

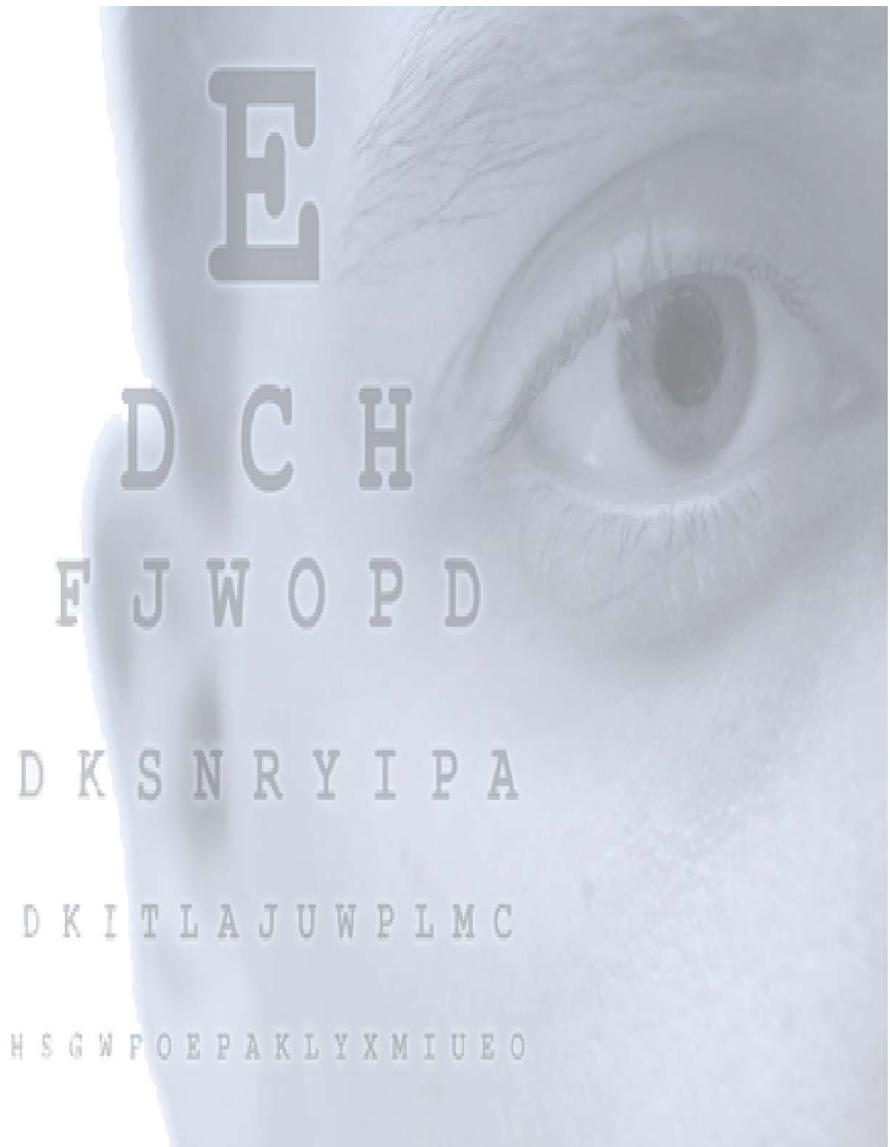
“I Can See Clearly Now ...” Mini Cases in Perception

by

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Introduction

Your group will be assigned one of the patient cases from the following pages, which are based in part on actual medical cases reported in the literature. After reading your case, you are to work in your groups to answer the questions that follow the case write-up.



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Case 1—Sandy

Sandy is a right-handed man in his mid-twenties. During a mugging, he suffered a gunshot wound to the head. The bullet entered the back of his head, but did not kill him. After being transported to the ER, doctors assessed his condition. They found the bullet's entry wound in his left occipital area, and a CT scan was ordered. The scan showed that the bullet had traveled horizontally through both occipital lobes, and that there were several small hemorrhagic foci and air bubbles in his right parieto-occipital region. What worried the doctors most was the presence of small metallic fragments in his parietal lobes, particularly on the right side.

Doctors operated immediately to remove the bone and metal fragments from Sandy's right parietal lobe. His surgical recovery was without complication. Following physical therapy, he regained the majority of his movement and seemed to be relatively "normal" with one exception—his vision was impaired. Although he could still "see," he had a variety of problems recognizing objects.

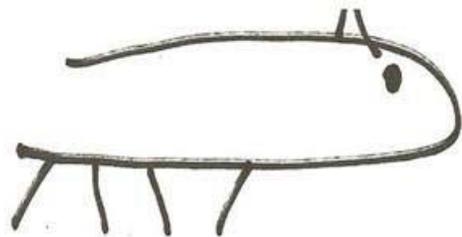
About 18 months later, Sandy was still having vision troubles and was admitted for a full workup. Standard neurological testing did not yield anything diagnostically relevant with regard to his visual troubles, and so Sandy was referred for a neuropsychological evaluation. Among other things, his neuropsychologist administered intelligence tests as well as a series of tests intended to evaluate Sandy's visual perceptions.

In the initial interview with his evaluator, Sandy described some of his issues. One of his major complaints was that he didn't seem to be able to "see the entire picture." He claimed that he could see objects, but for some reason was unable to take a larger view. He over focused on one or two particular details of an object and couldn't recognize the whole thing. Sandy also told the evaluator that he couldn't "see" more than one object at a time; he was quoted as saying "... when two people are walking together I can't see both of them at once."

After an extensive battery of testing, the evaluator compiled Sandy's results. Here are some of them.

| Test | Administration | Sandy's Performance |
|--|---|---|
| Wechsler Adult Intelligence Scale-Revised (WAIS-R) | The WAIS is a series of subtests intended to assess verbal abilities (such as Information, Comprehension, Arithmetic, etc.) and non-verbal abilities (such as Picture Completion, Picture Arrangement). | Normal on verbal portions, but unable to complete nonverbal portions; he was unable to complete any of the pictures or arrange them in the correct order. |
| Rey-Osterreith Complex Figure Test | Requires a patient to copy a complex figure while it is still in front of them, and then to reproduce it from memory after a delay. | Unable to copy any of the figures, either immediately or from memory. |

Along with the standardized neuropsychological tests, Sandy was asked to draw simple figures like a circle or a picture of a cat. Unfortunately, he was unable to imagine or describe these from memory.



Here is what he drew when asked to draw a cat.

Luckily, Sandy did not show any signs of significant motor problems (such as paresis, or weakness, in his limbs). However, when asked to perform complex motions, such as the sequence required to successfully complete a phone call from beginning to end, he failed to do so correctly (indicating ideomotor apraxia).

Questions

1. What condition or conditions (there may be more than one possibility) are being described in this case?
2. What brain area or area(s) may be involved? Be sure to consider which visual stream is involved. Is there a specific hemisphere that is affected? How do you know?
3. How should these brain areas function normally? What could be causing this dysfunction?
4. What do the assessments and their results tell you about this person's abilities and condition?

Remember to document your sources!

Case 2—Laura

Laura has recently experienced what her doctors call a “bilateral posterior vascular abnormality.” This resulted in some brain damage. While her rehabilitation has gone well, she has been left with some strange, specific visual difficulties.

As she described the problems to her doctors, Laura was clearly uncomfortable with the conversation. When asked why, she said, “I’m sorry, but it looks to me like your lips are just hopping up and down. It’s very distracting. I hope you don’t mind if I just close my eyes while we talk.”

After being told that this was all right, Laura went on to tell of how she sometimes felt like she was a blind person. “I can’t pour tea anymore unless I have my finger in the cup ... otherwise I can’t tell when the tea has reached the rim and I end up with hot tea in my lap! If I watch it pour from the pot, all I see is something like an icicle that goes from the spout to my cup. And what’s more, the tea doesn’t look right anymore; everything is just yucky and colorless ... a nasty grey.”

When asked about her everyday life, Laura seemed quite dejected. “I can’t go anywhere by myself. If I have to go where there are crowds of people I just feel like I’m in some kind of horror movie. People just disappear and suddenly reappear right in front of me ... and I never see them move! It’s terrifying! And what’s more ... I almost got run over by a car yesterday Somebody had to grab me before I stepped out into traffic. I swear I thought they had all stopped!”

Standard neuropsychological testing yielded no deficits in her reading or writing abilities. She could recognize objects well, and showed no problems with complex movements.

Strangely enough, her world has also become “washed out” and “colorless.” Not only did her tea look colorless, but people appeared to have nasty grey skin, foods were unappealing (everything appeared grey, dead, and tasteless), and she could no longer imagine things in color.

Questions

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Case 3—Jessie

Jessie has, until recently, been a healthy, active woman. On her 50th birthday, she collided with the left side of her garage as she drove in, an accident which both she and her husband attributed to her focusing too much on the party to come. At that party, Jessie blew out only those candles on the right side of her cake, and left those on the left side still burning. However, she seemed totally unaware of this and, when her husband pointed it out, said “Oh they’re just too pretty to blow out.”

Two days later, her husband found her on the bathroom floor; she was groggy, unaware of her surroundings, and incontinent.

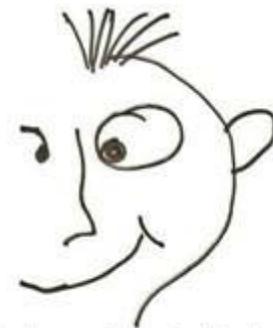
Neurologists found that Jessie had distinct sensory loss in her left arm, and a left-sided homonymous hemianopia. CT scans revealed a tumor, which was later debulked and further reduced with radiation therapy. As part of her rehabilitation, neuropsychologists conducted extensive testing. Here are some of the results:

| Test | Administration | Jessie’s Performance |
|--|---|--|
| Wechsler Adult Intelligence Scale-Revised (WAIS-R) | The WAIS is a series of subtests intended to assess verbal abilities (such as Information, Comprehension, Arithmetic, etc.) and non-verbal abilities (such as Picture Completion, Picture Arrangement). | Superior on verbal portions, but below average on many of the non-verbal (especially the Performance scales); she was unable to completely copy the pictures in the some of the tests (only the right half of them). |
| National Adult Reading Test (NART) | The NART assesses current reading ability; the patient is given a list of 50 short irregular words of increasing difficulty to read aloud. These words do not follow the regular rules of word pronunciation. | Within the “superior” range. |

When asked to copy other pictures, Jessie only ever reproduced the right sides of them. This also happened when she was asked to draw something from memory. And, when asked to draw a picture of her living room, she included all of the furniture (however it was all crowded to the right side of the room).

Along with these and other standardized tests, she was also given a book to read. Jessie read fluently, but missed two or three words from the left end of each line. Her “people skills” also suffered somewhat. When people stood on her left side, she either totally ignored them or swore at them (when they came around to her right side, she greeted them in a friendly manner).

She experienced other odd difficulties, though these did not seem to be related to any significant motor problems, including the fact that she did not use her left arm. She often referred to it as “that hunk of meat” when somebody asked her about it. Anecdotally, she often tried to dress herself while hopping on her right leg.



Here is what she drew when asked to draw a face.

Questions

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Case 4—Frank

Frank is a 71-year-old, right-handed male. He has come to his doctor complaining of an increasing difficulty with recognizing familiar people, including family members. In one instance, a woman started a conversation with him on the street, and it was not until he recognized her voice that he realized she was an ex-wife of his and that they'd had a child!

Frank was found to have normal visual acuity, and was referred to a neurologist and neuropsychologist team. After extensive testing, Frank's results were compiled. Here are some of them:

| Test | Administration | Frank's Performance |
|--|---|---|
| Wechsler Adult Intelligence Scale-Revised (WAIS-R) | The WAIS is a series of subtests intended to assess verbal abilities (such as Information, Comprehension, Arithmetic, etc.) and non-verbal abilities (such as Picture Completion, Picture Arrangement). | Superior on all portions, both verbal and non-verbal. |
| Visual Object and Space Perception Battery | A series of subtests that assess ability to perceive both objects and space; these include dot counting, recognizing objects in silhouette, and discriminating between a line drawing of a "real" object and several nonsense distractor objects. | Performed poorly on the object decision and silhouette tasks, but well on dot counting and other spatial tasks. |
| Benton Facial Recognition Test | Patients are shown black-and-white photographs of full faces. They are first given a face to examine, and then asked which of six faces matches this "target" face. Then they are shown photos with only $\frac{3}{4}$ of the face showing and again asked to match one to the "target" face. Finally, they are shown photos that were taken under low lighting conditions and asked to match one to the "target" face. | Able to correctly perceive age, sex, and emotions in the faces. However, his matching performance was in the low to average range. It seemed he was most able to correctly match faces when focusing on specific features of each face (such as a mustache) and not the <i>entire</i> face. |

Frank's overall language and executive functioning skills were normal, however.

Frank also showed a reduced ability to distinguish between famous and non-famous faces when shown photographs. He was only able to name four out of 40 celebrities by looking at their photographs.

Questions

1. What condition or conditions (there may be more than one possibility) are being described in this case?
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Case 5—David

David is a right-handed, 59-year-old male who has recently suffered an ischemic stroke of his posterior cerebral artery. An occipital lesion was apparent on his CT scan, and his neurological exam showed a right homonymous hemianopia. A general neuropsychological assessment yielded the following findings:

| Test | Administration | David's Performance |
|--|---|--|
| Wechsler Adult Intelligence Scale-Revised (WAIS-R) | The WAIS is a series of subtests intended to assess verbal abilities (such as Information, Comprehension, Arithmetic, etc.) and non-verbal abilities (such as Picture Completion, Picture Arrangement). | Above average verbal score. |
| Pyramid and Palm Trees | A test in which a patient is asked to pick out which of two pictures is connected with a target picture (for example, when shown a pyramid, asked to choose between a palm tree and a oak tree). | Impaired. |
| Real object naming, both visual and tactile tests | Patient was shown 30 real objects, and asked to identify them by sight and then by touch. | David was only able to name 17 of the objects by sight, but all 30 by touch. |

David was also given a series of line drawings and color photos of common objects to identify. He was only able to identify two out of 13 line drawings and only two out of 10 color photos. Interestingly enough, when presented with the picture of a famous politician (whom he should have recognized) and told to identify it, he asked “Is it an apple?”

David was then given a series of drawing and other exercises, including one requiring him to copy and then identify line drawings of objects. He was able to copy these drawings with no trouble, although when asked to identify them, he often made errors. For example, while copying the drawing of the glass, he said that it was “a sitting animal, sheep or dog; there is the neck, a paw, a hoof, and here the shadow or the soil.”

Questions

1. What condition or conditions (there may be more than one possibility) are being described in this case?
2. What brain area or area(s) may be involved? Be sure to consider which visual stream is involved. Is there a specific hemisphere that is affected? How do you know?
3. How should these brain areas function normally? What could be causing this dysfunction?
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Case 6—Charlie

Charlie was in a serious car accident in which several bones were broken. He appeared fine (besides the obvious injuries), and never lost consciousness. However, three days later he suffered a fat embolism (probably because of his fractures). This embolism occluded his posterior cerebral arteries, and initially resulted in cortical blindness. A week later, his vision had returned, but several other visual deficits remained. Among these he could not attend to more than one object at a time, and he was unable to track objects with his eyes (indicating ocular apraxia and ataxia).

As part of developing a rehabilitation protocol, Charlie underwent an intense neuropsychological evaluation 12 months after the occlusion. Something that his evaluators noticed right away was that, although he showed no verbal deficits and was oriented to time and place, he did not once establish eye contact during the course of the examination. He also continued to be unable to follow objects with his eyes when instructed or reach for target objects (he kept missing). Also, when Charlie was asked to pour a glass of water, he missed the mark entirely, pouring water all over the table and floor.

When asked to describe complex objects, all he could do was list specific details; he didn't seem able to talk about the whole, integrated object. When shown a circle and asked to point to the middle, Charlie was unable to do so. Also, when shown two objects overlapping each other (such as a hand partially covering a face), he could only recognize one or the other, but never both.

Here are some further results of his evaluation:

| Test | Administration | Charlie's Performance |
|--|---|--|
| Wechsler Adult Intelligence Scale-Revised (WAIS-R) | The WAIS is a series of subtests intended to assess verbal abilities (such as Information, Comprehension, Arithmetic, etc.) and non-verbal abilities (such as Picture Completion, Picture Arrangement). | Above average verbal score. |
| Rey-Osterreith Complex Figure Test | Requires a patient to copy a complex figure while it is still in front of them, and then to reproduce it from memory after a delay. | Unable to copy most of the figures, either immediately or from memory. |
| Real object naming, visual | Patient was shown 7 real objects, and asked to identify them. | Charlie could name all 7 real objects, but could not name line drawings of the same objects. |

Questions

1. What condition or conditions (there may be more than one possibility) are being described in this case?
2. What brain area or area(s) may be involved? Be sure to consider which visual stream is involved. Is there a specific hemisphere that is affected? How do you know?
3. How should these brain areas function normally? What could be causing this dysfunction?
4. What do the assessments and their results tell you about this person's abilities and condition?

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