

Can courts trust the polygraph?

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Institute: The Weizmann Institute of Science, Rehovot.
Country: Israel.

Subject: Science for all, Biology

Grade level: 9-10 graders

Curriculum content: Voluntary and involuntary muscles

Kind of activity: Critical reading and group activity

Anticipated time: 4 lessons of 45 minutes each

Task description

This module presents the subject of voluntary and involuntary muscles and connected it to a real life dilemma regarding the use of polygraph in court. The activity supplies the students with the opportunity to justify their point of view with scientific evidence, and to self asses their own performances.

General Instructions:

1. Your teacher presented an article from a newspaper, regarding the use of polygraph, followed by class discussion raising the question "Can court trust polygraph?". Please write your opinion regarding the question. Explain why you think this way and try to support your opinion thought with claims from the class discussion.

2. Each group will be concentrated in one of the changes that are measured during the polygraph test or the body system that in which the changes are expressed. Each of the groups should explain the whole class about its own subject.

Your subject is: respiration rate.

The incriminating (condemning) perspiration

Sweat is a solution which is composed of 99% water and 1% dissolved materials, among which we find NaCl (0.5%), amino acids and other waste such as Urea ($\text{CO}(\text{NH}_2)_2$). In making physical efforts, the amount of NaCl in the sweat increases, and as a result, the body loses salts and water.

The sweat is secreted from sweat glands which are located in the skin. The human body has approximately two million sweat glands. The amount of sweat which is secreted in 24 hours is 0.6-0.9 liters in average. In a dry and warm weather, the amount of sweat can be even 10 liters in 24 hours. Anxiety and excitement can also increase the amount of sweat which is secreted from the body.

The polygraph test is based on changed that the body undergoes in anxiety situations. One of the criteria is the amount of sweat which is measured by the skin electrical conductivity. The following figure presents the electrical conductivity of the skin of three people answering two kinds of questions: a neutral question, and another one – checking whether they gave true answers.

The next figure relates to the electrical conductivity of three people's skin while answering two questions each. One is a control question and the other is a question that examines whether the person is lies.

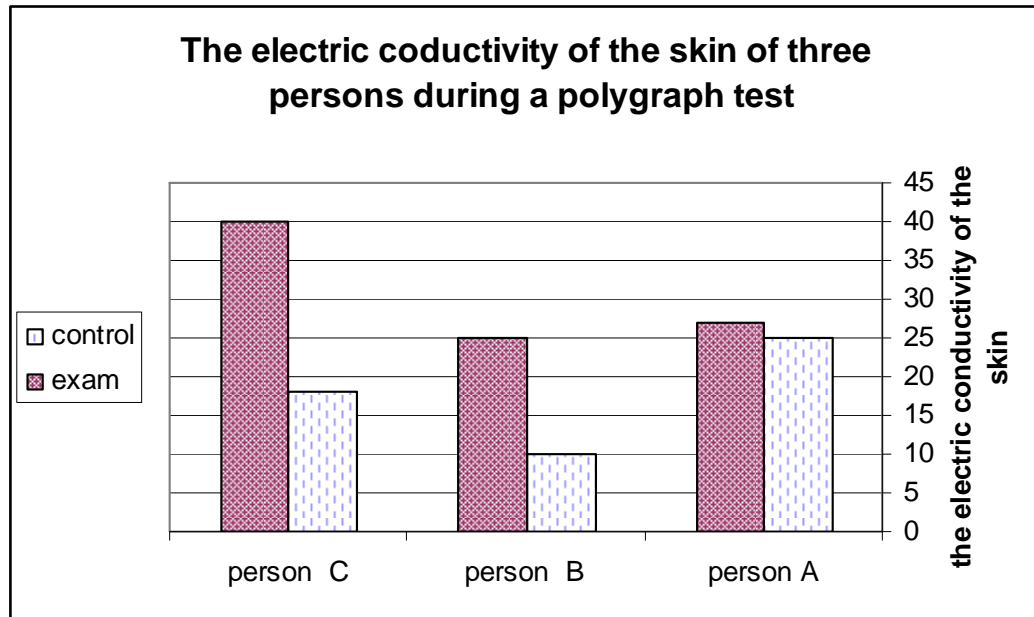


Figure 1 – The electric conductivity of the skin of three persons during a polygraph test.

Questions:

1. Which of the compounds of which the sweat consists – NaCl or $\text{CO}(\text{NH}_2)_2$, is "responsible" to the electrical conductivity?
2. Why do the investigators check the electrical conductivity twice?
3. Which of the investigated persons lied? Explain!
4. In regular conditions, people do not feel the sweat, since it evaporates immediately.
 - a. Formulate please the sweat evaporation.
 - b. Explain how it cools the body.