNESS-MISIDENTIFICATION.PHP


INNOCENCE PROJECT

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KNOW THE CASES : UNDERSTAND THE CAUSES : FIX THE SYSTEM | ABOUT : DONATE : NEWS & RESOURCES

understand the Causes

: EYEWITNESS MISIDENTIFICATION
: UNRELIABLE/LIMITED SCIENCE
: FALSE CONFESSIONS
: FORENSIC SCIENCE MISCONDUCT
: GOVERNMENT MISCONDUCT
: INFORMANTS / SNITCHES
: BAD LAWYERING
: E-MAIL THIS PAGE

Eyewitness Misidentification

Eyewitness misidentification is the single greatest cause of wrongful convictions nationwide, playing a role in 75% of convictions overturned through DNA testing.

While eyewitness testimony can be persuasive evidence before a judge or jury, 30 years of strong social science research has proven that eyewitness identification is often unreliable. Research shows that the human mind is not like a tape recorder; it neither records events exactly as it sees them, nor recalls events like a tape recorder that has been rewound. Instead, witness memory is like any other evidence at a crime scene; it must be preserved carefully and retrieved methodically, or it can be contaminated.

When witnesses get it wrong

In case after case, DNA has proven what scientists already know – that eyewitness identification is frequently inaccurate. In the wrongful convictions caused by eyewitness misidentification, the circumstances were different, but witnesses, law enforcement officials and juries all relied on testimony that could have been more accurate if reforms proven by science had been implemented. The Innocence Project has worked on cases in which:

RELATED LINKS

Fix The System: Eyewitness Identification Reform

Fact Sheet: Eyewitness Misidentification

Background: Scientific Studies on Identification

In Depth: Prof. Gary Wells's Website on Identification

- A witness made an identification in a "show-up" procedure from the back of a police car hundreds of feet away from the suspect in a poorly lit parking lot in the middle of the night.
- A witness in a rape case was shown a photo array where only one photo – of the person police suspected was the perpetrator – was marked with an "R."
- Witnesses substantially changed their description of a perpetrator (including key information such as height, weight and presence of facial hair) after they learned more about a particular suspect.
- Witnesses only made an identification after multiple photo arrays or lineups – and then made hesitant identifications (saying they "thought" the person "might be" the perpetrator, for example), but at trial the jury was told the witnesses did not waver in identifying the suspect.

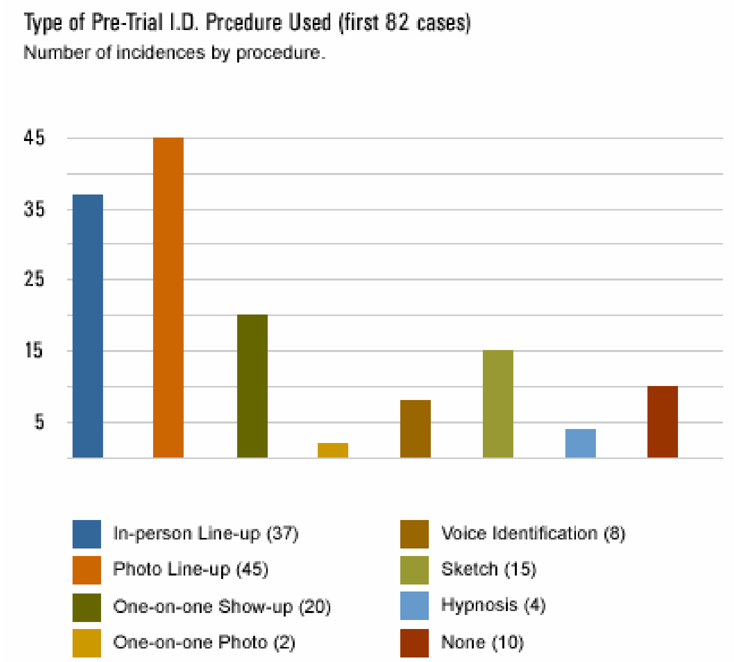
Variables impacting accuracy of identifications
Leading social science researchers identify two main categories of variables affecting eyewitness identification: estimator variables and system variables.

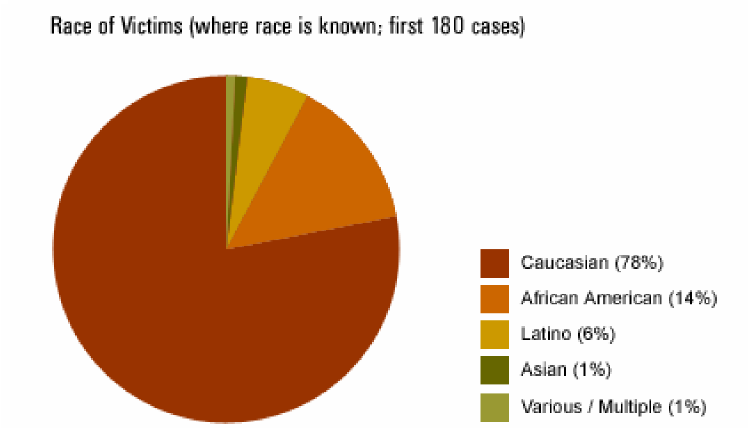
Estimator variables are those that cannot be controlled by the criminal justice system. They include simple factors like the lighting when the crime took place or the distance from which the witness saw the perpetrator. Estimator variables also include more complex factors, including race (identifications have proven to be less accurate when witnesses are identifying perpetrators of a different race). The presence of a weapon during a crime and the degree of stress or trauma a witness experienced while seeing the perpetrator are also estimator variables that have been proven to reduce the accuracy of identifications.

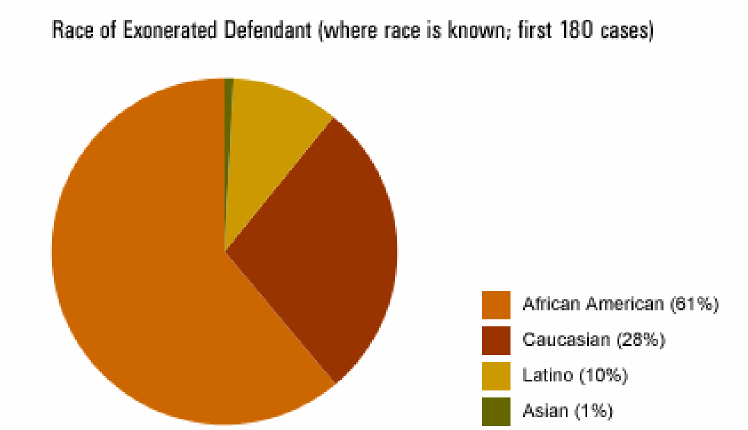
System variables are those that criminal justice can and should control. They include all of the ways that law enforcement agencies retrieve and record witness memory, such as lineups, photo arrays and other identification procedures. System variables that substantially impact the accuracy of identifications include selection of "fillers" (or members of a lineup or photo array who are not the actual suspect), instructions to witnesses before identification procedures, administration of lineups or photo arrays, and communication after witnesses make an identification.

Click here to learn about reforms the Innocence Project advocates for individual law enforcement agencies and state legislatures.

Decades of solid scientific evidence supports reform
As far back as 1932, experts have known that eyewitness identification is all-too-susceptible to error, and that scientific study should guide reforms for identification procedures. When Yale law professor Edwin Borchard studied 65 wrongful convictions for his pioneering 1932 book, "Convicting the Innocent," he found that eyewitness misidentification was the leading cause of wrongful convictions.


Type of Pre-Trial I.D. Prcedure Used (first 82 cases)
Number of incidences by procedure.
45
35
25
15
5
In-person Line-up (37)
Photo Line-up (45)
One-on-one Show-up (20)
One-on-one Photo (2)
Voice Identification (8)
Sketch (15)
Hypnosis (4)
None (10)


Race of Victims (where race is known; first 180 cases)
Caucasian (78%)
African American (14%)
Latino (6%)
Asian (1%)
Various / Multiple (1%)


Race of Exonerated Defendant (where race is known; first 180 cases)
African American (61%)
Caucasian (28%)
Latino (10%)
Asian (1%)

Featured Case: Calvin Willis

One night in 1982, three young girls were sleeping alone in a Shreveport, Louisiana home when a man in cowboy boots came into the house and raped the oldest girl, who was 10 years old. When police started to investigate the rape, the three girls all remembered the attack differently. One police report said the 10-year-old victim didn't see her attacker's face. Another report – which wasn't introduced at trial – said she identified Calvin Willis, who lived in the neighborhood. The girl's mother testified at trial that neighbors had mentioned Willis's name when discussing who might have committed the crime. The victim testified that she was shown photos and told to pick the man without a full beard. She testified that she didn't pick anyone, police said she picked Willis. Willis was convicted by a jury and sentenced to life in prison. In 2003, DNA testing proved Willis's innocence and he was released. He had served 22 years.

10.3. <u>Other Face Recognition Activities</u>

10.3.1. How good are you at identifying faces?

Reference: HTTP://WWW.ICN.UCL.AC.UK/FACETESTS/MYABILITIES.PHP

10.3.2. The Eyewitness Test

The following links are for an example crime scene video and lineup. This test gives students a chance to pick out who the perpetrator was. Who was it? Actually none of them, they are all innocent. Source of Videos: See expert on eyewitnesses URL.

F:\GK12\Face Identification Activity

Crime scene video

F:\GK12\Face Identification Activity

Lineup

10.4. <u>Other Resources</u>

10.4.1. Expert on Eyewitnesses

URL: HTTP://WWW.PSYCHOLOGY.IASTATE.EDU/FACULTY/GWELLS/HOMEPAGE.HTM