

Case Analysis: Summative Assessment

Brain and Behavior

Dr. Joelle Dayan

(15% of Final Grade)

The purpose of this Case Analysis is to gain a deeper understanding of the biopsychological processes involved in the behaviors of a patient, as described in the patient's case study report. In order to do so you will offer a comprehensive case analysis that integrates information from a variety of sources, including a minimum of 4 chapters from your course textbook and articles from the popular media. Your analysis will consist of a 1500-1700 word report.

SUMMATIVE ASSESSMENT: This Case Analysis comprises your summative assessment for this course. In order to pass this course you MUST obtain a passing grade of at least 60% on this assignment AND obtain a passing grade (minimum 60%) for this course.

LATE ASSIGNMENTS:

ALL Assignments MUST be submitted on time for full marks. Late assignments (unless specified otherwise) without dated, confirmable, written notes (from a healthcare provider, etc.) will be deducted **10% per day including weekends, and will not be accepted for grading if they are 7 or more days late, and will not be accepted for feedback if they are 14 or more days late**, unless there is a documented medical reason or if an extension has been granted before the due date.

GRADING SCHEME:

Please see the grading rubric for this assignment that is posted on Lea. Make sure to go over the grading rubric before beginning to write your assignment, and consult it over again as you write your paper. It gives important information regarding what I will be looking for when I read your paper!

The Problem Under Investigation

As a neuropsychologist specializing in the neurological bases of Post-Traumatic Stress Disorder, you have been asked to investigate the case of Jared, a young adult who has been struggling with the effects of PTSD since his return from Afghanistan 3 years ago. Despite several attempts at treatment, Jared's symptoms have only worsened, and Jared (and his therapist) are worried that he will seriously hurt someone if his symptoms don't get under control. His current therapist believes that perhaps the problem is that previous theories of PTSD do not fully explain its underlying neurological bases. However, new research has emerged, and you think that taking a closer look at this new research might help you to propose a new, more comprehensive theory regarding how PTSD develops, which may ultimately help to find new treatments for this disorder.

To develop this new, comprehensive theory, you must use the following sources:

- Your course textbook, class notes, and other activities done during the semester
- Jared's case study found on page 6 of this document
- DSM-V diagnostic criteria for PTSD found on page 8 of this document
- The article "What's really going on in PTSD brains? Experts suggest new theory" (2016), found on page 11 of this document.

Using evidence from Jared's case study report, the article, and your textbook, you will write a 1500-1700 word report geared to other neuropsychologists who are looking forward to hearing about your new insights regarding the roots and development of PTSD. Your report must address the questions below.

The following questions represent the sections of your report. Thus, make sure to provide a subtitle prior to each section. The subtitle should consist of no more than 3-4 words that represent the content that is being discussed in that particular section.

Discussion questions:

1. Provide a description of Jared's symptoms, identifying the following:
 - a. A description of Jared's main PTSD symptoms: Compare Jared's symptoms to the DSM-V diagnostic criteria for PTSD (See DSM-V criteria for PTSD on page 6 of this document). Through this comparison, you must decide whether Jared meets the criteria for a diagnosis of PTSD.
 - b. Events that might have triggered the onset of Jared's PTSD
 - c. Early life factors that might have placed Jared at risk for PTSD
 - d. A description of the present contexts or triggers for which Jared's current symptoms are likely to occur
 - e. Attempts that Jared has made to cope with his PTSD symptoms

2. What role might epigenetics play in Jared's case of PTSD? Is there any evidence that early life experiences might have produced epigenetic changes that might have made Jared more prone to developing PTSD? Explain how these epigenetic changes might have occurred. (Refer to module 4.1 of your textbook, as well as class notes and in-class activities related to epigenetics).
3. Explain the initial stress response that would have occurred at the moment when Jared was faced with enemy mortar. Make sure to explain the roles of the various brain areas involved, as well as the roles of the neurotransmitters and hormones that would be activated. In what ways was this initial stress response beneficial for Jared? (Refer to chapter 3 and Chapter 11 as well as class notes and in-class activities)
4. Explain the role of the following brain areas in the main PTSD symptoms that Jared is presenting (Refer to chapter 2 (pg 52), chapter 3, chapter 11, and chapter 12). Show how each of these brain areas contributes to Jared's symptoms.
 - a. Amygdala
 - b. Hippocampus
 - c. hypothalamus
 - d. Prefrontal cortex
 - e. Neurotransmitters & hormones
5. Using information from the textbook (chapter 11), class notes, and the article provided, explain how Jared's PTSD might be explained by a. fear conditioning model, and b. amygdala activation model. Explain why neither of these models is sufficient to explain the onset and maintenance of PTSD.
6. How does the contextual processing model proposed by Liberzon offer a more complete understanding of the brain circuitry involved in the development and maintenance of PTSD. Show how this model may account for Jared's symptoms.

FORMAT

1. Provide a cover page that includes a title for your case report. The title should represent the central issue that will be discussed in your assignment. The title is important....it tells the reader whether they should be interested in reading the paper. So the goal of the title is to get your readers interested! However, your cover page should NOT contain any images or embellishments. Remember to keep it in APA format throughout, cover page included.
2. Your Case Report must be written as an essay, with each of the questions above representing a separate section of the report.
3. Provide a subtitle for each section of your report. The subtitle should consist of no more than 3-4 words and should represent the content that is being discussed in that particular section.
4. Spelling, grammar, punctuation, sentence structure, paragraph formation, etc. will be penalised as per the grading rubric. Proofread and use spell-check! The Academic Skills Centre is a free and confidential service available to Dawson students – take advantage!
5. You are expected to use the APA documentation style for this assignment, including:
 - Use of cover page in APA format
 - Typed, double-spaced, using 12-point Times New Roman font
 - 1 inch margins all around
 - Page numbers on top right hand corner of each page
 - In-text citations and References section. Failure to include one or both of these will result in a grade of zero and the paper will be considered plagiarized. Make sure you are familiar with the ISEP policy on cheating and plagiarism that is stated in your course outline.
 - Remember that ALL sources used to write your report must be cited both in the text and in the References section.
 - Penalties (as per the grading rubric) will also apply for failure to respect the document format prescribed (APA format).

6. Although you are expected to consult external sources to write your assignments (textbook, articles, and videos), you must nonetheless summarize, paraphrase, and express your understanding of the material **in your own words** (even if the original sounds better). You must use in-text citations EVEN if you are expressing yourself in your own words. Material that is directly quoted must have quotation marks AND a proper in-text citation. Failure to use your own words (in the absence of quotation marks) is considered plagiarism EVEN if you use an in-text citation (this will be further explained in class). **Use of direct quotes is strongly discouraged and will significantly lower your grade** (you should limit yourself to 2 short direct quotes for any single assignment).

For information on proper APA formatting, referencing, and prevention of plagiarism, please consult the following documents found on Lea:

“APA format and Referencing”

“Citing sources in APA Format”

“Tips on how to paraphrase”

It is YOUR responsibility to consult these documents and to apply proper APA format in ALL assignments that you submit.

SUBMISSION OF ASSIGNMENTS

Please submit your assignment by going to your Moodle account. In your Moodle, go to “Assignment Submissions” and click on the correct assignment name. Then follow the instructions for submission of your assignment. This assignment will be graded with the use of Turnitin.

Make sure to obtain the **submission confirmation receipt** when you submit your assignment. **If a receipt is not provided it means that your paper was not submitted!** Your receipt is also your proof of submission in the event that I do not receive it.

Once you have submitted your assignment, please verify that you have submitted the correct document. **You are responsible for ensuring that you submit the correct document. If you submit an incorrect document, you will be notified, but penalties will still be taken from the original due date until the proper document is submitted.**

Important note: All assignments are due by 11:59pm on the due date. You will receive a confirmation via MIO indicating that I have received your assignment, usually by noon the day following the due date (probably earlier). It is your responsibility to check for my confirmation.

Patient Story: PTSD

Jared was a 36-year old married veteran who had returned from Afghanistan, where he had served as an officer. He went to the Veterans Affairs outpatient mental health clinic complaining of having “a short fuse” and being “easily triggered.”

Jared's symptoms involved out-of-control rage when startled, constant thoughts and memories of death-related events, weekly vivid nightmares of combat that caused trouble sleeping, anxiety and a loss of interest in hobbies he once enjoyed with friends.

Although all of these symptoms were very distressing, Jared was most worried about his extreme anger. His “hair-trigger temper” caused fights with drivers who cut him off, cursing at strangers who stood too close in checkout lines, and shifts into “attack mode” when coworkers startled him by accident. In a recent visit to the doctor, he was drifting off to sleep in the exam table. A nurse brushed by his foot, and he leapt up, cursing and threatening her — scaring both the nurse and himself.

He kept a handgun in his car for self-protection, but Jared had no intent to harm others. He had deep remorse after a threatening incident and worried that he might accidentally hurt someone.

These moments reminded him of a time in the military when he was on guard at the front gate. While he was dozing, an enemy mortar round stunned him into action.

Jared was raised in a loving family that struggled to make ends meet as Midwestern farmers. When he was a young child, he remembers times when entire crops were lost due to extreme weather conditions, leaving his family struggling to pay bills and to have sufficient food to eat. Nonetheless, his parents always tried to make the best of the situation, even during hard times. Thus, for most of his childhood and adolescence, Jared saw himself as a rather resilient and happy person. At age 20 he joined the U.S. Army and deployed to Afghanistan. He said he enjoyed basic training and his first few weeks in Afghanistan, until one of his comrades got killed. At that point, all he cared about was getting his best friend and himself home alive, even if it meant killing others. His personality changed, he said, from that of a happy and resilient farm boy to a frightened, overprotective soldier.

When he returned to civilian life, he got a college degree and a graduate business degree. He chose to work as a self-employed plumber because of his need to stay alone in his work. He had been married for seven years and was the father of two young daughters. In his retirement, he looked forward to woodworking, reading and getting some “peace and quiet.”

Jared was diagnosed with posttraumatic stress disorder. His main concerns were due to his symptoms of fear, and his aggression when startled by someone. Jared was jittery

and always on the lookout for danger. He also had intrusive memories, nightmares and flashbacks.

Jared's attempts to reduce the risk of conflict have reduced his social and career opportunities. For instance, his decision to work as a plumber rather than to use his M.B.A. seemed based largely on his effort to control his personal space.

<https://www.psychiatry.org/patients-families/ptsd/patient-story-ptsd>

DSM-5 Criteria for PTSD

National Center for PTSD, U.S. Department of Veterans Affairs

All of the criteria are required for the diagnosis of PTSD. The following text summarizes the diagnostic criteria:

Criterion A: stressor (one required)

The person was exposed to: death, threatened death, actual or threatened serious injury, or actual or threatened sexual violence, in the following way(s):

- Direct exposure
- Witnessing the trauma
- Learning that a relative or close friend was exposed to a trauma
- Indirect exposure to aversive details of the trauma, usually in the course of professional duties (e.g., first responders, medics)

Criterion B: intrusion symptoms (one required)

The traumatic event is persistently re-experienced in the following way(s):

- Unwanted upsetting memories
- Nightmares
- Flashbacks
- Emotional distress after exposure to traumatic reminders
- Physical reactivity after exposure to traumatic reminders

Criterion C: avoidance (one required)

Avoidance of trauma-related stimuli after the trauma, in the following way(s):

- Trauma-related thoughts or feelings
- Trauma-related external reminders

Criterion D: negative alterations in cognitions and mood (two required)

Negative thoughts or feelings that began or worsened after the trauma, in the following way(s):

- Inability to recall key features of the trauma
- Overly negative thoughts and assumptions about oneself or the world
- Exaggerated blame of self or others for causing the trauma
- Negative affect
- Decreased interest in activities
- Feeling isolated
- Difficulty experiencing positive affect

Criterion E: alterations in arousal and reactivity

Trauma-related arousal and reactivity that began or worsened after the trauma, in the following way(s):

- Irritability or aggression
- Risky or destructive behavior
- Hypervigilance
- Heightened startle reaction
- Difficulty concentrating
- Difficulty sleeping

Criterion F: duration (required)

Symptoms last for more than 1 month.

Criterion G: functional significance (required)

Symptoms create distress or functional impairment (e.g., social, occupational).

Criterion H: exclusion (required)

Symptoms are not due to medication, substance use, or other illness.

Two specifications:

- **Dissociative Specification** In addition to meeting criteria for diagnosis, an individual experiences high levels of either of the following in reaction to trauma-related stimuli:
 - **Depersonalization.** Experience of being an outside observer of or detached from oneself (e.g., feeling as if "this is not happening to me" or one were in a dream).
 - **Derealization.** Experience of unreality, distance, or distortion (e.g., "things are not real").
 - **Delayed Specification.** Full diagnostic criteria are not met until at least six months after the trauma(s), although onset of symptoms may occur immediately.
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For a review of the *DSM-5* changes to the criteria for PTSD, see the American Psychiatric Association website on [Posttraumatic Stress Disorder](#). Full copyrighted criteria are available from the American Psychiatric Association¹.

1. American Psychiatric Association. (2013) Diagnostic and statistical manual of mental disorders, (5th ed.). Washington, DC: Author.

<https://www.sciencedaily.com/releases/2016/10/161007123407.htm>

What's really going on in PTSD brains? Experts suggest new theory

October 7, 2016

Date:

University of Michigan Health System

Source:

Summary:

PTSD experts agree that the condition has its roots in very real, physical processes within the brain – and not some sort of psychological “weakness”. But no clear consensus has emerged about what exactly has gone “wrong” in the brain. A new theory that integrates decades of research focuses on a key function called context processing.

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FULL STORY

For decades, neuroscientists and physicians have tried to get to the bottom of the age-old mystery of post-traumatic stress disorder, to explain why only some people are vulnerable and why they experience so many symptoms and so much disability.

All experts in the field now agree that PTSD indeed has its roots in very real, physical processes within the brain -- and not in some sort of psychological "weakness." But no clear consensus has emerged about what exactly has gone "wrong" in the brain.

In a Perspective article published this week in *Neuron*, a pair of University of Michigan Medical School professors -- who have studied PTSD from many angles for many years -- put forth a theory of PTSD that draws from and integrates decades of prior research. They hope to stimulate interest in the theory and invite others in the field to test it.

The bottom line, they say, is that people with PTSD appear to suffer from disrupted context processing. That's a core brain function that allows people and animals to recognize that a particular stimulus may require different responses depending on the context in which it is encountered. It's what allows us to call upon the "right" emotional or physical response to the current encounter.

A simple example, they write, is recognizing that a mountain lion seen in the zoo does not require a fear or "flight" response, while the same lion unexpectedly encountered in the backyard probably does.

For someone with PTSD, a stimulus associated with the trauma they previously experienced -- such as a loud noise or a particular smell -- triggers a fear response even when the context is very safe. That's why they react even if the noise came from the front door being slammed, or the smell comes from dinner being accidentally burned on the stove.

Context processing involves a brain region called the hippocampus, and its connections to two other regions called the prefrontal cortex and the amygdala. Research has shown that activity in these brain areas is disrupted in PTSD patients. The U-M team thinks their theory can unify wide-ranging evidence by showing how a disruption in this circuit can interfere with context processing and can explain most of the symptoms and much of the biology of PTSD.

"We hope to put some order to all the information that's been gathered about PTSD from studies of human patients, and of animal models of the condition," says Israel Liberzon, M.D., a professor of psychiatry at U-M and a researcher at the VA Ann Arbor Healthcare System who also treats veterans with PTSD. "We hope to create a testable hypothesis, which isn't as common in mental health research as it should be. If this hypothesis proves true, maybe we can unravel some of the underlying pathophysiological processes, and offer better treatments."

Liberzon and his colleague, James Abelson, M.D., Ph.D., describe in their piece models of PTSD that have emerged in recent years, and lay out the evidence for each. The problem, they say, is that none of these models sufficiently explains the various symptoms seen in patients, nor all of the complex neurobiological changes seen in PTSD and in animal models of this disorder.

The first model, abnormal fear learning, is rooted in the amygdala -- the brain's 'fight or flight' center that focuses on response to threats or safe environments. This model emerged from work on fear conditioning, fear extinction and fear generalization.

The second, exaggerated threat detection, is rooted in the brain regions that figure out what signals from the environment are "salient," or important to take note of and react to. This model focuses on vigilance and disproportionate responses to perceived threats.

The third, involving executive function and regulation of emotions, is mainly rooted in the prefrontal cortex -- the brain's center for keeping emotions in check and planning or switching between tasks.

By focusing only on the evidence bolstering one of these theories, researchers may be "searching under the streetlight," says Liberzon. "But if we look at all of it in the light of context processing disruption, we can explain why different teams have seen different things. They're not mutually exclusive."

The main thing, says Liberzon, is that "context is not only information about your surroundings -- it's pulling out the correct emotion and memories for the context you are in."

A deficit in context processing would lead PTSD patients to feel "unmoored" from the world around them, unable to shape their responses to fit their current contexts. Instead, their brains would impose an "internalized context" -- one that always expects danger -- on every situation.

This type of deficit, arising in the brain from a combination of genetics and life experiences, may create vulnerability to PTSD in the first place, they say. After trauma, this would generate symptoms of hypervigilance, sleeplessness, intrusive thoughts and dreams, and inappropriate emotional and physical outbursts.

Liberzon and Abelson think that testing the context processing theory will enhance understanding of PTSD, even if all of its details are not verified. They hope the PTSD community will help them pursue the needed research, in PTSD patients and in animal models. They put forth specific ideas in the Neuron paper to encourage that, and are embarking on such research themselves.

The U-M/VA team is currently recruiting people with PTSD -- whether veterans or not -- for studies involving brain imaging and other tests.

In the meantime, they note that there is a growing set of therapeutic tools that can help patients with PTSD, such as cognitive behavioral therapy mindfulness training and pharmacological approaches.

These may work by helping to anchor PTSD patients in their current environment, and may prove more effective as researchers learn how to specifically strengthen context processing capacities in the brain.

Story Source:

[Materials](#) provided by **University of Michigan Health System**. *Note: Content may be edited for style and length.*

Journal Reference:

1. Israel Liberzon, James L. Abelson. **Context Processing and the Neurobiology of Post-Traumatic Stress Disorder**. *Neuron*, 2016; 92 (1): 14 DOI: [10.1016/j.neuron.2016.09.039](https://doi.org/10.1016/j.neuron.2016.09.039)
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