

Handwriting and Voice Identification

Reading Preview

Key Concepts

- What clues are used to compare writing samples?
- What methods do scientists use to compare voice samples?

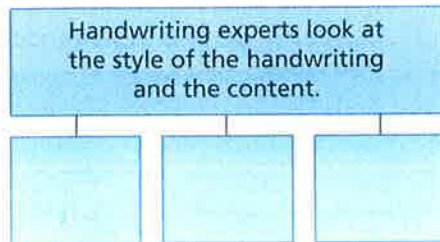
Key Terms

- voiceprint

Target Reading Skill

Identifying Main Ideas Make a graphic organizer like the one below about handwriting. As you read, add three supporting details that help explain the main idea.

Main Idea



Discovery
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Forensic Science Video

Voice Stress Analysis

Discover Activity

Can Handwriting Identify a Person?

Your teacher will give you a sheet of paper on which several people have signed their names.

1. Pick a vowel that appears in many of the signatures. Is the shape of the vowel the same in all the signatures? If not, describe any differences you observe.
2. Does the size of the letters vary within a signature? Does it vary between signatures?
3. List one other characteristic that you think could be used to compare signatures.

Think It Over

Inferring Do you think it is possible to use handwriting to identify a suspect? Why or why not?

Charles Lindbergh was the first person to fly a plane solo across the Atlantic Ocean in 1927. This deed made him rich and famous, but it also made him a target. On March 1, 1932, Bruno Hauptmann climbed a ladder to the second floor of Lindbergh's house. Then Bruno grabbed Lindbergh's 20-month-old son and left a ransom note asking for \$50,000.

When Lindbergh paid the ransom on April 2, he didn't know that his son was dead. The added weight of the child may have caused the ladder to break as Bruno climbed down. Although the child probably died on March 1, his hidden body wasn't discovered until May 12.

The evidence at Bruno's trial included 45 writing samples. There were 15 ransom notes. There were 9 auto registration forms that Bruno had filled out. There were also samples that Bruno agreed to write as he was questioned by the police. Experts were able to use the samples to explain why it was likely that Bruno had written the ransom notes. People's handwriting styles are distinctive.



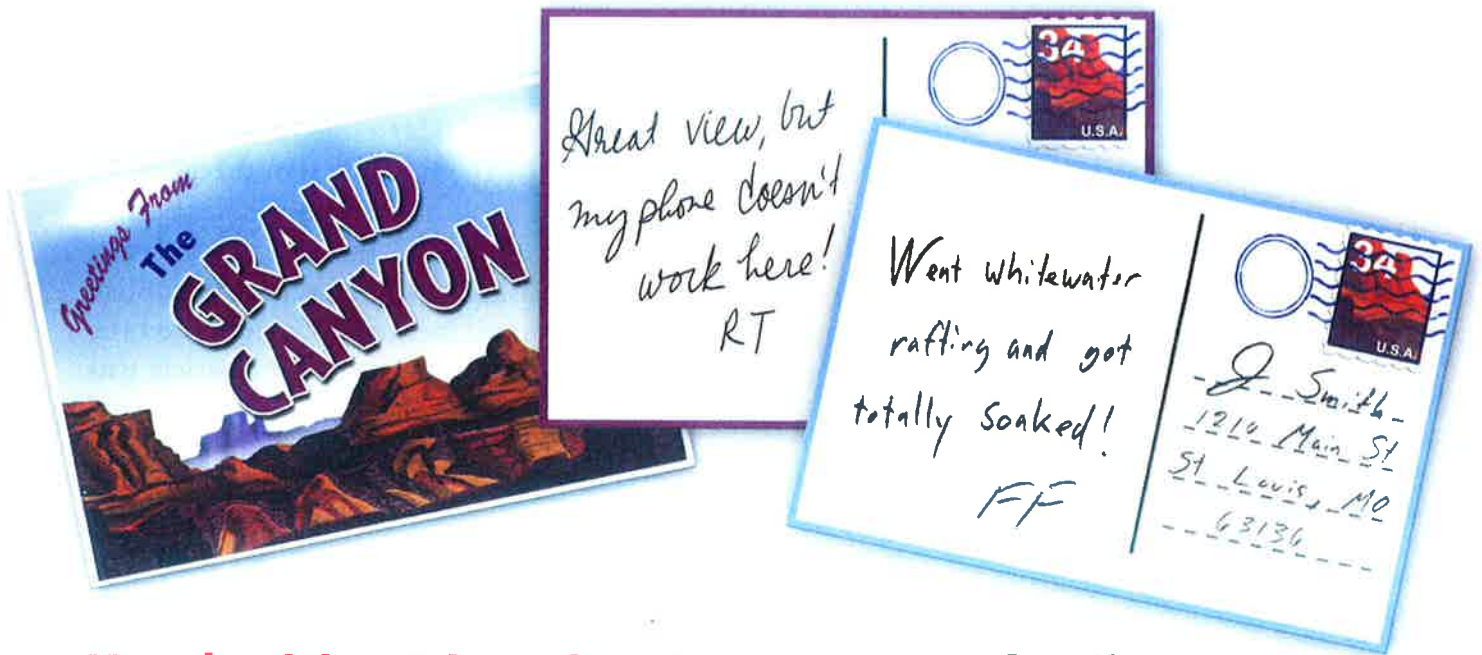


FIGURE 16

Handwriting Samples

These samples show how writing styles can vary among people.

Comparing and Contrasting In what ways are the two writing samples similar? In what ways are they different?

Handwriting Identification

A robber hands a bank teller a note. A thief forges the signature on a stolen check. When detectives have this type of evidence, they call on a handwriting expert. **Handwriting experts look at the style of the handwriting and for content clues.**

Handwriting Features When you look at someone's writing, you probably notice whether it's hard or easy to read. But that's not what handwriting experts look for. They start with the general style. Some people print each letter separately. Some people join the letters together within a word.

An expert looks at the shape, the slant, and the size of letters. He notices whether the lines are thin or thick. He looks for personal touches. For instance, does the writer circle the dot over an "i"? Figure 16 compares two writing samples.

Comparing Writing Samples Experts need samples of a suspect's writing to compare with their written evidence. Few people today write letters by hand. They use a computer to send e-mail or to type a report for school. But handwritten samples still exist. People hand write grocery lists, entries on a calendar, or a note on a birthday card. They sign legal documents, such as checks. A person's signature appears on the front of a driver's license and the back of a credit card.

Ideally, experts want a writing sample with some of the same words as in the evidence sample. This makes it easier to compare the samples. If it isn't possible to compare words, then the experts will look at individual letters.



FIGURE 17

Sketch of Ted Kaczynski

In 1987 in Salt Lake City, Utah, a bomb exploded outside a computer store. A woman was able to describe the man who left the package. Content clues in an article Ted wrote helped identify him as the bomber.

Content Clues Handwriting experts also look for clues in the content of a writing sample. The clues could include word choice, spelling, and punctuation. Experts can also apply this type of analysis to text messages. With text messages, the trick is to look for letters that a writer tends to leave out.

Content clues helped catch the man shown in Figure 17. In 1978, he began mailing pipe bombs to people. His bombs killed 3 people and injured 23 others. In 1995, the bomber offered to stop. In return, he asked two newspapers to publish a long article that he had written. In the article, he stated the reasons for his actions. One person who read the article was David Kaczynski. He realized that the content and tone of the articles matched the content and tone of letters that he had received from his brother Ted.

Altered Documents Sometimes an expert looks at just one writing sample. The task is to figure out if the writing has been altered in some way. Suppose detectives suspect that a person has changed the amount of a check or forged another person's signature. The expert can use a hand lens or simple microscope to see details of the writing.

The expert may use lighting to reveal other clues. Shining a light on paper from the back may reveal a rough place where writing has been erased. Shining a light from the side can reveal a deep groove in the paper. The groove is where a writer may have pressed down hard while copying a signature.



Reading Checkpoint What clues do experts look for in text messages?

Voice Identification

You answer the phone. You hear, "Hi, it's me." You may not have to ask who "me" is. That's because people's voices have certain distinctive qualities. One person's normal voice is loud and booming. Another person's voice can barely be heard. People may have a voice that is high-pitched like a violin or low-pitched like a tuba. Such differences can be used to identify a voice.

For instance, a woman finds a threatening message in her voice mail. If detectives have a suspect, they can compare the recording to a recording of the suspect's voice. **To compare voice samples, analysts can graph the sounds or listen to the recordings.**

Skills Activity

Observing

Your teacher will play a recording of several voices. As you listen, try to identify each voice. Were you able to identify all the voices? If not, why not?

Graphing Sound What does your voice *look* like? A machine called a sound spectrograph can make an image of your voice like the one in Figure 19. The machine changes sound waves to electrical impulses that can be graphed and displayed on a computer screen. The graph, or **voiceprint**, plots the pitch and loudness of sound over time.

What if people try to disguise their voices? There will still be some telltale features that can be used to identify them. Some features will show up in a voiceprint. Some can be recognized by a person listening to a recording.

Listening to Recordings An analyst can compare how sounds are pronounced. She will listen for breathing patterns or the way a voice rises and falls in pitch as a person speaks. She will also note uncommon words or phrases.

The analyst will use what she learns by listening and looking at graphs to draw a conclusion. If she finds 20 or more points in common, she can identify the suspect. If she finds 20 or more differences, she can eliminate the suspect.

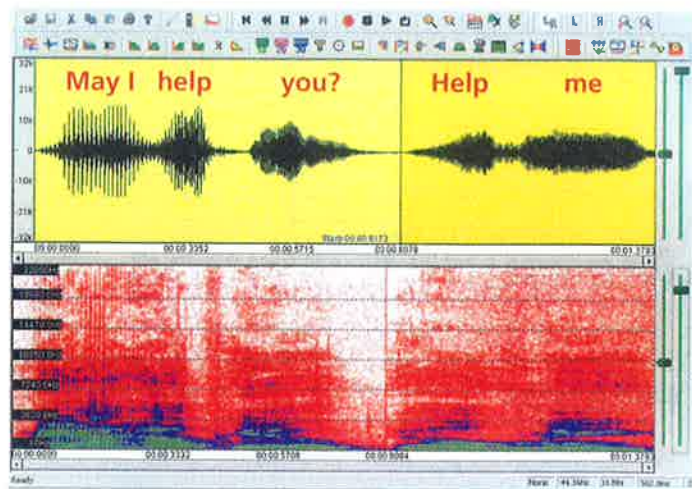


FIGURE 18

Comparing Voiceprints

This graph shows two voiceprints side by side. The voiceprints were made by two different speakers. In the top band, loudness is plotted against time. In the red band below, pitch is plotted against time.

Inferring What do you think a gap in a voiceprint might represent?

Lesson 4 Assessment

Target Reading Skill Identifying Main Ideas Use the information in your graphic organizer about handwriting to help answer Question 1.

Reviewing Key Concepts

1. a. **Identifying** What features might an expert look for when examining the letters in a writing sample?
- b. **Describing** What clues do experts use to compare the content of writing samples?
- c. **Making Judgments** Police have two writing samples from a suspect. They have a grocery list and a sample the suspect wrote at the police station. Which sample do you think would be more useful and why?

2. a. **Describing** What methods can analysts use to compare voice samples?
- b. **Explaining** What voice qualities does a voiceprint measure?
- c. **Comparing and Contrasting** What voice features can be heard in a recording that would not show up in a voiceprint?

Writing in Science

Advertisement You want to hire an actor to give news updates during a radio broadcast. Write a help wanted ad for the job. Describe the kind of voice qualities you would want this person to have.