Critical Analysis Using the Clever Hans Story
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The objective of this unit is to introduce critical thinking/analysis using the Clever Hans story. It will be presented in three parts:

Part 1 - The Clever Hans Story.
Part 2 - Summary of Robert Steiner's "Confession of a Magician"
Part 3 - Excerpts From the First Author’s Letters to Robert Steiner.

**Part 1 - The Clever Hans Story:**

Over the years, the authors of this article have encountered many versions and many comments about the Clever Hans story. Some of these are reflected in the articles, bibliography, and reference section. Besides those cited here, many others have related accounts of Clever Hans. We have tried to capture the better established segments of the Clever Hans story.

The Clever Hans story consists of a series of events that happened in the early 1900’s. This article introduces critical analysis, and we hope readers of this article will use these critical analysis skills in studying the area of critical analysis itself.

In Germany during the 1900’s, Wilhelm Von Osten, a mathematics teacher, attempted to demonstrate that his horse, Hans, had outstanding intellectual abilities. He claimed Hans had this outstanding intellectual ability for quite some time. Some called Wilhelm an eccentric who was an over devoted horseman. According to many published reports, Hans was good at arithmetic, had knowledge in history and writing, learned German, possessed musical knowledge, and was familiar with current events and many other academic skills.

Wilhelm spent years tutoring Hans by applying methods used to teach children in some German schools during that time period. He used flash cards, counting frames, etc. One method used was showing Hans one object and saying, "one," and this would cause Hans to lift his foot once. It was clear that the horse could not develop traditional human verbal ability, so he simply allowed Hans to use foot movement to identify the correct response. Hans would lift his foot the number of times needed to identify the correct answer. Eventually, when Von Osten displayed various objects, Hans tapped his foot the correct number of times.

Wilhelm could hold up a single object in one hand, two objects in the other hand, bring them together, and say, "One plus two equals three." Hans would then tap three times. Wilhelm repeated the procedure with 1+6, 2+3, and other numerical combinations. Wilhelm wanted to show that Hans was capable of true mathematical reasoning, not just memorization. After demonstrating a few
examples, he told Hans that he would leave and come back, and Hans was to figure out the rest of the addition table. When Von Osten returned the next day and asked questions like 4 + 5 and 3 + 8, Hans tapped the correct number of times. They did the same with subtraction, multiplication, division and other math functions. He would demonstrate a few examples and supposedly let Hans figure out the rest of the tables for himself. In each case, Hans appeared as though he calculated the math accurately.

If the answer was a number, Hans would tap it out with his hoof. Otherwise, he'd gesture with his head. Hans learned to answer yes or no questions by tossing his head up and down for “yes”, and back and forth for “no”.

Von Osten toured Germany to exhibit Hans' abilities. He would give Hans a question, either orally or in writing, and Hans would tap for his answer. He was able to add fractions, convert fractions to decimals or vice versa, do simple algebra, tell time to the minute, and give the values of all German coins. Using a number code for letters, he could spell out the names of objects and even identify musical notes such as d or b-flat. (By this time you might not be surprised to learn that Hans supposedly had perfect pitch.)

Some were skeptical of Hans, and an investigative panel was formed of experts that included two zoologists, a psychologist, a horse trainer, and a circus manager. Yet when they came to account for Hans' behavior, they found Hans had real skills. Hans fielded questions not only from Von Osten, but from these other experts as well.

One might believe Wilhelm used somewhat different training techniques from those most frequently used because the investigating circus trainers apparently did not report it as a circus training method.

Following the commission's report, a psychologist named Oscar Pfungst set out to see how Hans would do if questioned by someone who didn't know the correct answers. Using this method, Hans would reply incorrectly. Hans hadn't learned math, music or German after all. Further studies showed that he had learned to detect subtle changes in various postures, eye or eyebrow movement, facial expressions, etc. Up and down head motions for yes, sideways motion for no, were commonly displayed by the observers of Hans and he soon learned the appropriate response. Pfungst observed that any questioner who asked Hans a question would lean forward to watch Hans' foot. As soon as Hans had given the correct number of taps, the questioner tended to give a slight upward movement of the head or would change facial expression, indicating to Hans that this was the last tap. Even skeptical scientists who tested Hans had a hard time not doing this involuntarily. Hans simply continued tapping until he saw that movement, change of facial expression, etc.

The horse was not doing the calculations but was getting the answers from the
questioner. Pfungst learned that Hans had to see the experimenter. When the experimenter stood in plain sight, Hans' accuracy was 90 percent or better; when he could not see the experimenter; he either did not answer or guessed wildly.

Hans was a clever horse. However, what Hans did can be explained in simple terms that did not involve knowledge, calculations, or other inferred cognitive processes.

Most writers on the topic of Hans did not suggest a planned hoax by Von Osten. Von Osten charged no fee for performances. Hans responded correctly to questions when put to him by persons other than Von Osten, even when Hans was in an unfamiliar place far from Von Osten. Most of the cues were subtle, and Pfungst reported that the cues were so common that even he had to make a special effort not to cue Hans after he asked him a question. Also, Von Osten had always been very open to inquiry and investigations about Hans.

Given the conditions under which Hans had shown supposed thinking ability, many people were ready to assume that Hans had great intellectual skills. Others were not. Certainly, the evidence met the criteria of being replicable. The reason that people assumed that Hans had intelligence had to do with not applying the principle of parsimony. Rather, they assumed that this horse had intelligence beyond that of most humans. The people who discovered the truth about Hans looked for a simpler explanation, one with fewer inferences, i.e., he was responding to cues.

Consider an implication relevant to current issues in extra ordinary claims. What if Clever Hans had died before Pfungst had discovered his secret? We would never have known for sure how Clever Hans had done it. Would we have been obliged to believe forever that this one horse could understand spoken language and could solve complex mathematical problems? How could we have evaluated such a hypothesis years later?

Bibliography & References


Part 2 - Summary of Steiner's "Confessions of a Magician":

Robert Steiner, a professional magician, was part of a magic show after a banquet at a CSICOP (The Committee for the Scientific Investigation of Claims of the Paranormal) Convention in 1986. It was supposedly a skeptical audience. Steiner was quite sure they would understand that this magician, participating in a magic show, would be doing a magic trick. Steiner talked about the story of Clever Hans. After the story, he had three people from the audience each pick a card from a deck of playing cards. He told them that he would call out the names of their cards from the deck. He requested that they try not to react when their card was called out. Before the show, it never occurred to Steiner that anyone would think anything other than a magic performance would take place. However, based upon feedback after the show from members of the audience, a number asked what subtle cues he saw in the audience members. A number of people asked questions implying he was doing something other than a magic card trick. A newspaper article about the conference by a science journalist described the presentation, "The three stood amid an audience of hundreds while Steiner briskly named the 52 cards: 'Spades ace, two, three...' Then he correctly identified all three cards. When Steiner's litany named their cards, the three pickers had responded in ways imperceptible to almost everyone but him."

Steiner in the article talks about how skeptics are critical of the believers in psychic powers, contending they should be more skeptical. If it is now announced as NOT being psychic (just a different extraordinary claim), then what about these same skeptics? From the results of this event, it seems that many of the skeptics bought the extraordinary claim of Clever Hans variety. Steiner hypothesized that they find that approach easier than admitting that they were fooled and that they did not understand and cannot explain what happened.

Steiner goes on, "I timed myself. I recited the entire deck of cards in under 14 seconds. That is four cards per second. And there were three people to be observed in various parts of the spacious dining hall. Did they pause at all to ponder how long it would take each of them to exhibit recognizable bodily reactions after hearing the names of their cards? Could each one hear, absorb, understand and react in a clearly discernible manner in less than one-quarter of one second? Could I accurately perceive and pinpoint such split-second reactions from all three people scattered about the room?"

If he had told that audience that he was a "psychic," they would not have believed him. Steiner states, "However, many of the assembled skeptics
apparently found it easier to believe that I am a horse than that they were fooled by a magician."

The summary and excerpts are from Robert A. Steiner, "Confessions of a Magician." Skeptical Inquirer, Fall 1986, Vol. 11, Pages 10-11

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**Part 3 - Some Excerpts and Summaries From Letters the First Author Sent to Steiner:**

Bob,

I thought you might enjoy this one. I was curious what happened when college students not only read of Clever Hans, but also read your Skeptical Inquiry article and then confronted a trick like yours. I was interested in what would they say was going on. Below is the summary of the data:

<table>
<thead>
<tr>
<th></th>
<th>Class 1</th>
<th>Class 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Thought I was using some subtle cues - like Clever Hans</td>
<td>8</td>
<td>16</td>
</tr>
<tr>
<td>2. Not sure what was going on.</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>3. It was a magic trick</td>
<td>5</td>
<td>5</td>
</tr>
</tbody>
</table>

Peace,

Jerry Mertens

Feb. 2, 1990

Dear Bob,

In reference to our earlier correspondence (attached), I continue to find it interesting what went on in the CSICOP convention audience members, and with my college students, in their effort to account for the "Cleaver Hans" magic trick. I am not sure if this topic continues to interest you, but I thought you might enjoy one more episode. As you may recall, I started last Summer school and have just added to the packet; I have students read the letters I have written to you in Fall and Winter. I was curious what happened when college students not only read:

1. the Clever Hans story
2. your Skeptical Inquire article
3. The material what I wrote you about what students were saying to account for this trick
4. then confront a trick like yours. What would they say was going on?

Below is the data:

<table>
<thead>
<tr>
<th></th>
<th>Class 1</th>
<th>Class 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thought I was using something like what was used in the Clever Hans Venture</td>
<td>8</td>
<td>13</td>
</tr>
<tr>
<td>Not sure what was going on</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>It was a magic trick</td>
<td>5</td>
<td>6</td>
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In talking with students after I have offered these influences to explain why students cling to subtle cues:

1. It is an easy out for the students to say "subtle cues" or "read body language".

2. "Body Language", "Subtle Cues", "Subliminal Perception" are examples of "pop psychology," that is the fashion in some sources, like buzz words.

3. It is just one more example of the obedience to authority paradigm. Steiner at the CSICOP convention, and myself directly or indirectly hinted at a Clever Hans subtle cue explanation.

4. The students do not grasp what they read.

Peace,

Jerry Mertens