



AP®

# AP Seminar Performance Task 2: Individual Research-Based Essay and Presentation

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## Directions and Stimulus Materials

January 2024

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45 **Credits**

## Introduction

This performance task, highlighted in bold below, is one of three parts of the overall assessment for AP Seminar, and one of two performance tasks. The assessment for this course comprises the following:

Performance Task 1: Team Project and Presentation

- › Component 1: Individual Research Report
- › Component 2: Team Multimedia Presentation and Oral Defense

**Performance Task 2: Individual Research-Based Essay and Presentation**

- › **Component 1: Individual Written Argument**
- › **Component 2: Individual Multimedia Presentation**
- › **Component 3: Oral Defense**

End-of-Course Exam

- › Part A: Three Short-Answer Questions (based on one source)
- › Part B: One Essay Question (based on four sources)

The attached pages include the directions for Performance Task 2, information about the weighting of the task within the overall assessment, and detailed information as to the expected quantity and quality of work that you should submit.

Also included are the stimulus materials for the task. These materials are theme-based and broadly span the academic curriculum. After analyzing the materials, develop a research question that suits your individual interest based on a thematic connection between at least two of the stimulus materials. Your research question must be rich enough to allow you to engage in meaningful exploration and to write and present a substantive, defensible argument.

# AP Seminar Performance Task 2: Individual Research-Based Essay and Presentation

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## Student Version

**Weight:** 35% of the AP Seminar score

### Task Overview

This packet includes a set of stimulus materials for the AP Seminar Performance Task 2: Individual Research-Based Essay and Presentation.

You must identify a research question prompted by analysis of the provided stimulus materials, gather information from a range of additional sources, develop and refine an argument, write and revise your argument, and create a presentation that you will be expected to defend orally immediately following your presentation. Your teacher will give you a deadline for when you need to submit your written argument and presentation media. Your teacher will also give you a date on which you will give your presentation.

Task Components	Length	Date Due (fill in)
Individual Written Argument (IWA)	2,000 words	
Individual Multimedia Presentation (IMP)	6–8 minutes	
Oral Defense (OD)	Respond to 2 questions	

In all written work, you must:

- Acknowledge, attribute, and/or cite sources using in-text citations, endnotes or footnotes, and/or through bibliographic entry. You must avoid plagiarizing (see the attached AP Capstone Policy on Plagiarism and Falsification or Fabrication of Information).
- Adhere to established conventions of grammar, usage, style, and mechanics.

## Task Directions

### 1. Individual Written Argument (2,000 words)

- › Read and analyze the provided stimulus materials to identify thematic connections among the sources and possible areas for inquiry.
- › Compose a research question of your own prompted by analysis of the stimulus materials. Your question must relate to a theme that connects at least two of the stimulus materials.
- › Gather information from a range of additional sources representing a variety of perspectives, including scholarly work.
- › Analyze, evaluate, and select evidence. Interpret the evidence to develop a well-reasoned argument that answers the research question and conveys your perspective.
- › Throughout your research, continually revisit and refine your original research question to ensure that the evidence you gather addresses your purpose and focus.
- › Identify and evaluate opposing or alternate views and consider their implications and/or limitations as you develop resolutions, conclusions, or solutions to your research question.

### Required Checkpoints

While you are working on your research for the IWA:

- › you will be required to submit evidence of the original sources that you have found and read to your teacher.
- › your teacher will arrange a time for you to discuss your research and sources with them. For that discussion you should be prepared to talk about your sources, and the perspectives and ideas you have found in your research.

When you begin planning your argument you will also be required to present and discuss your argument outline with your teacher. For that presentation you should explain your decisions about the structure of your paper and what information you decided to include.

- › Compose a coherent, convincing and well-written argument in which you:
  - Explain the significance or importance of your research question by situating it within a larger context.
  - Establish a well-organized argument that links claims and evidence and leads to a specific and plausible conclusion, resolution or solution that addresses your research question.
  - Integrate at least one of the stimulus materials as part of your argument. (For example, as providing relevant context for the research question or as evidence to support relevant claims.)
  - Evaluate different perspectives by considering objections to them, and their limitations and/or implications.
  - Include relevant evidence from credible sources to support your claims. You should include evidence from scholarly work.
  - Cite all sources that you have used, including the stimulus materials, and include a list of works cited or a bibliography.
  - Use correct grammar and a style appropriate for an academic audience.
- › Abide by the 2,000-word limit (excluding footnoted citations, bibliography, and text in figures or tables). Word count does include titles, sub-headings, and in-text citations.
- › Remove references to your name, school, or teacher.
- › Upload your document to the AP Digital Portfolio as directed by your teacher.

**2. Individual Multimedia Presentation (6–8 minutes)**

- › Develop and prepare a multimedia presentation that will convey the argument from your final paper to an educated, non-expert audience.
  - › Be selective about the information you choose for your presentation by focusing on key points you want your audience to understand.
  - › Design your oral presentation with supporting visual media (e.g., presentation slides, a poster, a website), and consider audience, context, and purpose.
  - › Prepare to engage your audience using appropriate strategies (e.g., eye contact, vocal variety, expressive gestures, movement).
  - › Prepare notecards or an outline that you can quickly reference as you are speaking so that you can interact with supporting visuals and the audience.
  - › Rehearse your presentation in order to refine your design and practice your delivery.
  - › Check that you can do the presentation within the 6- to 8-minute time limit.
- › Deliver a 6- to 8-minute multimedia presentation in which you:
- Contextualize and identify the importance of your research question.
  - Explain the connection between your research and your analysis of the stimulus materials.
  - Deliver a well-organized argument that connects claims and evidence.
  - Incorporate and synthesize relevant evidence from various perspectives to support your argument. Make sure you cite or attribute the evidence you use to support your claims (either orally or visually).
  - Offer a plausible resolution(s), conclusion(s), and/or solution(s) based on evidence and consider the implications of any suggested solutions.
  - Engage the audience with an effective and clearly organized presentation design that guides them through your argument.
  - Engage the audience with effective techniques of delivery and performance.

**3. Individual Oral Defense**

Defend your research process, use of evidence, and conclusion(s), solution(s), or recommendation(s) through oral responses to two questions asked by your teacher. Be prepared to describe and reflect on your process as well as defend and extend your written work and oral presentation. Make sure you include relevant and specific details about your work in your answers.

## Sample Oral Defense Questions

Here are some examples of the types of questions your teacher might ask you during your oral defense. These are *examples only*; your teacher may ask you different questions, but there will still be one question that relates to each of the following two categories.

**1. Reflection on Research Process**

- › How did some preliminary information you gathered inform your research?
- › What evidence did you gather that you didn't include? Why did you choose not to include it?
- › How did your research question evolve as you moved through the research process?
- › Did your research go in a different direction than you originally expected?

- › What information did you need that you weren't able to find or locate?
  - › How did you approach and synthesize the differing perspectives in order to reach a conclusion?
- 2. Extending Argumentation through effective questioning and inquiry**
- › What additional questions emerged from your research? Why are these questions important?
  - › What are the implications of your findings to your community?
  - › How is your conclusion in conversation with the body of literature or other research sources you examined?
  - › How did you use the conclusions or questions of others to advance your own research?

## AP Capstone™ Policy on Plagiarism and Falsification or Fabrication of Information

A student who fails to acknowledge the source or author of any and all information or evidence taken from the work of someone else through citation, attribution or reference in the body of the work, or through a bibliographic entry, will receive a score of 0 on that particular component of the AP Seminar and/or AP Research Performance Task. In AP Seminar, a team of students that fails to properly acknowledge sources or authors on the Team Multimedia Presentation will receive a group score of 0 for that component of the Team Project and Presentation.

A student who incorporates falsified or fabricated information (e.g. evidence, data, sources, and/or authors) will receive a score of 0 on that particular component of the AP Seminar and/or AP Research Performance Task. In AP Seminar, a team of students that incorporates falsified or fabricated information in the Team Multimedia Presentation will receive a group score of 0 for that component of the Team Project and Presentation.

## AP Capstone Policy on Use of Generative Artificial Intelligence (AI)

### DEFINITION OF GENERATIVE AI IN AP CAPSTONE COURSES

Generative AI tools use predictive technology to produce new text, charts, images, audio, video, etc. This includes not only ChatGPT and similar Large Language Models (LLMs), but also many writing assistants or plug-ins that are built on this or similar AI technologies. Generative AI tools can be contrasted with other AI-based tools that do specific tasks—for example, that help students with grammar, but don't generate new writing.

### POLICY ON ACCEPTABLE GENERATIVE AI USE IN AP CAPSTONE COURSES

Generative AI tools must be used ethically, responsibly, and intentionally to support student learning, not to bypass it. Accordingly, all performance tasks submitted in AP Seminar and AP Research must be the student's own work. While students are permitted to use Generative AI tools consistent with this policy, their use is optional and not mandatory.

Students can use generative AI tools as optional aids for exploration of potential topics of inquiry, initial searches for sources of information, confirming their understanding of a complex text, or checking their writing for grammar and tone. However, students must read primary and secondary sources directly, perform their own analysis and synthesis of evidence, and make their own choices on how to communicate effectively both in their writing and presentations. It remains the student's responsibility to engage deeply with credible, valid sources and integrate diverse perspectives when working on the performance tasks. Students must complete interim "checkpoints" with their teacher to demonstrate genuine engagement with the tasks.

The following table describes what constitutes acceptable use of generative AI at different phases of the work to complete the performance tasks.

Phase of Work	Acceptable Use	Not Acceptable Use
Exploring ideas to develop and refine an area of inquiry	Using generative AI tools to get a sense of existing debates on an issue, potential sub-topics, or what is generally already widely known about a topic.	Taking the output of generative AI tools uncritically, such as using AI to generate a research question or thesis, without engaging with the actual research or relying solely on generative AI as a source of information about a topic
Finding sources	<ul style="list-style-type: none"> <li>› Using generative AI to find authors, organizations, publications, or sources that may be pertinent to the area of inquiry, so that the student can then locate and read those perspectives directly.</li> <li>› Asking for recommendations on related sources to further explore the topic or address gaps in research.</li> </ul> <p><b>NOTE:</b> Not all AI tools are the same in terms of the likelihood they will provide output with credible sources. For example, AI-powered search engines for research databases draw from vetted sources, whereas ChatGPT does not necessarily differentiate. Students must review output with a skeptical, critical eye to be sure any suggested sources are real, credible, and relevant to their inquiry.</p>	Using a list of sources generated by AI without going to the original sources and reviewing the content.
Summarizing and/or interpreting sources	<p>Using generative AI to help develop understanding of complex texts by:</p> <ul style="list-style-type: none"> <li>› Requesting help with understanding complex vocabulary or sentence structures in a source.</li> <li>› Asking for clarification on a confusing concept or passage in a source.</li> </ul> <p><b>NOTE:</b> Students should <u>always</u> read the original text of the sources they intend to use to ensure they are accurately understanding and utilizing the evidence from those sources in their work</p>	<ul style="list-style-type: none"> <li>› Generating a summary or paraphrasing of the source instead of reading it.</li> <li>› Requesting direct quotes or citations from a source to use as evidence without independently identifying them.</li> <li>› Copying and pasting AI generated source summaries into the final draft.</li> </ul>

Phase of Work	Acceptable Use	Not Acceptable Use
Synthesizing ideas and information from sources into a literature review, report, or argument	<p>No acceptable use.</p> <p><b>NOTE:</b> Students will be asked questions in either their PREP-based in-progress meetings (AP Research) or in the checkpoints (AP Seminar) to ensure they have done this work themselves.</p>	<p>Asking generative AI to:</p> <ul style="list-style-type: none"> <li>➤ Compare or contrast sources and/or generate a review of literature.</li> <li>➤ Synthesize common or contrasting elements from within a source or across multiple sources.</li> <li>➤ Develop statements or paragraphs that put sources in conversation.</li> </ul>
Developing an aligned method for their Research <b>(AP Research only)</b>	<p>Summarizing commonly used methods in discipline-specific fields or reviewing benefits and drawbacks of different generic methods or methodologies.</p> <p><b>NOTE:</b> Students will be asked questions in their PREP-based in-progress meetings (AP Research) to ensure that they have done this work themselves.</p>	<p>Using generative AI to determine the appropriate method for an individual student's research and/or providing rationales for a specific method.</p>
Producing, summarizing and/or interpreting data <b>(AP Research only)</b>	<p>No acceptable use.</p> <p><b>NOTE:</b> Students will be asked questions in their PREP-based in-progress meetings (AP Research) to ensure that they have done this work themselves.</p>	<ul style="list-style-type: none"> <li>➤ Using generative AI to generate data (this would count as falsified and/or fabricated data). <i>The only exception would be if use of generative AI tools is the subject of the inquiry. In this case, using generative AI to generate data would be part of the method.</i></li> <li>➤ Using AI to summarize or discuss their results or data.</li> </ul>
Developing displays of data <b>(AP Research only)</b>	Using generative AI to create charts/graphs or other representations of data collected and assembled by the student.	<p>Using generative AI to produce or generate the data itself. See exception noted above.</p>
Drafting or outlining a paper	<p>Seeking guidance on general best practices in how to structure a research paper, essay, or report.</p> <p><b>NOTE:</b> Students will be asked questions (on the reasoning underpinning their choices for structure and content) in either their PREP-based in-progress meetings (AP Research) or the checkpoints (AP Seminar) to ensure that they have done this work themselves.</p>	<ul style="list-style-type: none"> <li>➤ Asking generative AI to produce an outline or draft of a specific paper.</li> <li>➤ Requesting generative AI to write all or part of the paper.</li> <li>➤ Using writing generated by AI in the final draft.</li> </ul>

Phase of Work	Acceptable Use	Not Acceptable Use
Revising a paper	<ul style="list-style-type: none"> <li>› Using spell or grammar checkers.</li> <li>› Asking for feedback on style and tone (students must make deliberate choices on what feedback to incorporate).</li> </ul>	<ul style="list-style-type: none"> <li>› Accepting AI-generated suggestions for revisions of written work without critically evaluating such contributions.</li> <li>› Incorporating into student submissions new sections of text suggested by generative AI.</li> </ul>
Creating Citations / Bibliography	<ul style="list-style-type: none"> <li>› Seeking guidance on how to cite or check citations.</li> <li>› Generating a draft of the bibliographic listing of citations or checking the format of a student-generated draft of the bibliographic listing of citations.</li> </ul>	<ul style="list-style-type: none"> <li>› Using AI to generate citations without having directly studied the original sources.</li> <li>› Relying on generative AI to create the bibliographic listing of citations without then checking the accuracy of the format.</li> </ul>
Developing Presentations	<ul style="list-style-type: none"> <li>› Seeking general guidance on effective presentations.</li> <li>› Generating initial ideas for key points, sequence, or visuals for presentations.</li> </ul>	<ul style="list-style-type: none"> <li>› Uncritically using AI to produce the key points, visuals, or structure for presentations.</li> <li>› Using AI to generate a script that is memorized or read for the presentation.</li> </ul>
Preparing for Oral Defense	No acceptable use.	Using AI to generate possible answers to potential oral defense questions (and memorizing or reading them).

## REQUIRED CHECKPOINTS AND ATTESTATIONS

To ensure students are not using generative AI to bypass work, students must complete interim “checkpoints” with their teacher to demonstrate genuine engagement with the tasks. **AP Seminar and AP Research students will need to complete the relevant checkpoints successfully to receive a score for their performance tasks. Teachers must attest, to the best of their knowledge, that students completed the checkpoints authentically in the AP Digital Portfolio. Failure to complete the checkpoints will result in a score of zero on the associated task.**

- In AP Seminar, teachers assess the authenticity of student work based on checkpoints that take the form of short conversations with students during which students make their thinking and decision-making visible (similar to an oral defense). These checkpoints should occur during the sources and research phase (IRR and IWA), and argument outline phase (IWA only). A final validation checkpoint (IRR and IWA) requires teachers to confirm the student’s final submission is, to the best of their knowledge, authentic student work.
- In AP Research, students must complete “checkpoints” in the form of in-progress meetings and work in the Process and Reflection Portfolio (PREP). No further checkpoints will be required.

College Board reserves the right to investigate submissions where there is evidence of the inappropriate use of generative AI as an academic integrity violation and request from students copies of their interim work for review.

# Moral Courage and Intelligent Disobedience

**by Ted Thomas and Ira Chaleff**

The military needs men and women who have courage—the physical courage to go into battle, to overcome fear in the face of bodily injury or death, mental pain, and lifelong disabilities. Militaries run on physical courage. Without it, they run from a fight and surrender. Many sources quote Aristotle as saying, “Courage is the first of human qualities because it is the quality which guarantees the others.”<sup>1</sup> Courage is a primary virtue, as all other virtues require it.

There is another type of courage the military needs, but it is hard to measure or even define—moral courage. The following words of Robert F. Kennedy are as salient today as they were in June of 1966 when he spoke them in Cape Town, South Africa. “Few men are willing to brave the disapproval of their fellows, the censure of their colleagues, the wrath of their society. Moral courage is a rarer commodity than bravery in battle or great intelligence. Yet it is the one essential, vital quality of those who seek to change a world which yields most painfully to change.”<sup>2</sup> Bravery in battle is needed, but so is the courage to stand up for what is right and against what is immoral, unethical, or illegal.

A critical application of moral courage is knowing when and how to disobey—which can be thought of as intelligent disobedience. This involves an ability to work within the system to maintain standards and uphold moral values. Organizational culture and operational pressures can sometimes cause the values of people to become blurred when the mission becomes more important than virtues. These can take us down the slippery slope of ends justifying means. Good people and good Soldiers can do bad things in these situations. An organizational emphasis on personal accountability for our

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actions, regardless of situational pressures, will support the courage needed to do what is morally and ethically right. This article will make the case that moral courage, including intelligent disobedience when warranted, should be taught and encouraged to ensure those in the follower role have the disciplined initiative to disobey orders when appropriate and to recommend alternatives that uphold professional military core values. First, we need to define the terms we are using to understand their importance.

### Obedience

Society and culture place a large amount of pressure on people to obey orders. It starts with children as they are taught to obey their parents and other adults such as teachers or people in uniform like policemen or firemen. Stanley Milgram, a psychologist at Yale University, conducted a classic experiment in the early 1960s on obedience to authority. Two thirds of those in the experiment followed the orders of someone who looked like an authority figure due to a lab coat and a clipboard. The experiment used predominantly males between 20 and 50 years old who were ordered to administer electrical shocks to another person. This individual was a confederate in the experiment who purposely answered questions incorrectly. The recruited subjects obeyed orders by administering shocks of up to 450 volts. These people believed and were disturbed that they may be injuring or even killing another innocent human being (who was a part of the experiment, although this was unknown to the person administering the shocks).<sup>3</sup>

People in the military have a legal obligation to obey lawful orders. Military order and discipline, as well as mission accomplishment, are built on obedience to orders. Failure to do so is punishable under the Uniform Code of Military Justice in Articles 90, 91, and 92.

Article 90 makes it a crime to willfully disobey a superior commissioned officer; Article 91 makes it a crime to willfully disobey a superior noncommissioned officer or warrant officer; and Article 92 makes it a crime to disobey any lawful order. Punishment can range anywhere from loss of pay to imprisonment to loss of life in wartime.<sup>4</sup>

**...there is a concurrent obligation in the U.S. military to disobey orders if an order is illegal.**

### Intelligent Disobedience

However, there is a concurrent obligation in the U.S. military to disobey orders if an order is illegal. The Uniform Code of Military Justice articles listed above apply only to lawful orders. The service member can be prosecuted for executing the illegal order. In the war criminal trials that followed World War II, Nuremberg Principle IV was established. The fact that a person acted pursuant to an order of his government or of a superior does not relieve him from responsibility under international law, provided a moral choice was in fact possible to him.

...

Intelligent disobedience requires refusing to follow orders that are either unlawful or will produce harm. While this often takes courage to do so, failure to find and act on that courage often does more damage to a career and life than the risk that would be taken by disobeying.

**...“moral courage is lonely courage.”... It risks being isolated and singled out for painful personal consequences...**

### Moral Courage

William Miller, in his book *The Mystery of Courage*, defines moral courage as “the capacity to overcome the fear of shame and humiliation in order to admit one’s mistakes, to confess a wrong, to reject evil conformity, to denounce injustice, and to defy immoral or imprudent orders.” Miller makes the case that “moral courage is lonely courage.”<sup>7</sup> It risks being isolated and singled out for painful personal consequences such as ridicule, rejection, and loss of job and social standing. Given this, moral courage might seem like it would be a rare occurrence, but when it is displayed it is of real value in preventing and righting wrongs. However, *knowing* what is right is not enough. *Acting* on one’s obligations, morals and convictions is necessary for moral courage.<sup>8</sup> The following examples will help illustrate moral courage, as well as illustrate the subjectivity and the difficulty in defining it.

Did the 9/11 hijackers demonstrate moral courage? The question seems outrageous to us, but it provides an extreme example to analyze. The hijackers are considered evil and cowardly by most of us in the U.S. but are considered courageous heroes and martyrs by others in the world. We find it abhorrent to call anyone who kills innocent men, women, and children courageous, and that it is misplaced to call those who commit suicide martyrs. Nevertheless, cowards do not usually willingly kill themselves and these hijackers died for a cause they apparently believed in. Therefore,

objectively it is hard to label them cowards since they knowingly took actions leading to their own certain death. Yet, maybe the label is still correct. Why?

These attackers must have had the courage of their convictions but did they have moral courage? They did not brave the disapproval of their fellow jihadists, the censure of their colleagues, or the wrath of their social group. In fact, they conformed to its prevailing thinking. They did not have moral courage since the subset of society from which they came approved of their actions and gave them praise instead of wrath. They planned and schemed as a group, so there was no loneliness involved. If courage is a morally neutral virtue and not defined by the values of the specific group, the attackers could be said to have had physical courage in order to act in the face of grave bodily harm and death, and perhaps spiritual courage to sacrifice themselves for their extreme religious beliefs, but they cannot claim moral courage; it was not needed or evidenced in their actions.<sup>9</sup> Only individual resistance to the group’s destructive plan would have been an act of moral courage.

### Moral Courage and Civil Disobedience

The case of Edward Snowden further illustrates the difficulty in defining moral courage. Edward Snowden is considered a villain and traitor by some and a brave individual by others. Snowden was a contractor for the National Security Agency who leaked documents to the media concerning massive amounts of internet and phone surveillance by United States intelligence agencies.<sup>10</sup> He committed several crimes by doing so, including communication of classified documents, stealing government property, and unauthorized disclosure of information vital to national defense. He stated,

"I do not want to live in a world where everything I do and say is recorded."<sup>11</sup> Viewpoints depend on where one stands on certain issues. The question becomes, did Snowden display courage in what he did, and if so, what kind of courage?

When Snowden committed his crime, he knew that the government would prosecute him on criminal charges that would potentially result in a lengthy prison sentence. In this sense, Snowden's act was one of civil disobedience, which is defined as knowingly breaking a rule or law that is considered unjust with the intention of bringing it to the light of public scrutiny to have it remediated. This is distinct from the concept of intelligent disobedience, which is working within the framework of an existing law to resist or refuse a harmful order. Nevertheless, we can use this as another extreme example to determine if his actions could be considered courageous.

To the best of our knowledge, Snowden was not working as part of a group of people trying to disclose government secrets, but acted on his own inner convictions. After he went public, there were many like-minded people who rallied around him, calling him a hero and whistleblower. Without approving of his methods, Congress even passed legislation correcting the abuses he brought to public light. However, before that, he felt very much alone and fearful of sharing what he was doing with any colleagues or even his girlfriend. In one author's words, "he sounds like that most awkward and infuriating of creatures—a man of conscience."<sup>12</sup>

In Edward Snowden's mind, he took actions he thought were correct and did so in isolation at the expense of the disapproval of his fellows, the censure of his colleagues, the wrath of his society, and incurring the legal machinery of his government. This would meet the objective definition of moral courage. It also highlights the difficulty of an objective assessment, as many in our security apparatus view his acts as those of a traitor. It is the contention of this article,

that if we can create cultures that value acts of internal attempts to correct abuse, which we are characterizing as intelligent disobedience rather than civil disobedience, we will avoid morally fraught decisions such as those made by Snowden.

**...intelligent disobedience...is working within the framework of an existing law to resist or refuse a harmful order.**

### Intelligent Disobedience

The Army is considered by many to be a culture of blind obedience. While this is not as true as many believe, General Mark Milley, the 39th Chief of Staff of the Army, is trying to break that paradigm. He recently described the need for intelligent disobedience when he discussed warfare in the near future. General Milley asserted that in the current asymmetric warfare of ill-defined front lines and fighting on land, sea, air, space, cyberspace, and electromagnetic spectrum, Soldiers need to disobey orders to accomplish the mission when battlefield realities have fundamentally changed and there is no ability or time to consult with superiors.<sup>13</sup> This type of thinking is based on an assumption that the boss would do what the subordinate did if only the boss knew what the subordinate does.

Though General Milley did not use the term directly, he captured the essence of intelligent disobedience. Knowing when and how to disobey is a higher order skill than to just obey.<sup>14</sup> It requires an atmosphere of trust and empowerment, and the ability of the leader to recognize the person closest to the action may have the best picture of what needs to be done. Army doctrine uses the term mission command (ADRP 6-0) to describe this idea. Mission command includes the ideas of disciplined initiative and commander's intent.

Disciplined initiative allows subordinates the freedom of action to quickly adapt to changes in the environment as long as they stay within the leader's intent for the mission.<sup>15</sup> Intelligent disobedience goes beyond disciplined initiative to address violations of values, asking tough and relevant questions to clarify orders, and looking beyond rationalizations and pressures to engage those giving orders.<sup>16</sup>

Intelligent disobedience can simply involve the professionalism to not execute an order that would clearly have negative operational consequences. It often also involves moral courage. The individual in the follower role will need moral courage both to disobey unethical, illegal, and immoral orders and to disobey orders that would inadvertently bring harm to the organization and its mission.

**Intelligent disobedience can simply involve the professionalism to not execute an order that would clearly have negative operational consequences. It often also involves moral courage.**

Obedience and disobedience are terms and concepts, which are neither inherently good nor bad. However, put in a context, they can gain either positive or negative connotations.<sup>17</sup> We can intelligently disobey when no moral courage is needed, as in the case of the U.S. Army's concept of disciplined initiative where trust and empowerment are given. "Disciplined initiative is action in the absence of orders, when existing orders no longer fit the situation, or when unforeseen opportunities or threats arise. Commanders rely on subordinates to act."<sup>18</sup> Leaders expect their followers to disobey in these instances.

We can be called upon to disobey when courage is clearly required to do so. A recent

example shows the convergence of moral courage and intelligent disobedience. Political pressure played a large role in coercing distorted intelligence reports in the U.S. military's Central Command. Over fifty intelligence analysts filed a complaint that their senior officials altered reports that effectively rose to the level of lying to fit a political narrative in line with President Obama's contention that the fight against ISIS and al Qaeda in Syria was going better than it actually was. The analysts claimed they worked in a hostile climate where they could not give an accurate picture of the situation because their commanders wanted to protect their careers. Some of those who complained were even encouraged to retire.<sup>19</sup>

It took moral courage and an act of intelligent disobedience to go around the hierarchy to the press to report the misuse of power coercing them to lie and alter reports. Compared to Snowden, though they blew the whistle, they did so largely within the system. Their actions were vindicated by society. At the time, it took moral courage to risk losing their job and status, and it took intelligent disobedience to get results in a moral and legal manner.

## Organizational Culture

Military culture is replete with such terms as "make it happen," "that's NCO business," "check the block," "what happens in theater stays in theater," and "make your statistics." These mental models have the potential to encourage either immoral, unethical, or illegal behavior, yet Service doctrine and values stress ethical, moral, and legal behavior. The Uniform Code of Military Justice is written to enforce even higher standards of conduct on the military than those in the civilian world. Nevertheless, codes and laws still do not keep people from breaking them. The climate and culture of organizations are key predictors of the morality and ethics of those organizations.

Lord John Fletcher Moulton, an English

judge from about 100 years ago, wrote on the concept of “obedience to the unenforceable.” He envisioned this idea as a domain between law and pure personal preference. He stated this middle domain is the obedience a person enforces on himself to those things which he cannot be forced to obey. It includes concepts of moral duty, social responsibility and behavior, and doing what is right when there is no one to enforce it. He stated the true greatness of a nation is the extent to which a country can trust its citizens to act in appropriate ways without being forced to do so.<sup>20</sup> It requires virtuous citizens who act with civic responsibility. The culture in an organization reflects the attitude of its people in their conduct of obedience with or without force. Leaders set the standard in what they enforce, reward, punish, and how they act personally. Followers then reinforce the culture or develop a subculture counter to the espoused culture.

Leonard Wong and Stephen Gerras wrote a monograph asserting that many leaders in the Army lie in order to succeed. Their premise is that the military has “created an environment where it is literally impossible to execute to standard all that is required.”<sup>21</sup> Their solution to changing the culture is to recognize the Army has a problem, exercise restraint, prioritize what can be done instead of lying about what was done, and lead truthfully.<sup>22</sup> This requires moral courage of the leadership to step forward, risking loss of job and status by going against the culture. If everyone follows, then moral courage is no longer needed, but if only a few are doing what is right and risking their employment, reputation, and friendships, then moral courage is most definitely needed. Since the Wong and Gerras article was written over a year ago, not much has changed in the culture. As General Patton said, “Moral courage is the most valuable and usually the most absent characteristic in men.”<sup>23</sup>

Of course, it is not just the military that is subject to these stresses. Pressure from superiors,

as well as self-interest and greed, can create an atmosphere of compliance and doing what one is told. Scandals at Wells Fargo Bank and Volkswagen are both indicative of cultures in desperate need of intelligent disobedience and moral courage. There was no one who visibly stood up and disobeyed in the face of lying, falsifying results, and illegally earning bonuses. At Wells Fargo, their employees created over two million fake accounts, incurring various customer expenses to include interest charges and overdraft protection fees. Wells Fargo fired 5,300 employees who made up PIN numbers and email addresses to enroll their existing customers in more accounts.<sup>24</sup> Volkswagen equipped 11 million of its cars with software designed to lie about emissions tests. This deception started over a decade ago when their leaders knew they could not meet United States clean air standards.<sup>25</sup> In both instances there was a culture driven by pressure from above and greed which encouraged cheating and fraud by involving thousands of people. Individuals with moral courage using intelligent disobedience could have prevented these scandals and the great costs their companies ultimately paid for lack of a culture embracing these virtues.

**As General Patton said, “Moral courage is the most valuable and usually the most absent characteristic in men.”**

Those who are just obeying orders and conforming to the culture are just as culpable as those giving the orders. More people need to come forward to decry and stand against immoral, unethical, or illegal behavior, or just plain wrong orders that will cause avoidable failures and harm. Corporate culture has a tremendous influence on corporate behavior. New employees to an organization quickly determine the business norms. The

organizational culture becomes the standard to which their behavior is held and whether they are retained, promoted, fired, or voluntarily leave. Thus, many employees will follow a separate set of ethical standards at work than they will at home, thereby living a form of corporate cultural ethical relativism.<sup>26</sup>

There are at least four ways our moral standards and values are turned off at work. First, improper behavior is relabeled as good because it appears to achieve organizational goals. Second, we distance ourselves from wrongdoing by rationalizing that we are just doing our job and performing what we were hired to do. Third, we use euphemisms to reduce the impact of what we are doing; for instance, a boss might tell an employee to use “creative accounting” to make numbers for the quarter, implying they need to lie. Fourth, we dehumanize the victims of harmful or even evil acts through derogatory terms to make them seem less human and deserving of poor treatment.<sup>27</sup> All four of these instances are seen in both Volkswagen and Wells Fargo, as well as in many other crises. Oftentimes it just takes one person to take a stand and bring the voice of reason and light into a dark room.

**Cultures that focus on short-term gain and stifle dissent will tend to damage long term growth and success.**

### **Responsibility of Leaders and Followers to Change Culture**

It is the responsibility of leadership to find and encourage people who are willing to take action and disobey when needed. President John Adams made the statement, “It is not true, in fact, that any people ever existed who loved the public better than themselves, their private friends, neighbors...”<sup>28</sup> If that is the

case, then where does the moral courage arise when one’s reputation, position, or influence is at stake? President John F. Kennedy made the case that love for self is at the root of one’s need to maintain respect for self over popularity with others; the desire to maintain one’s honor and integrity is more important than job or position; conscience and personal standards of ethics become stronger than public disapproval; and the conviction that the justification of the course chosen will then overcome the fear of reprisal.<sup>29</sup> Love of self, not in a narcissistic sense but in a sense of being true to one’s values, is then at the root of moral courage and intelligent disobedience.

Organizations that punish whistleblowers and others who attempt to do the right thing will maintain a culture where lying, cheating, and dishonesty are encouraged in the unwritten culture, outside of the corporate creed or posted values. Cultures that focus on short-term gain and stifle dissent will tend to damage long term growth and success.<sup>30</sup> Organizational values are put into place to encourage honorable long-term behavior. Policies that reward results, no matter how they are achieved, are ones which send a double message—we want employees to be honorable, but will look the other way if they bend the rules to get the results we want. Leadership starts at the top and leaders who stress ends or results over means or methods will breed dishonesty and reap the results of a culture which says one thing and does another.

Leaders have a moral obligation to lead ethically, and followers have a moral obligation to inform, and even confront their boss when ethical standards are ignored or when truth needs to be told. General Eric Shinseki, the 34<sup>th</sup> Chief of Staff of the Army, told Congress that it would take twice the number of troops in Iraq to win the peace. He was marginalized and vilified with the result of silencing other military critics precisely at the time when critical judgment was most needed.<sup>31</sup>

## Conclusion

It takes moral courage and intelligent disobedience on the part of followers to know when not to obey and even to know when to go outside of the hierarchy and report any malfeasance and wrongdoing. It may cost a job, reputation, or other adverse consequence, but it is the right thing to do. The historic virtues of courage and obedience now require additional virtues of moral courage and intelligent disobedience with the capacity to disobey and innovate when morality or rapidly changing field conditions require doing so. Moral courage and intelligent disobedience are concepts that need to be taught in every organization. **IAJ**

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# Through the Tunnel

Doris Lessing

From *The Habit of Loving*, 1957

Going to the shore on the first morning of the vacation, the young English boy stopped at a turning of the path and looked down at a wild and rocky bay and then over to the crowded beach he knew so well from other years. His mother walked on in front of him, carrying a bright striped bag in one hand. Her other arm, swinging loose, was very white in the sun. The boy watched that white naked arm and turned his eyes, which had a frown behind them, toward the bay and back again to his mother. When she felt he was not with her, she swung around. "Oh, there you are, Jerry!" she said. She looked impatient, then smiled. "Why, darling, would you rather not come with me? Would you rather—" She frowned, conscientiously worrying over what amusements he might secretly be longing for, which she had been too busy or too careless to imagine. He was very familiar with that anxious, apologetic smile. Contrition sent him running after her. And yet, as he ran, he looked back over his shoulder at the wild bay; and all morning, as he played on the safe beach, he was thinking of it.

Next morning, when it was time for the routine of swimming and sunbathing, his mother said, "Are you tired of the usual beach, Jerry? Would you like to go somewhere else?"

"Oh, no!" he said quickly, smiling at her out of that unfailing impulse of contrition—a sort of chivalry. Yet, walking down the path with her, he blurted out, "I'd like to go and have a look at those rocks down there."

She gave the idea her attention. It was a wild-looking place, and there was no one there, but she said, "Of course, Jerry. When you've had enough, come to the big beach. Or just go straight back to the villa, if you like." She walked away, that bare arm, now slightly reddened from yesterday's sun, swinging. And he almost ran after her again, feeling it unbearable that she should go by herself, but he did not.

She was thinking, Of course he's old enough to be safe without me. Have I been keeping him too close? He mustn't feel he ought to be with me. I must be careful.

He was an only child, eleven years old. She was a widow. She was determined to be neither possessive nor lacking in devotion. She went worrying off to her beach.

As for Jerry, once he saw that his mother had gained her beach, he began the steep descent to the bay. From where he was, high up among red-brown rocks, it was a scoop of moving bluish green fringed with white. As he went lower, he saw that it spread among small promontories and inlets of rough, sharp rock, and the crisping, lapping surface showed stains of purple and darker blue. Finally, as he ran sliding and scraping down the last few yards, he saw an edge of white surf and the shallow, luminous movement of water over white sand and, beyond that, a solid, heavy blue.

He ran straight into the water and began swimming. He was a good swimmer. He went out fast over the gleaming sand, over a middle region where rocks lay like discolored monsters under the surface, and then he was in the real sea—a warm sea where irregular cold currents from the deep water shocked his limbs.

When he was so far out that he could look back not only on the little bay but past the promontory that was between it and the big beach, he floated on the buoyant surface and looked for his mother. There she was, a speck of yellow under an umbrella that looked like a slice of orange peel. He swam back to shore, relieved at being sure she was there, but all at once very lonely.

On the edge of a small cape that marked the side of the bay away from the promontory was a loose scatter of rocks. Above them, some boys were stripping off their clothes. They came running, naked, down to the rocks.

The English boy swam toward them but kept his distance at a stone's throw. They were of that coast; all of them were burned smooth dark brown and speaking a language he did not understand. To be with them, of them, was a craving that filled his whole body. He swam a little closer; they turned and watched him with narrowed, alert dark eyes. Then one smiled and waved. It was enough. In a minute, he had swum in and was on the rocks beside them, smiling with a desperate, nervous supplication. They shouted cheerful greetings at him; and then, as he preserved his nervous, uncomprehending smile, they understood that he was a foreigner strayed from his own beach, and they proceeded to forget him. But he was happy. He was with them.

They began diving again and again from a high point into a well of blue sea between rough, pointed rocks. After they had dived and come up, they swam around, hauled themselves up, and waited their turn to dive again. They were big boys—men, to Jerry. He dived, and they watched him; and when he swam around to take his place, they made way for him. He felt he was accepted and he dived again, carefully, proud of himself.

Soon the biggest of the boys poised himself, shot down into the water, and did not come up. The others stood about, watching. Jerry, after waiting for the sleek brown head to appear, let out a yell of warning; they looked at him idly and turned their eyes back toward the water. After a long time, the boy came up on the other side of a big dark rock, letting the air out of his lungs in a sputtering gasp and a shout of triumph. Immediately the rest of them dived in. One moment, the morning seemed full of chattering boys; the next, the air and the surface of the water were empty. But through the heavy blue, dark shapes could be seen moving and groping.

Jerry dived, shot past the school of underwater swimmers, saw a black wall of rock looming at him, touched it, and bobbed up at once to the surface, where the wall was a low barrier he could see across. There was no one visible; under him, in the water, the dim shapes of the swimmers had disappeared. Then one and then another of the boys came up on the far side of the barrier of rock, and he

understood that they had swum through some gap or hole in it. He plunged down again. He could see nothing through the stinging salt water but the blank rock. When he came up, the boys were all on the diving rock, preparing to attempt the feat again. And now, in a panic of failure, he yelled up, in English, "Look at me! Look!" and he began splashing and kicking in the water like a foolish dog.

They looked down gravely, frowning. He knew the frown. At moments of failure, when he clowned to claim his mother's attention, it was with just this grave, embarrassed inspection that she rewarded him. Through his hot shame, feeling the pleading grin on his face like a scar that he could never remove, he looked up at the group of big brown boys on the rock and shouted, "*Bonjour! Merci! Au revoir! Monsieur, monsieur!*"<sup>1</sup> while he hooked his fingers round his ears and wagged them.

Water surged into his mouth; he choked, sank, came up. The rock, lately weighted with boys, seemed to rear up out of the water as their weight was removed. They were flying down past him now, into the water; the air was full of falling bodies. Then the rock was empty in the hot sunlight. He counted one, two, three . . .

At fifty, he was terrified. They must all be drowning beneath him, in the watery caves of the rock! At a hundred, he stared around him at the empty hillside, wondering if he should yell for help. He counted faster, faster, to hurry them up, to bring them to the surface quickly, to drown them quickly—anything rather than the terror of counting on and on into the blue emptiness of the morning. And then, at a hundred and sixty, the water beyond the rock was full of boys blowing like brown whales. They swam back to the shore without a look at him.

He climbed back to the diving rock and sat down, feeling the hot roughness of it under his thighs. The boys were gathering up their bits of clothing and running off along the shore to another promontory. They were leaving to

1. *Bonjour! . . . monsieur* (bōn zhōōr' . . . mə syō'): Babbling of commonly known French words: "Hello! Thank you! Goodbye! Sir, sir!"

get away from him. He cried openly, fists in his eyes. There was no one to see him, and he cried himself out.

It seemed to him that a long time had passed, and he swam out to where he could see his mother. Yes, she was still there, a yellow spot under an orange umbrella. He swam back to the big rock, climbed up, and dived into the blue pool among the fanged and angry boulders. Down he went, until he touched the wall of rock again. But the salt was so painful in his eyes that he could not see.

He came to the surface, swam to shore, and went back to the villa to wait for his mother. Soon she walked slowly up the path, swinging her striped bag, the flushed, naked arm dangling beside her. "I want some swimming goggles," he panted, defiant and beseeching.

She gave him a patient, inquisitive look as she said casually, "Well, of course, darling."

But now, now, now! He must have them this minute, and no other time. He nagged and pestered until she went with him to a shop. As soon as she had bought the goggles, he grabbed them from her hand as if she were going to claim them for herself, and was off, running down the steep path to the bay.

Jerry swam out to the big barrier rock, adjusted the goggles, and dived. The impact of the water broke the rubber-enclosed vacuum, and the goggles came loose. He understood that he must swim down to the base of the rock from the surface of the water. He fixed the goggles tight and firm, filled his lungs, and floated, face down, on the water. Now he could see. It was as if he had eyes of a different kind—fish eyes that showed everything clear and delicate.

Under him, six or seven feet down, was a floor of perfectly clean, shining white sand, rippled firm and hard by the tides. Two grayish shapes steered there, like long, rounded pieces of wood or slate. They were fish. He saw them nose toward each other, poised motionless, make a dart forward, swerve off, and come around again. It was like a water dance. A few inches above them the water sparkled as if sequins were dropping through it. Fish again—myriads of minute fish, the length of his fingernail—were drifting through the

water, and in a moment he could feel the innumerable tiny touches of them against his limbs. It was like swimming in flaked silver. The great rock the big boys had swum through rose sheer out of the white sand—black, tufted lightly with greenish weed. He could see no gap in it. He swam down to its base.

Again and again he rose, took a big chestful of air, and went down. Again and again he groped over the surface of the rock, feeling it, almost hugging it in the desperate need to find the entrance. And then, once, while he was clinging to the black wall, his knees came up and he shot his feet out forward and they met no obstacle. He had found the hole.

He gained the surface, clambered about the stones that littered the barrier rock until he found a big one, and with this in his arms, let himself down over the side of the rock. He dropped, with the weight, straight to the sandy floor. Clinging tight to the anchor of stone, he lay on his side and looked in under the dark shelf at the place where his feet had gone. He could see the hole. It was an irregular, dark gap; but he could not see deep into it. He let go of his anchor, clung with his hands to the edges of the hole, and tried to push himself in.

He got his head in, found his shoulders jammed, moved them in sidewise, and was inside as far as his wrist. He could see nothing ahead. Something soft and clammy touched his mouth; he saw a dark frond moving against the grayish rock, and panic filled him. He thought of octopuses, of clinging weed. He pushed himself out backward and caught a glimpse, as he retreated, of a harmless tentacle of seaweed drifting in the mouth of the tunnel. But it was enough. He reached the sunlight, swam to shore, and lay on the diving rock. He looked down into the blue well of water. He knew he must find his way through that cave, or hole, or tunnel, and out the other side.

First, he thought, he must learn to control his breathing. He let himself down into the water with another big stone in his arms, so that he could lie effortlessly on the bottom of the sea. He counted. One, two, three. He counted steadily. He could hear the movement of blood in his chest. Fifty-one, fifty-two. . . His chest was hurting. He let go of the rock and went up into the air. He saw that the sun

was low. He rushed to the villa and found his mother at her supper. She said only, "Did you enjoy yourself?" and he said, "Yes."

All night the boy dreamed of the water-filled cave in the rock, and as soon as breakfast was over, he went to the bay.

That night, his nose bled badly. For hours he had been underwater, learning to hold his breath, and now he felt weak and dizzy. His mother said, "I shouldn't overdo things, darling, if I were you."

That day and the next, Jerry exercised his lungs as if everything, the whole of his life, all that he would become, depended upon it. Again his nose bled at night, and his mother insisted on his coming with her the next day. It was a torment to him to waste a day of his careful self-training, but he stayed with her on that other beach, which now seemed a place for small children, a place where his mother might lie safe in the sun. It was not his beach.

He did not ask for permission, on the following day, to go to his beach. He went, before his mother could consider the complicated rights and wrongs of the matter. A day's rest, he discovered, had improved his count by ten. The big boys had made the passage while he counted a hundred and sixty. He had been counting fast, in his fright. Probably now, if he tried, he could get through that long tunnel, but he was not going to try yet. A curious, most unchildlike persistence, a controlled impatience, made him wait. In the meantime, he lay underwater on the white sand, littered now by stones he had brought down from the upper air, and studied the entrance to the tunnel. He knew every jut and corner of it, as far as it was possible to see. It was as if he already felt its sharpness about his shoulders.

He sat by the clock in the villa, when his mother was not near, and checked his time. He was incredulous and then proud to find he could hold his breath without strain for two minutes. The words "two minutes," authorized by the clock, brought close the adventure that was so necessary to him.

In another four days, his mother said casually one morning, they must go home. On the day before they left, he would do it. He

would do it if it killed him, he said defiantly to himself. But two days before they were to leave—a day of triumph when he increased his count by fifteen—his nose bled so badly that he turned dizzy and had to lie limply over the big rock like a bit of seaweed, watching the thick red blood flow onto the rock and trickle slowly down to the sea. He was frightened. Supposing he turned dizzy in the tunnel? Supposing he died there, trapped? Supposing—his head went around, in the hot sun, and he almost gave up. He thought he would return to the house and lie down, and next summer, perhaps, when he had another year's growth in him—then he would go through the hole.

But even after he had made the decision, or thought he had, he found himself sitting up on the rock and looking down into the water; and he knew that now, this moment, when his nose had only just stopped bleeding, when his head was still sore and throbbing—this was the moment when he would try. If he did not do it now, he never would. He was trembling with fear that he would not go; and he was trembling with horror at the long, long tunnel under the rock, under the sea. Even in the open sunlight, the barrier rock seemed very wide and very heavy; tons of rock pressed down on where he would go. If he died there, he would lie until one day—perhaps not before next year—those big boys would swim into it and find it blocked.

He put on his goggles, fitted them tight, tested the vacuum. His hands were shaking. Then he chose the biggest stone he could carry and slipped over the edge of the rock until half of him was in the cool enclosing water and half in the hot sun. He looked up once at the empty sky, filled his lungs once, twice, and then sank fast to the bottom with the stone. He let it go and began to count. He took the edges of the hole in his hands and drew himself into it, wriggling his shoulders in sidewise as he remembered he must, kicking himself along with his feet.

Soon he was clear inside. He was in a small rock-bound hole filled with yellowish-gray water. The water was pushing him up against the roof. The roof was sharp and pained his back. He pulled himself along with his

hands—fast, fast—and used his legs as levers. His head knocked against something; a sharp pain dizzied him. Fifty, fifty-one, fifty-two. . . . He was without light, and the water seemed to press upon him with the weight of rock. Seventy-one, seventy-two. . . . There was no strain on his lungs. He felt like an inflated balloon, his lungs were so light and easy, but his head was pulsing.

He was being continually pressed against the sharp roof, which felt slimy as well as sharp. Again he thought of octopuses, and wondered if the tunnel might be filled with weed that could tangle him. He gave himself a panicky, convulsive kick forward, ducked his head, and swam. His feet and hands moved freely, as if in open water. The hole must have widened out. He thought he must be swimming fast, and he was frightened of banging his head if the tunnel narrowed.

A hundred, a hundred and one . . . The water paled. Victory filled him. His lungs were beginning to hurt. A few more strokes and he would be out. He was counting wildly; he said a hundred and fifteen and then, a long time later, a hundred and fifteen again. The water was a clear jewel-green all around him. Then he saw, above his head, a crack running up through the rock. Sunlight was falling through it, showing the clean, dark rock of the tunnel, a single mussel shell, and darkness ahead.

He was at the end of what he could do. He looked up at the crack as if it were filled with air and not water, as if he could put his mouth to it to draw in air. A hundred and fifteen, he heard himself say inside his head—but he had said that long ago. He must go on into the blackness ahead, or he would drown. His head was swelling, his lungs cracking. A hundred and fifteen, a hundred and fifteen, pounded through his head, and he feebly clutched at rocks in the dark, pulling himself forward, leaving the brief space of sunlit water behind. He felt he was dying. He was no longer quite conscious. He struggled on in the darkness between lapses into unconsciousness. An immense, swelling pain filled his head, and then the darkness cracked with an explosion of green light. His hands, groping forward, met nothing; and his feet, kicking back, propelled him out into the open sea.

He drifted to the surface, his face turned up to the air. He was gasping like a fish. He felt he would sink now and drown; he could not swim the few feet back to the rock. Then he was clutching it and pulling himself up onto it. He lay face down, gasping. He could see nothing but a red-veined, clotted dark. His eyes must have burst, he thought; they were full of blood. He tore off his goggles and a gout of blood went into the sea. His nose was bleeding, and the blood had filled the goggles.

He scooped up handfuls of water from the cool, salty sea, to splash on his face, and did not know whether it was blood or salt water he tasted. After a time, his heart quieted, his eyes cleared, and he sat up. He could see the local boys diving and playing half a mile away. He did not want them. He wanted nothing but to get back home and lie down.

In a short while, Jerry swam to shore and climbed slowly up the path to the villa. He flung himself on his bed and slept, waking at the sound of feet on the path outside. His mother was coming back. He rushed to the bathroom, thinking she must not see his face with bloodstains, or tearstains, on it. He came out of the bathroom and met her as she walked into the villa, smiling, her eyes lighting up.

“Have a nice morning?” she asked, laying her hand on his warm brown shoulder a moment.

“Oh, yes, thank you,” he said.

“You look a bit pale.” And then, sharp and anxious, “How did you bang your head?”

“Oh, just banged it,” he told her.

She looked at him closely. He was strained; his eyes were glazed-looking. She was worried. And then she said to herself, Oh, don’t fuss! Nothing can happen. He can swim like a fish.

They sat down to lunch together.

“Mummy,” he said, “I can stay underwater for two minutes—three minutes, at least.” It came bursting out of him.

“Can you, darling?” she said. “Well, I shouldn’t overdo it. I don’t think you ought to swim anymore today.”

She was ready for a battle of wills, but he gave in at once. It was no longer of the least importance to go to the bay.

# Inaugural Address

Franklin D. Roosevelt

1933

I am certain that my fellow Americans expect that on my induction into the Presidency I will address them with a candor and a decision which the present situation of our Nation impels. This is preeminently the time to speak the truth, the whole truth, frankly and boldly. Nor need we shrink from honestly facing conditions in our country to-day. This great Nation will endure as it has endured, will revive and will prosper. So, first of all, let me assert my firm belief that the only thing we have to fear is fear itself—nameless, unreasoning, unjustified terror which paralyzes needed efforts to convert retreat into advance. In every dark hour of our national life a leadership of frankness and vigor has met with that understanding and support of the people themselves which is essential to victory. I am convinced that you will again give that support to leadership in these critical days.

In such a spirit on my part and on yours we face our common difficulties. They concern, thank God, only material things. Values have shrunken to fantastic levels; taxes have risen; our ability to pay has fallen; government of all kinds is faced by serious curtailment of income; the means of exchange are frozen in the currents of trade; the withered leaves of industrial enterprise lie on every side; farmers find no markets for their produce; the savings of many years in thousands of families are gone.

More important, a host of unemployed citizens face the grim problem of existence, and an equally great number toil with little return. Only a foolish optimist can deny the dark realities of the moment.

Yet our distress comes from no failure of substance. We are stricken by no plague of locusts. Compared with the perils which our forefathers conquered because they believed and were not afraid, we have still much to be thankful for. Nature still offers her bounty and human efforts have multiplied it. Plenty is at our doorstep, but a generous use of it languishes in the very sight of the supply. Primarily this is because the rulers of the exchange of mankind's goods have failed, through their own stubbornness and their own incompetence, have admitted their failure, and abdicated. Practices of the unscrupulous money changers stand indicted in the court of public opinion, rejected by the hearts and minds of men.

True they have tried, but their efforts have been cast in the pattern of an outworn tradition. Faced by failure of credit they have proposed only the lending of more money. Stripped of the lure of profit by which to induce our people to follow their false leadership, they have resorted to exhortations, pleading tearfully for restored confidence. They know only the rules of a generation of self-seekers. They have no vision, and when there is no vision the people perish.

The money changers have fled from their high seats in the temple of our civilization. We may now restore that temple to the ancient truths. The measure of the restoration lies in the extent to which we apply social values more noble than mere monetary profit.

Happiness lies not in the mere possession of money; it lies in the joy of achievement, in the thrill of creative effort. The joy and moral stimulation of work no longer must be forgotten in the mad chase of evanescent profits. These dark days will be worth all they cost us if they teach us that our true destiny is not to be ministered unto but to minister to ourselves and to our fellow men.

Recognition of the falsity of material wealth as the standard of success goes hand in hand with the abandonment of the false belief that public office and high political position are to be valued only by the standards of pride of place and personal profit; and there must be an end to a conduct in banking and in business which too often has given to a sacred trust the likeness of callous and selfish wrongdoing. Small wonder that confidence languishes, for it thrives only on honesty, on honor, on the sacredness of obligations, on faithful protection, on unselfish performance; without them it can not live.

Restoration calls, however, not for changes in ethics alone. This Nation asks for action, and action now.

Our greatest primary task is to put people to work. This is no unsolvable problem if we face it wisely and courageously. It can be accomplished in part by direct recruiting by the Government itself, treating the task as we would treat the emergency of a war, but at the same time, through this employment, accomplishing greatly needed projects to stimulate and reorganize the use of our natural resources.

Hand in hand with this we must frankly recognize the overbalance of population in our industrial centers and, by engaging on a national scale in a redistribution, endeavor to provide a better use of the land for those best fitted for the land. The task can be helped by definite efforts to raise the values of agricultural products and with this the power to purchase the output of our cities. It can be helped by preventing realistically the tragedy of the growing loss through foreclosure of our small homes and our farms. It can be helped by insistence that the Federal, State, and local governments act forthwith on the demand that their cost be drastically reduced. It can be helped by the unifying of relief activities which to-day are often scattered, uneconomical, and unequal. It can be helped by national planning for and supervision of all forms of transportation and of communications and other utilities which have a definitely public character. There are many ways in which it can be helped, but it can never be helped merely by talking about it. We must act and act quickly.

Finally, in our progress toward a resumption of work we require two safeguards against a return of the evils of the old order; there must be a strict supervision of all banking and credits and investments; there must be an end to speculation with other people's money, and there must be provision for an adequate but sound currency.

There are the lines of attack. I shall presently urge upon a new Congress, in special session, detailed measures for their fulfillment, and I shall seek the immediate assistance of the several States.

Through this program of action we address ourselves to putting our own national house in order and making income balance outgo. Our international trade relations, though vastly important, are in point of time and necessity secondary to the establishment of a sound national economy. I favor as a practical policy the putting of first things first. I shall spare no effort to restore world trade by international economic readjustment, but the emergency at home can not wait on that accomplishment.

The basic thought that guides these specific means of national recovery is not narrowly nationalistic. It is the insistence, as a first consideration, upon the interdependence of the various elements in and parts of the United States—a recognition of the old and permanently important manifestation of the American spirit of the pioneer. It is the way to recovery. It is the immediate way. It is the strongest assurance that the recovery will endure.

In the field of world policy I would dedicate this Nation to the policy of the good neighbor—the neighbor who resolutely respects himself and, because he does so, respects the rights of others—the neighbor who respects his obligations and respects the sanctity of his agreements in and with a world of neighbors.

If I read the temper of our people correctly, we now realize as we have never realized before our interdependence on each other; that we can not merely take but we must give as well; that if we are to go forward, we must move as a trained and loyal army willing to sacrifice for the good of a common discipline, because without such discipline no progress is made, no leadership becomes effective. We are, I know, ready and willing to submit our lives and property to such discipline, because it makes possible a leadership which aims at a larger good. This I propose to offer, pledging that the larger purposes will bind upon us all as a sacred obligation with a unity of duty hitherto evoked only in time of armed strife.

With this pledge taken, I assume unhesitatingly the leadership of this great army of our people dedicated to a disciplined attack upon our common problems.

Action in this image and to this end is feasible under the form of government which we have inherited from our ancestors. Our Constitution is so simple and practical that it is possible always to meet extraordinary needs by changes in emphasis and arrangement without loss of essential form. That is why our constitutional system has proved itself the most superbly enduring political mechanism the modern world has produced. It has met every stress of vast expansion of territory, of foreign wars, of bitter internal strife, of world relations.

It is to be hoped that the normal balance of executive and legislative authority may be wholly adequate to meet the unprecedented task before us. But it may be that an unprecedented demand and need for undelayed action may call for temporary departure from that normal balance of public procedure.

I am prepared under my constitutional duty to recommend the measures that a stricken nation in the midst of a stricken world may require. These measures, or such other measures as the Congress may build out of its experience and wisdom, I shall seek, within my constitutional authority, to bring to speedy adoption.

But in the event that the Congress shall fail to take one of these two courses, and in the event that the national emergency is still critical, I shall not evade the clear course of duty that will then confront me. I shall ask the Congress for the one remaining instrument to meet the crisis—broad Executive power to wage a war against the emergency, as great as the power that would be given to me if we were in fact invaded by a foreign foe.

For the trust reposed in me I will return the courage and the devotion that befit the time. I can do no less.

We face the arduous days that lie before us in the warm courage of the national unity; with the clear consciousness of seeking old and precious moral values; with the clean satisfaction that comes from the stern performance of duty by old and young alike. We aim at the assurance of a rounded and permanent national life.

We do not distrust the future of essential democracy. The people of the United States have not failed. In their need they have registered a mandate that they want direct, vigorous action. They have asked for discipline and direction under leadership. They have made me the present instrument of their wishes. In the spirit of the gift I take it.

In this dedication of a Nation we humbly ask the blessing of God. May He protect each and every one of us. May He guide me in the days to come.

# Elouise Cobell: A Small Measure of Justice

By Melinda Janko

From *American Indian Magazine*, Issue: Summer 2013/Vol. 14 No. 2

**A**s I was driving the long stretch of Highway 89, from the Great Falls airport to the Blackfeet Reservation in Browning, Mont., to meet with Elouise Cobell, I wondered how many miles she had driven over the course of her lengthy court battle known as *Cobell v. (in succession) Babbitt, Norton, Kempthorne and Salazar*. How many miles had she logged on planes to and from Washington, D.C., where she was holding the federal government accountable for its mismanagement of billions held in Indian Trust Funds?



President Barack Obama meets with Elouise Cobell in the Oval Office, Dec. 8, 2010. Official White House Photo by Pete Souza

How many nights had she spent away from her beloved family and home on the Blacktail Ranch in Blackfeet where she was raised? How many steps had she taken, how many hours had she waited in a courtroom with her lawyers and accountants through the many years of litigation? What kind of person does it take to muster the courage, commitment and sacrifice needed to sue the U.S. government? On that two-hour stretch of highway from the Great Falls airport to Browning there is plenty of time to think. I can't imagine all the thoughts that ran through Cobell's mind in those countless hours of quiet solitude. What I do know is what kept her going: her passion for righting an historic wrong and her love for her people.

When I first read about the Cobell lawsuit in a 2002 article in *Mother Jones* magazine I was shocked and appalled by the federal government's gross mismanagement of the Indian Trust Funds. It was hard for me to wrap my brain around the fact that despite the newspaper headlines of the *nouvea-riche* Indians of Gaming, there was a much bigger story in 21st century America; Indians who were land-rich, were living dirt-poor, without running water and electricity. The U.S. government trustee who managed the leasing of Indian oil and gas, timber and grazing lands through the Department of Interior had never given Indians an accounting of their royalty payments. Not once over the course of a century! How was that possible?

I was completely unaware of the lawsuit and I was ashamed of the neglect by my government! This was the largest class-action lawsuit ever filed against the U.S. so why weren't there front-page headlines all across America about this story? I wanted to know more, but as a non-Native who had never set foot on an Indian reservation and didn't know any American Indians, I was at a loss. But I couldn't get this story out from under my skin, and I couldn't force myself to look the other way. So I took my passion and started on a journey.

Eight years later I have formed friendships with Indians all across the country and with one woman in particular, Elouise Pepion Cobell. What Cobell taught me, by example, was that heroes don't start out to be heroes; they simply do whatever it takes to make things right, no matter what the cost! As one of her lawyers said, "When you lead a movement that seeks fundamental change, there always has to be someone who simply refuses to go to the back of the bus, and that person is Elouise Cobell."

The decision to file the lawsuit in 1996 was shaped by many events throughout Cobell's life. One of them was Ghost Ridge. On my first trip to the Blackfeet Reservation she took me to the sacred burial site. The historic state marker along Highway 89, south of the Two Medicine River tells the story: "The Starvation Winter of 1883–1884 took the lives of 500 Blackfeet Indians who had been camping in the vicinity of Old Agency. This tragic event was the result of an inadequate supply of government rations during the exceptionally hard winter."

The story passed down to Cobell by her father every time they passed the site, however, was much bleaker: "There was an old agency where the Indian agent was housed to make sure the Indians didn't get off the reservation," Cobell recalled.

"They would not allow Indian people to hunt or carry arms because they wanted them to be dependent on the Indian agent. And so people just hung around and waited for their rations. The rations were diverted, black-marketed, and the women and children and men had to stay confined without any means to hunt. As a result, 500 Blackfeet Indians starved to death. And the government just dug big, open-pit graves and threw them in and covered it up.

"And I drive this road every single day, and some days I feel really, really tired of fighting this lawsuit against the United States government, and all I have to do is look up to the west and see Ghost Ridge, and remember all the people that starved to death for

injustice. And so then it becomes their fight; it becomes the fight of the people of Ghost Ridge that we are trying to hold the United States government accountable for.”

Born one of nine children on the Blackfeet Reservation on Nov. 5, 1945, Elouise Cobell was the great, great granddaughter of the revered Mountain Chief, the hereditary chief of the Blackfeet who refused to compromise with the U.S. government. “I like to think a little bit of him trickled down to me,” Cobell said.

As a child she would always hear stories about missing money from her parents and relatives. The story that impacted her the most was about her aunt who needed the lease money from her land to get medical care for her sick husband. “It was a harsh winter and they traveled 30 miles through snow in a horse and buggy to get to the agency office, but they wouldn’t let them in,” Cobell recalled.

“They waited outside in freezing cold weather all day. At the end of the day the agency told them, ‘Come back tomorrow...’ The next day they waited again and at the end of the day the agency told them, ‘Go home.’ Their check finally came in the spring. My aunt died without ever seeing justice, and her husband died from lack of medical care.”

For every one of the 300,000 members of the class-action lawsuit there are hundreds of stories. James “Mad Dog” Kennerly, also a Blackfeet Indian, lived in a modest home without running water, despite his 300 acres of oil producing land. Mad Dog made beaded necklaces to supplement his meager royalty payments. He shows me his oil and gas statement from the government.

“Over \$6,000 of oil taken from my land,” he said, “and I get \$89 bucks. Oh yeah, they’ll even tell you that they overpaid me. In the next check they take it out.” Like so many beneficiaries of the Indian Trust, Kennerly would go to the Bureau of Indian Affairs (BIA) office looking for answers to his questions, answers that never came. Kennerly died without ever seeing justice.

On the Navajo Reservation lives Mary Johnson, an 87-year-old woman with five oil wells pumping on her land. She speaks only Navajo so her story is translated to me through her son and daughter. The oil companies started drilling on Johnson’s land in the 1950s. You might imagine her living in a mansion after all these years, but she is too poor to afford running water. Johnson could see the oil wells pumping and hear the sound of the oil rushing through the pipes on her land but she wasn’t getting the funds she so desperately needed.

One day she decided to take matters into her own hands. She marched out to one of her wells and shut it down. Minutes later, the BIA police and an oil company representative threatened to throw her in jail if she didn’t turn it back on. Others on the Navajo reservation took harsher measures and set their oil wells on fire.

It was for the Mary Johnsons and the Mad Dog Kennerlys of Indian Country that Cobell fought so long and so hard. And it was by no small coincidence that the woman who was holding the U.S. government accountable, had a knack for numbers.

After completing an accounting program at a business school in Great Falls, Mont., Cobell became the treasurer of the Blackfeet Tribe and, years later, a banker and founder of the Native American Bank. As the treasurer, she discovered that the numbers on the books just didn’t add up. Oil was being taken off the reservation but oil money was seldom coming in. She quickly learned that no accounts-receivable system was in place, so she started attending government meetings and asking questions. They told her she didn’t know how to read an account statement. And that’s when she started calling senators and congressmen and anyone who would or wouldn’t listen. She banded together with a group of tribal finance officers from Red Lake, Jicarilla Apache, Turtle Mountain and White Mountain Apache reservations and David J. Matheson

(Coeur d'Alene), Deputy Commissioner of Indian Affairs under the George H.W. Bush administration. Together, they started to get the attention of Congress.

In 1994 Congress passed the Indian Trust Reform Act and the Department of Interior appointed a Special Trustee to help remedy the problems in both the Tribal and IIM (Individual Indian Monies) Accounts. Two years later, however, nothing had changed. A chance encounter with Attorney General Janet Reno, however, changed everything.

Cobell met the Attorney General at an Indian banking conference where they were both speakers. She told Reno about the problems with the Trust Fund, and Reno asked her to write a letter requesting a meeting. Several months later, after calling Reno's office every week, Cobell finally got her meeting. In D.C. she was greeted by lawyers from the departments of Interior, Justice and Treasury, but no Attorney General. "Now Elouise," one attorney told her, "don't you come in here with any false expectations," she recalled.

"You ought to be ashamed of yourself," Cobell replied. "You have got to understand that every day Indian people are dying in Indian communities without the money that they need for the basics of life, and you ought to be ashamed of yourself." It was the straw that broke the camel's back!

"I tried to do the right thing," she said, "the way that you believe government should work. I really tried to follow the entire process; I went to the administration, I told them the stories, I told them what was happening. But through the years they told many people, 'Just sue us.' And, so, we just sued them."

On June 10, 1996, Cobell, along with the Native American Rights Fund and lead attorney Dennis Gingold filed a class-action lawsuit against the United States Department of Interior for the mismanagement of the Indian Trust Funds belonging to over 300,000 individual tribal members, the largest class-action lawsuit ever filed against the United States government.

When Cobell filed the lawsuit, she expected it to take about three years. Instead, it languished in the courts for 15 long years. On one of her many flights to D.C. she was asked by a fellow passenger what she did for a living.

"I knew from experience that if I told him I was a banker he would just nod his head and stare out the window. So I told him I was reforming the U.S. government," she recalled. "His response was, 'Say what?' But that was a good way for me to get people talking about this lawsuit."

For 10 of those 15 years in the court, the presiding judge was Federal Judge Royce C. Lamberth, a Republican from Texas, appointed by President Reagan.

Judge Lamberth is known for his "take no bull" attitude. During the case he held two Secretaries of Interior in contempt of court: Bruce Babbitt (Clinton Administration) for failing to produce documents related to the lawsuit and Gale Norton (G.W. Bush Administration) for failing to initiate a court-ordered Historical Accounting.

I was honored to interview Judge Lamberth. "I'm a judge who just calls them as he sees them," he said. On July 12, 2005, this was how he saw it:

"For those harboring hope that the stories of murder, dispossession, forced marches, assimilationist policy programs and other incidents of cultural genocide against the Indians are merely the echoes of a horrible, bigoted government-past that has been sanitized by the good deeds of more recent history, this case serves as an appalling reminder of the evils that result when large numbers of the politically powerless are placed at the mercy of institutions engendered and controlled by a politically powerful few. It reminds us that even today our great democratic enterprise remains unfinished. And it reminds us, finally, that the terrible power of government, and the frailty of the

restraints on the exercise of that power, are never fully revealed until government turns against the people.”

On July 11, 2006, the U.S. Court of Appeals for the District of Columbia Circuit removed Judge Lamberth, stating that he had lost his objectivity. Cobell was disappointed with the decision but she never lost hope. “We might have lost our judge but we didn’t lose the facts,” she said. “And victory is going to come no matter what judge.”

Over the many years we knew each other, Cobell and I would often talk about the lawsuit. Even in those times when victory seemed far away she would always say, “I know I am doing the right thing,” and then she’d say it, what I called the Elouise mantra: “the stars are aligned, the stars are aligned.” And then it came to pass.

When candidate Barack Obama became President he kept his campaign promise to bring a fair and just resolution to the Cobell lawsuit. In December 2009, after six months of negotiations and 13 years of contentious litigation, Cobell and her lawyers agreed to a \$3.4 billion settlement. In November, 2010 Congress ratified the settlement and in December of 2010, President Obama made the announcement, “After years of delay,” he said, “this bill will provide a small measure of justice to Native Americans whose funds were held in trust by a government charged with looking out for them.” On June 21, 2011, the Federal District Court in Washington, D.C., gave it the final stamp of approval.

The Cobell settlement included \$1.5 billion for the members of the class, \$1.9 billion for a Land Consolidation Program and \$60 million for a college scholarship fund for Indian youth. It is the largest government settlement ever awarded in the history of the United States.

Imagine the celebration that took place after winning a 30-year battle with the most powerful government in the world! But for Cobell, there would be no celebration until after government checks were received by the Indian Trust beneficiaries.

Finally, over the Christmas holidays of 2012, the first round of government checks, or “Elouise checks” as many referred to them, were sent out to 300,000 beneficiaries. The checks averaged between \$1,000 to \$2,000 per person. Many used their funds to buy Christmas gifts for their family or to pay for heat, food and medical care. Some gave a portion of their funds to help others, in the name of Elouise Cobell.

The woman who fought so long and hard for justice, however, never saw those checks. On October 16, 2011, just four months after the Court’s final approval of the settlement that bore her name, Elouise Pepion Cobell succumbed to a deadlier battle, cancer. As her lead attorney, Dennis Gingold, said at her funeral, “She saw the finish line but she never crossed it.” The following week the Department of Interior flew its flags at half-mast in her honor.

## AUTHORS

Melinda Janko

Melinda Janko is the producer/director of *A Small Measure of Justice*, a feature length documentary about Elouise Cobell’s fight for justice and the filing of the largest class-action lawsuit in U.S. history.

Note: the documentary is on Netflix/PBS – 100 years

# Confrontation on the Bridge

By Jacob Lawrence



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OPEN

# Predator-induced fear causes PTSD-like changes in the brains and behaviour of wild animals

Received: 27 February 2019

Accepted: 26 June 2019

Published online: 07 August 2019

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Predator-induced fear is both, one of the most common stressors employed in animal model studies of post-traumatic stress disorder (PTSD), and a major focus of research in ecology. There has been a growing discourse between these disciplines but no direct empirical linkage. We endeavoured to provide this empirical linkage by conducting experiments drawing upon the strengths of both disciplines. Exposure to a natural cue of predator danger (predator vocalizations), had enduring effects of at least 7 days duration involving both, a heightened sensitivity to predator danger (indicative of an enduring memory of fear), and elevated neuronal activation in both the amygdala and hippocampus – in wild birds (black-capped chickadees, *Poecile atricapillus*), exposed to natural environmental and social experiences in the 7 days following predator exposure. Our results demonstrate enduring effects on the brain and behaviour, meeting the criteria to be considered an animal model of PTSD – in a *wild animal*, which are of a nature and degree which can be anticipated could affect fecundity and survival in free-living wildlife. We suggest our findings support both the proposition that PTSD is not unnatural, and that long-lasting effects of predator-induced fear, with likely effects on fecundity and survival, are the norm in nature.

Biomedical scientists studying post-traumatic stress disorder (PTSD), and ecologists, have independently developed an interest in the impacts of predator-induced fear in the last two decades<sup>1,2</sup>. These interests are converging, with a dramatic growth in interdisciplinary discourse over the past few years, which has been detailed in multiple reviews<sup>3–8</sup>, and fostered at dedicated conferences<sup>9</sup>. Influenced by ecologists, biomedical researchers have begun to consider that PTSD may not be an unnatural, “maladaptive”, dysfunction, but rather a naturally-occurring phenomenon serving an evolutionarily adaptive purpose<sup>3,5–7,9–12</sup>. Ecologists in turn have begun appreciating that predator-induced fear can have long-lasting consequences transforming the animal’s subsequent reactions to predators<sup>3,4,8,9,13,14</sup>. This discourse having begun, the next essential step is to empirically establish that there is a linkage between the two disciplines, by demonstrating that PTSD-like changes in the brain and behaviour can occur in wild animals. Whereas there is a large literature on the behavioural effects of predator-induced fear in wild animals<sup>2–4,8,15,16</sup>, and a considerable number of studies have documented the effects on stress physiology (particularly glucocorticoid levels)<sup>3,4,8</sup>, whether predator-induced fear has enduring effects on the brain in wild animals remains to be experimentally tested<sup>3,4,8,17</sup>.

W. B. Canon coined the phrase “fight or flight” in 1915, to describe the immediate, transitory response of organisms to a threat<sup>18</sup>. A century later, we now well know that life-threatening events can have enduring effects on the brain and behaviour, not just transitory ones, as demonstrated most clearly by PTSD. Developing a medical treatment of almost any human ailment requires first developing an ‘animal model’, which typically entails inducing the condition in laboratory rodents, primarily to test the efficacy of drugs, and PTSD is no different. A recent comprehensive review of over 600 animal model studies of PTSD identified six experimental paradigms which meet the criteria of inducing neurobiological and behavioural effects, enduring from 7 to 90 days after stress termination, that mirror those seen in humans<sup>19</sup>. One of the most commonly-used of these paradigms not only successfully induces enduring effects, but also well-emulates the etiology of PTSD in simulating a life-threatening event; by exposing laboratory rodents to predator cues, for example, a live cat, or predator odours<sup>1,5,6,19,20</sup> (as

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described in over 170 papers to date; Web of Science search for “predator” and “PTSD”, 21 May 2019, excluding papers referring to: humans as “predators”, or “Predator” drones).

Avoiding predation is a preeminent selective force in nature because failing to do so immediately extinguishes the individual’s future Darwinian fitness<sup>15,16</sup>. Retaining a powerful enduring memory of a life-threatening predator encounter is thus clearly evolutionarily beneficial if it helps the individual avoid such events in the future<sup>3,4,8</sup>. Contemplating this, in light of the many PTSD-like changes manifest in laboratory rodents in response to predator-induced fear<sup>19</sup>, has prompted a growing number of biomedical researchers to propose<sup>3,5,7,9–11</sup> that “PTSD is the cost of inheriting an evolutionarily primitive mechanism that considers survival more important than the quality of one’s life”<sup>12</sup>. In this view, PTSD-like changes in the brain and behaviour are not unnatural or “maladaptive”, but are rather evolutionary adaptations which entail costs, such as “hypervigilance”<sup>12,19,20</sup> and the avoidance of trauma-related cues<sup>19</sup>, that provide the benefit of increasing the probability of survival, by increasing the likelihood of detecting a life-threatening danger (hypervigilance), and reducing the probability of encountering one (avoidance). In humans, the costs in terms of reduced quality of life resulting from hypervigilance and avoidance of trauma-related cues, can be numerous and diverse<sup>3,5–7,9–12</sup>. In wild animals, one of the most well-established principles in ecology is that the cost of increased vigilance is reduced time spent feeding, and avoiding predators generally also entails a significant cost with respect to reducing feeding opportunities<sup>2,15,16,21</sup>.

The cost of evolutionarily prioritizing avoiding predation underlies both this recent thinking about PTSD, and recent thinking about predator-prey ecology. What is termed the “ecology of fear”<sup>22</sup> concerns quantifying the total impact of predators on prey populations and communities. The traditional view in ecology is that predators directly kill prey, thereby reducing prey survival, and this is the limit of their impact. The ‘ecology of fear’ posits that the behavioural, physiological and neurobiological costs of avoiding predation (‘fear’ for short<sup>2,18,22</sup>), such as reduced feeding time or reduced feeding opportunities, may additionally reduce prey fecundity and survival, and the total reduction in prey numbers resulting from exposure to predators may thus far exceed that due to direct killing alone<sup>4,21</sup>. Two factors have limited the general acceptance of this. The first is that prey responses to predators in the wild are still predominantly assumed to be instantaneous and fleeting (i.e., “fight or flight”), and thus not sufficiently long-lasting to affect fecundity and survival<sup>3,4,8</sup>. Fecundity, for example, is unlikely to be affected by an animal missing a meal because it fled from a predator; only an enduring, protracted period of reduced feeding is likely to reduce fecundity, and it is thus necessary to demonstrate that predator-induced fear can have enduring effects<sup>3,4,8</sup>. The second factor that has limited the general acceptance of the idea that fear can affect fecundity and survival results from the fact that, whereas one can watch a predator killing a prey one cannot ‘see’ fear killing a prey, but must instead infer its effects; meaning that manipulative experiments are essential to making strong inferences about the effects of fear. Due to the logistical challenges involved only a handful of recent experiments have demonstrated that predator-induced fear can reduce prey fecundity and survival in free-living wildlife, but these have nonetheless established that the effects of fear itself (the costs of avoiding predation) can be powerful enough to reduce the number of young born and surviving to adulthood by more than 50%<sup>23–29</sup>.

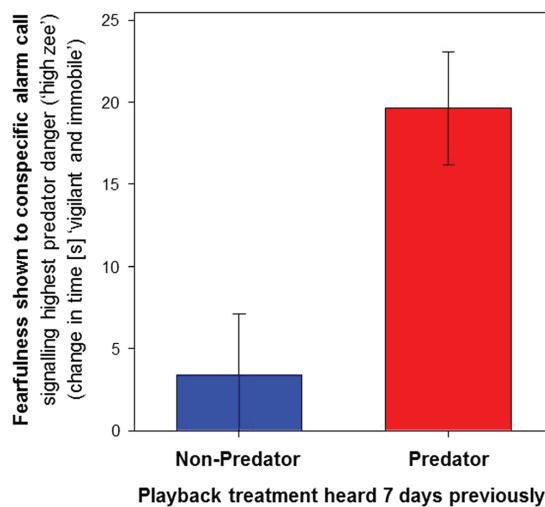
To experimentally test if predator-induced fear causes PTSD-like changes in the brains and behaviour of wild animals we drew upon the strengths of the two disciplines involved. From animal model studies of PTSD, we adhered to the criteria of testing for effects enduring for at least 7 days, affecting behaviour (“hypervigilance”<sup>12,20</sup>), and the brain areas (amygdala and hippocampus), most pertinent to PTSD in humans<sup>1,12,19,20</sup>. We experimentally tested for these enduring effects by employing a well-established predator-fear protocol used in animal model studies of PTSD (2 days experimental predator cue exposure followed by 7 days without<sup>30,31</sup>), and subsequently measuring both, a behavioural reaction to danger (‘freezing’, i.e., time spent ‘vigilant and immobile’<sup>15,16</sup>) commonly assessed in animal model studies of PTSD<sup>19</sup>, and a well-studied marker of long-term neuronal activation ( $\Delta$ FosB<sup>30–32</sup>). To maximize the ecological relevance we tested for effects on birds (black-capped chickadees, *Poecile atricapillus*), because we knew that an enduring effect of 7 days duration on the behaviour of birds can affect survival, from the field experiments conducted to date demonstrating that predator-induced fear can reduce fecundity and survival in free-living wildlife<sup>25,29</sup>. We further enhanced the external validity by inducing fear using predator vocalizations (as done in most of the aforesaid field experiments), housing the birds outdoors in flocks for the 7 days after the 2 days of experimental cue exposure (to determine if effects were measurable after a week of natural experiences), and assessing their enduring memory of fear by evaluating their reaction to another, different, natural cue of predator danger (conspecific alarm calls<sup>33,34</sup>). Our results demonstrate that PTSD-like changes in the brain and behaviour can occur in wild animals; which we suggest supports both the proposition that PTSD is not unnatural<sup>3,5–7,9–12</sup>, and that long-lasting effects of predator-induced fear, with likely effects on fecundity and survival, are the norm in nature<sup>2–4,8,21,25,29</sup>.

## Results

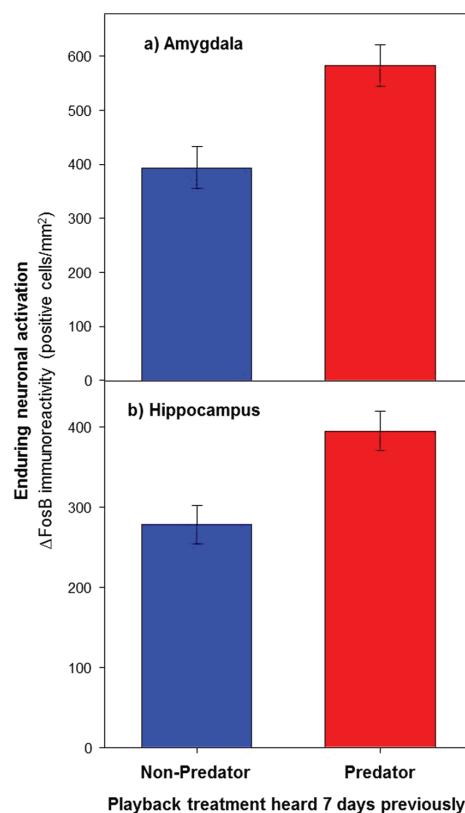
**Enduring effect on behaviour.** Exposure to predator cues had an enduring effect on behaviour of at least 7 days duration consistent with having induced an enduring memory of fear. In response to hearing conspecific alarm calls signalling the highest level of predator danger (‘high zee’ calls)<sup>33,34</sup>, individuals that heard predator vocalizations 7 days previously behaved significantly more fearfully, demonstrating a 6-fold greater increase in time spent ‘vigilant and immobile’ (i.e., ‘freezing’<sup>15,16,19,33</sup>) than did individuals that heard non-predator vocalizations 7 days previously (Fig. 1;  $F_{1,11} = 10.8$ ,  $P = 0.007$ ,  $n = 8$  predator and 7 non-predator individuals).

**Enduring effects on neuronal activation.** Predator-induced fear had enduring effects on neuronal activation of at least 7 days duration in both the amygdala (nucleus taeniae of the amygdala, see Methods) and hippocampus. Individuals that heard predator vocalizations 7 days previously demonstrated a highly significant (Fig. 2a;  $F_{1,8} = 21.0$ ,  $P = 0.002$ ), 48% greater level of  $\Delta$ FosB immunoreactivity (positive cells/mm<sup>2</sup>) in the amygdala than did those that heard non-predator vocalizations 7 days previously, as well as a highly significant (Fig. 2b;

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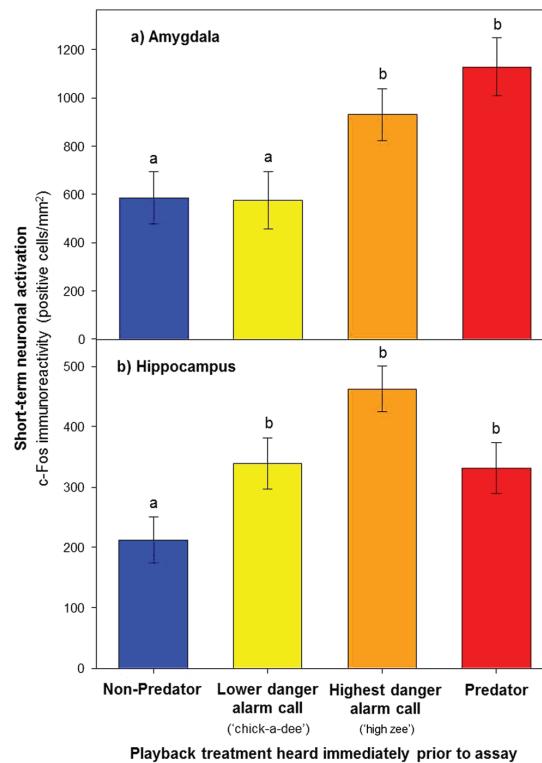


**Figure 1.** Effect of predator (red) and non-predator (blue) playbacks heard 7 days previously on the fearfulness shown in response to hearing conspecific alarm calls signalling the highest level of predator danger ('high zee' calls), as quantified by the change in time (seconds) spent 'vigilant and immobile', compared between the 1 minute before, vs. the 1 minute after, the start of the first alarm call. Values are means  $\pm$  S.E.



**Figure 2.** Effect of predator (red) and non-predator (blue) playbacks heard 7 days previously on enduring neuronal activation in (a) the amygdala and (b) hippocampus, as quantified by  $\Delta$ FosB immunoreactivity (positive cells/mm<sup>2</sup>). Values are means  $\pm$  S.E.

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**Figure 3.** Effect of immediately previously heard playbacks of predator (red) and non-predator (blue) vocalizations, and conspecific alarm calls signalling the highest level of predator danger ('high zee' calls; orange) and a lower level of predator danger ('chick-a-dee' calls; yellow), on short-term neuronal activation in (a) the amygdala and (b) hippocampus, as quantified by c-Fos immunoreactivity (positive cells/mm<sup>2</sup>). Letters indicate significant differences ( $p < 0.05$ ) in Dunnett's tests comparing the other treatments vs. the control (non-predator). Values are means  $\pm$  S.E.

$F_{1,8} = 12.1$ ,  $P = 0.008$ ), 42% greater level of  $\Delta$ FosB immunoreactivity in the hippocampus ( $n = 6$  predator and 6 non-predator individuals).

**Immediate effects on neuronal activation.** The effects on the brain and behaviour found in the main experiment were directly attributable to the fear induced by hearing the various audio playbacks, as demonstrated by the results from a subsidiary experiment testing the immediate effects of hearing the various playbacks on short-term neuronal activation (90 minutes after experimental cue exposure). In our subsidiary experiment, there was a highly significant overall effect of playback treatment on the level of c-Fos immunoreactivity in both the amygdala (Fig. 3a;  $F_{3,14} = 5.7$ ,  $P = 0.009$ ) and hippocampus (Fig. 3b;  $F_{3,14} = 8.4$ ,  $P = 0.002$ ). Hearing predator vocalizations ( $n = 5$  individuals) significantly increased the level of c-Fos immunoreactivity in both the amygdala (Fig. 3a; Dunnett's test,  $P = 0.013$ ) and hippocampus (Fig. 3b; Dunnett's test,  $P = 0.027$ ), in comparison to hearing non-predator vocalizations ( $n = 5$  individuals). Consistent with 'high zee' conspecific alarm calls signalling the highest level of predator danger<sup>33,34</sup>, individuals that heard this type of alarm call ( $n = 5$  individuals) similarly demonstrated significantly increased immunoreactivity in both the amygdala (Fig. 3a; Dunnett's test,  $P = 0.046$ ) and hippocampus (Fig. 3b; Dunnett's test,  $P = 0.001$ ). In contrast, individuals ( $n = 5$ ) that heard alarm calls signalling a lower level of predator danger ('chick-a-dee' calls)<sup>33,34</sup>, while demonstrating significantly increased c-Fos immunoreactivity in the hippocampus (Fig. 3b; Dunnett's test,  $P = 0.041$ ), showed no corresponding effect whatsoever in the amygdala (Fig. 3a; Dunnett's test,  $P = 0.864$ ).

### Discussion

Our demonstration of effects of predator-induced fear on the brain and behaviour enduring at least 7 days, meets the criteria to be considered an animal model of PTSD<sup>19</sup> – in a *wild* animal. Individuals exposed to predator cues manifested an enduring memory of fear, demonstrating a heightened sensitivity to predator danger rather than a memory of specific cues, as shown by their greater responsiveness to a cue of predator danger distinct from those they were exposed to 7 days previously. "Hypervigilance" is one of the characteristic consequences of PTSD in humans<sup>12,19,20</sup>, and inducing an enduring exaggerated fear response is accordingly one of the criteria it is

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necessary to meet to be considered an animal model of PTSD, which our results satisfy<sup>19</sup>. Enduring neurobiological effects, on the “fear-circuit” involving the amygdala<sup>19</sup> and the hippocampus, are also criteria which our results meet<sup>1,12,19,20</sup>. That these enduring effects on the amygdala and hippocampus were directly attributable to the fear induced by hearing predator cues 7 days previously, is clear from the immediate activation of these brain areas resulting from hearing these cues, as shown in our subsidiary experiment. Demonstrating that predator-induced fear can cause PTSD-like changes in the brain and behaviour in wild animals establishes the empirical linkage between their disciplines, which growing numbers of biomedical scientists studying PTSD, and ecologists, are recognizing exists<sup>3,9</sup>.

To our knowledge ours is the first experiment to demonstrate that predator-induced fear can cause enduring effects on the amygdala and hippocampus in a wild animal. We suggest this is solely due to the newness of this field of research, and more studies will reveal such effects to be the norm in nature. Indeed, the striking correspondence between the effects we have demonstrated in a wild bird responding to acoustic predator cues, and those found in mammals (laboratory rodents) reacting to visual and olfactory cues in animal model studies of PTSD<sup>19</sup>, testifies to the likely generality. This correspondence extends further, in relation to the cue inducing enduring effects being a life-threatening one, consistent with the etiology of PTSD. Our subsidiary experiment demonstrated that hearing predator vocalizations, and high threat (‘high zee’) alarm calls, both had significant effects on immediate neuronal activation in both the amygdala and hippocampus (Fig. 3), whereas hearing low threat (‘chick-a-dee’) alarm calls did not affect immediate activation in the amygdala (Fig. 3a) and hence is unlikely to induce enduring effects. The ‘chick-a-dee’ alarm call is emitted when mobbing a predator, which entails a group of prey attacking a predator in a position (e.g. perched) such that it poses little danger<sup>33,34</sup>. Our results correspond with recent studies reporting immediate activation in the amygdala in birds shown a life-threatening cue, but not a lower threat one (a perched hawk)<sup>35,36</sup>. We suggest the fact that the enduring effects on the brain we have shown in a wild animal appear restricted to life-threatening predator cues, supports the proposition that the enduring effects in PTSD are the cost of evolutionarily prioritizing survival<sup>12</sup>.

The effectiveness of the ‘predator exposure’ paradigm in animal model studies of PTSD has been proposed to be attributable to the presentation of a cue of predator danger, which is “inescapable”<sup>19</sup>. In the context of the ‘predator exposure’ paradigm, we suggest ‘inescapability’ *per se* may not be pertinent to predator exposure’s causing PTSD-like changes, but rather what is, is the intensity of the fear induced. In our experiments predator exposure was ‘inescapable’ because the subjects were in small cages during the cue exposure period. Predator cue exposure and ‘inescapability’ in combination did not necessarily cause effects, as shown by the lack of amygdala activation in response to the low threat cue (‘chick-a-dee’ alarm; Fig. 3a). This corresponds with the recent finding of a lack of amygdala activation to a low threat visual cue (perched hawk), which too was ‘inescapable’, because the subjects were caged<sup>36</sup>.

Paradigms other than predator exposure are used in animal model studies of PTSD and these include “immobilization or restraint stress” and “inescapable shocks”<sup>19</sup>. Thus, immobility and inescapability are traumatic for laboratory rodents. For wild animals, fleeing is generally the principal response to a predator threat<sup>16</sup>, and the relative immobility and inescapability resulting from being in captivity could be largely responsible for the strength of the effects documented in experiments testing the consequences of predator exposure on wild animals in captivity<sup>3,4,8</sup>. Consequently, establishing that the fear of predators, separate from the stress of captivity, or capture, can have enduring effects on the brains and behaviour of wild animals comparable to those in laboratory rodent studies of PTSD – and those demonstrated here – requires determining if such effects are demonstrated in free-living wildlife in nature, something which remains to be tested experimentally<sup>3,4,8</sup>. Our results provide a necessary first step towards the goal of testing the enduring effects of fear in free-living wildlife. Free-living wild animals regularly experience intensely life-threatening predator encounters and are frequently physically traumatized as a result. Most predator attacks are unsuccessful<sup>37,38</sup>, meaning most prey escape, but they do not necessarily escape unharmed. For example, recent studies have shown that up to 32% of living adult female giraffes (*Giraffa camelopardalis*) bear scars from lions (*Panthera leo*)<sup>39</sup>, 25% of harbour porpoises (*Phocoena phocoena*) bear claw and bite marks from grey seals (*Halichoerus grypus*)<sup>40</sup>, and 100% of manta rays (*Manta alfredi*) bear multiple bite wounds from sharks<sup>41</sup>. From an evolutionary perspective, it is difficult to envisage that these free-living wild animals do not bear enduring psychological effects, corresponding with their physical injuries<sup>3,4,8,9,16</sup>.

Whether the enduring effects in PTSD are ‘natural’ or not has a bearing on both biomedical research and clinical practice<sup>3,5–7,9–12</sup>. Our results demonstrating enduring amygdala ‘hyperactivation’<sup>12,19</sup> – in a wild animal, in response to natural predator cues, which persists after a period of natural experiences, and is associated with heightened sensitivity to subsequent natural predator cues, is all directly relevant to recent discourse among biomedical researchers regarding whether the amygdala in PTSD is “hyperfunctional” or dysfunctional<sup>12,19</sup>. The ‘hyperfunctional’ view is that the amygdala is functioning perfectly naturally in being ‘switched on’ by a life-threatening event, in anticipation of a subsequent one<sup>12,42</sup>, whereas the ‘dysfunctional’ view is that the amygdala is damaged or diseased<sup>19,42</sup>; reducing amygdala hyperactivity being the appropriate treatment objective in the former view, in contrast to the latter’s focus on ‘blocking’ activation (pharmacologically or otherwise)<sup>43</sup>. Clinically, psychotherapy remains the most effective treatment for PTSD, rather than pharmacotherapy<sup>44</sup>. Particularly among military veterans, PTSD is associated with a sense of shame, which can often lead to suicide<sup>45</sup>. Recent psychotherapeutic approaches (e.g. “compassion focused therapy”<sup>46</sup>) aim to alleviate the sufferer’s shame by helping them understand their symptoms within the context of the evident evolutionary functions of those symptoms, such as the survival benefits of hypervigilance in anticipation of a subsequent life-threatening event<sup>12,42,46,47</sup>. Evidence indicating that PTSD is not ‘unnatural’ but rather a cost of evolutionarily prioritizing survival<sup>3,5–7,9–12,42,43,46,47</sup>, thus directly supports such therapeutic approaches.

Our results demonstrate that predator-induced fear in wild animals can entail more than just “fight or flight”, and instead can produce long-lasting effects likely to affect fecundity and survival. We tested for enduring effects of predator-induced fear on the brains and behaviour of wild birds, because birds have been the subjects of all

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the experiments to date demonstrating that predator-induced fear can affect fecundity and survival in free-living wildlife<sup>23–29</sup>. There is abundant evidence to indicate that comparable effects occur in mammals, and most other animals<sup>2,4,8,9,15,16,21</sup>, and the present lack of field experiments on mammals is most likely due to the logistical difficulties resulting from mammals typically being secretive and nocturnal. Our experiment induced a heightened sensitivity to predator cues, which endured at least 7 days, and involved increased time spent vigilant (Fig. 1). Heightened sensitivity to predator cues lasting at least 7 days, like protracted exposure to them<sup>25</sup>, has been shown to impair parental care and reduce offspring survival in free-living wild birds. This was established in a recent study which assessed individual differences in fearfulness (heightened sensitivity) among parental birds, in their reaction to short-term (1 h) playbacks of predator cues (much as we did in our behavioural assay), and then showed that this measure of each parent's fearfulness predicted their offspring's survival to independence, 3 weeks later<sup>29</sup>. Importantly, it was the responses of more fearful parents to entirely naturally-occurring predator cues, over this 3 weeks, which evidently led to the deaths of their offspring, indicating that enduring heightened sensitivity to predator danger such as we have shown, can be expected to affect fecundity and survival in nature.

For wild animals the cost of avoiding predation can include parents having some of their offspring die, because the time taken being vigilant and immobile in response to predator cues prevents the parent from having the time to find enough food to feed all of its young<sup>25,29</sup>. Critically, it must be remembered that the cost of failing to avoid predation, i.e., the parent's death in this example, would likely entail all of its offspring dying not just some, and the parent obviously never having any more<sup>2,15,16</sup>. Evolutionarily prioritizing survival at the cost of the 'quality of life' is thus part of nature, and the grim arithmetic in the face of predation risk exemplified by parents ensuring their survival and that of some of their offspring at the cost of others, almost certainly applied equally to humans, as to most animals, throughout our prehistory<sup>12</sup>. Prioritizing survival in the face of predation risk has only very recently, in evolutionary terms, become less immediately relevant and universal to humans, thanks to our progressively having destroyed almost all of our predators (large carnivores), in just the past few centuries and decades<sup>48,49</sup>. Considered ecologically, a species (ourselves) now living largely free of predation risk is what is highly anomalous<sup>50</sup>, rather than the arguably evolutionarily adaptive response seen in PTSD. Having established the empirical linkage between animal model studies of PTSD and ecology, we view our results not as a final word, but a starting point, in the advance from the current interdisciplinary discourse between biomedical scientists studying PTSD and ecologists, to a new fully-fledged interdisciplinary field of research exploring the relevance of predator-induced fear in relation to both ourselves and other animals.

## Materials and Methods

**Overview of experimental design.** Wild free-living adult chickadees of both sexes were live-captured during the non-breeding season and housed in flocks outdoors for 1 week prior to experimental trials. To experimentally test if predator-induced fear has enduring effects, individuals were housed solitarily in acoustic isolation chambers and exposed for 2 days to audio playbacks of the vocalizations of either predators (treatment group) or non-predators (control group)<sup>23,25–27,29–31</sup>, and then housed again in flocks outdoors for 7 days, during which time they were not exposed to any further experimental cues, but were instead exposed to natural sights and sounds and social interactions. Enduring effects on behaviour were then assessed in one set of individuals and effects on the brain were evaluated in a separate set, to ensure that effects on the brain were attributable to exposure to the cues heard 7 days previously and not the cues used in assessing behaviour.

To assess effects on behaviour, individuals were again housed solitarily in acoustic isolation chambers, and all were exposed for 15 minutes to playbacks of conspecific alarm calls ('high zee' calls<sup>33,34</sup>), a signal which, like hearing predator vocalizations, alerts the hearer to a predator danger<sup>33,34</sup>, but in the context of the experiment entailed individuals hearing cues (chickadee vocalizations) distinct from those they were exposed to 7 days previously. More fearful reactions in those individuals that previously heard predators, vs. non-predators, could thereby be interpreted as reflecting an enduring memory of fear, i.e., a heightened sensitivity to predator danger<sup>19</sup>, rather than a memory of the specific cues heard 7 days previously. To gauge the fearfulness of their reactions we measured the time each individual remained 'vigilant and immobile' (i.e., 'freezing') upon first hearing the alarm calls; 'freezing' being an anti-predator behaviour demonstrated in almost every type of animal<sup>1,5,16,33</sup>, which is commonly measured in animal model studies of PTSD<sup>19</sup>.

To determine if there were enduring effects on the brain we assayed  $\Delta$ FosB expression to identify long-term neuronal activation<sup>30–32</sup> in the avian homologues of the two brain regions most pertinent to PTSD in humans, the amygdala and hippocampus<sup>12,19,20,51,52</sup>. The amygdala is responsible for fear processing and the acquisition and expression of fear memories, as demonstrated by lesioning studies on laboratory rodents, and the fact that people with a damaged amygdala report not feeling fearful in response to a variety of fear-provoking stimuli, including life-threatening traumatic events<sup>51–54</sup>. The hippocampus is involved in forming declarative, episodic and spatial memories<sup>51,52</sup>. Whereas amygdala activation generally increases with the intensity of a trauma, the duration and magnitude of effects on the hippocampus can be complex and vary with what is measured<sup>51,52</sup>.  $\Delta$ FosB is a protein produced by the *FosB* gene. It is a transcription factor, meaning it modifies the transcription of other genes. Whereas most transcription factors degrade within hours,  $\Delta$ FosB is unusually stable and can continue to have effects for weeks, effects which include promoting resistance to the deleterious consequences of chronic stress<sup>32</sup>.

To be certain that enduring effects on the brain and behaviour, found in the main experiment, were directly attributable to the fear induced by hearing the various audio playbacks, we conducted a subsidiary experiment, testing the immediate effects of hearing predator vocalizations and conspecific alarm calls on short-term neuronal activation in the same brain areas examined in the main experiment. Additional wild free-living adult chickadees of both sexes were live-captured during the non-breeding season, housed in flocks outdoors for 1 week, and then housed solitarily in acoustic isolation chambers and exposed for 30 minutes to audio playbacks of either predator vocalizations, conspecific alarm calls signalling the highest level of predator danger ('high zee' calls<sup>33,34</sup>) or a lower level of predator danger ('chick-a-dee' calls<sup>33,34</sup>), or non-predator vocalizations. To quantify the immediate effects

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on short-term neuronal activation we assayed c-Fos expression in the two relevant brain areas; c-Fos being a short-lived transcription factor that degrades in a few hours, which is related to ΔFosB<sup>32</sup>.

**Species, housing and playback procedures.** The black-capped chickadee is a small (12 g) songbird resident year-round throughout southern Canada, which lives in small territorial flocks over winter. Male and female chickadees look and sound alike, and in the non-breeding season their behaviour is indistinguishable, such that the sexes can only be discriminated by a slight difference in wing length<sup>33</sup>. We included both sexes in our experiment for the purposes of obtaining an ecologically representative sample rather than to compare between the sexes, which we expected would not likely differ in their reactions to predators<sup>33</sup>. The immediate anti-predator responses of chickadees to playbacks of predator vocalizations and conspecific alarm calls have been well-studied<sup>33,34</sup>, as have the short-term neurobiological effects on the auditory processing areas of the brain resulting from hearing these signals of predator danger<sup>35</sup>.

Wild free-living chickadees were live-captured on the campus of Western University (London, Ontario, Canada) in the non-breeding season (September to March), and housed at the University's Advanced Facility for Avian Research (<http://birds.uwo.ca>). Upon initial capture, and during the 7 days following the 2 days of cue exposure in the main experiment, individuals were housed in flocks in room-sized (2.1 × 2.4 × 3.7 m) outdoor aviaries on the Facility's roof. During cue exposure individuals were housed solitarily, in small cages (25 × 30 × 37 cm), inside acoustic isolation chambers, to ensure that all they heard were the experimental cues.

In the main experiment, 27 individuals (15 males, 12 females) heard, during the 2 days of cue exposure, playlists matched for maximum amplitude and frequency and average decibel level, composed of the vocalizations of either, six predator species known to prey on chickadees (Cooper's hawk, *Accipiter cooperii*; sharp-shinned hawk, *Accipiter striatus*; northern saw-whet owl, *Aegolius acadicus*; red-tailed hawk, *Buteo jamaicensis*; merlin, *Falco columbarius*; barred owl, *Strix varia*), or six non-threatening non-predator species (mallard, *Anas platyrhynchos*; wood frog, *Lithobates sylvaticus*; song sparrow, *Melospiza melodia*; downy woodpecker, *Picoides pubescens*; hairy woodpecker, *Picoides villosus*; red-breasted nuthatch, *Sitta canadensis*). All of these predator and non-predator species occur locally and their vocalizations would all be heard naturally by chickadees in the area. Vocalizations were broadcast for a total of 5 minutes per hour, during the 12 hours of daylight, at randomly selected intervals, with each species used one to four times every two hours, using different exemplars and call lengths each time. Individuals were randomly-assigned to treatment, balancing assignment between the treatments and sexes. To assess the enduring effects on behaviour 7 days after predator cue exposure, 15 individuals were randomly-selected, balancing between the treatments and sexes, and exposed to playbacks of conspecific alarm calls signalling the highest level of predator danger ('high zee' calls<sup>33,34</sup>), for 15 seconds every minute, over a period of 15 minutes. All wild chickadees are familiar with conspecific alarm calls<sup>33,34</sup>. Individuals were filmed for 15 minutes before and during cue exposure, and the time they spent 'freezing'<sup>15,16,19,33</sup>, operationally defined as immobile (stationary; not hopping, walking or flying) with their head upright and eyes open (vigilant; as opposed to, e.g. head down foraging)<sup>33</sup>, in the 1 minute before and after the start of the first playback<sup>33,56,57</sup>, was subsequently scored by an observer blind to which treatment each bird had received 7 days previously.

In the subsidiary experiment testing the immediate effects of hearing the playbacks on short-term neuronal activation, 22 individuals were randomly-assigned to treatment, balancing between treatments and sexes, and heard playbacks broadcast for 15 seconds every minute, over a period of 30 minutes, consisting of either predator (northern saw-whet owl) vocalizations, conspecific alarm calls ('high zee' or 'chick-a-dee' calls<sup>33,34</sup>) or non-predator (red-breasted nuthatch) vocalizations. Individuals hearing conspecific alarm calls necessarily heard the vocalizations of a single species (chickadees), which we matched by broadcasting a single predator and non-predator to the other individuals.

Predator and non-predator vocalizations were obtained from the Macaulay Library ([www.macaulaylibrary.org](http://www.macaulaylibrary.org)) or xeno-canto ([www.xeno-canto.org](http://www.xeno-canto.org)). Chickadee 'high zee' and 'chick-a-dee' alarm calls were obtained by recording captive wild-caught chickadees reacting to a taxidermic mount of a northern saw-whet owl. At least three exemplars of every vocalization were utilized. All sounds were edited using Audacity ([www.audacityteam.org](http://www.audacityteam.org)) to eliminate noise and standardize decibel levels. All playbacks were broadcast at a volume of 74 dB using all the same make and model of speaker and mp3 player.

This research was approved by Western University's Animal Care Committee under protocol 2010-0245 and by Environment Canada under Scientific Permit CA-0244. All procedures were conducted in licensed and inspected facilities, and followed the guidelines set forth by the Canadian Council on Animal Care.

**Neurobiological details and procedures.** The nucleus taeniae of the amygdala (TnA) is the avian homologue of the mammalian medial amygdala<sup>35,36,58</sup>, and the hippocampus is homologous in birds and mammals<sup>35,36,59</sup>. To avoid any confusion concerning the relevance of our results to existing (i.e., mammalian) animal model studies of PTSD, we refer simply to the 'amygdala' when describing effects found in the nucleus taeniae of the amygdala. Immediate increases in activation in both the amygdala and the hippocampus have been reported previously in birds shown life-threatening visual cues<sup>35,36</sup>.

To assay ΔFosB and c-Fos expression in the amygdala and hippocampus in response to the audio playbacks used in our experiments, individuals were euthanized 7 days (ΔFosB) or 90 minutes (c-Fos) after experimental cue exposure, using isoflurane, and perfused with 0.1 M phosphate buffered saline (pH 7.4) followed by 4% paraformaldehyde. Brains were removed, placed in 4% paraformaldehyde for a minimum of 24 h, then 30% sucrose for 24 h until saturated, and frozen at -80 °C. Brains were sectioned into 40 µm coronal slices using a cryostat at -20 °C. A series of sections were collected for Nissl staining to locate the brain regions of interest (see Supplementary Fig. S1), and two series were collected for immunohistochemistry. ΔFosB and c-Fos were labelled using commercial antibodies (Santa Cruz Biotechnology: FosB (102) rabbit IgG, sc-48; c-Fos (4) rabbit IgG, sc-52e) following established protocols<sup>30,31,60</sup>. Sections were processed free-floating in tissue culture

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wells. Sections were blocked in 0.05% H<sub>2</sub>O<sub>2</sub> followed by 10% normal serum and then incubated in the primary antibodies diluted (1:500) in phosphate buffered saline and 0.3% Triton (PBS/T). Following incubation in the primary antibody, sections were incubated in a biotinylated secondary antibody (diluted 1:500) followed by an avidin-biotin reaction (Vectastain Elite kit PK-6100, Vector Labs). Finally, immunoreactive cells were visualized using 3,3'-diaminobenzidine tetrachloride (SigmaFAST DAB). Sections were then mounted on microscope slides, dehydrated, cleared, and cover-slipped.

We captured z-stack images of each region of interest using a Leica Digital CCD (model 420D) camera mounted on a Leica DM500B light microscope through X10 (amygdala) and X5 (hippocampus) objective lenses. We used Leica Application Suite to compile each picture as a z-stack from a series of images taken at a regular interval (0.63 mm) throughout the focal depth of the section to create images in which all cells were in focus<sup>60</sup>. The area of each region was measured in mm<sup>2</sup> using ImageJ software calibrated to the relevant magnification. Each image was next converted from colour to 16-bit grayscale, the background subtracted and contrast enhanced, following which the ImageJ thresholding tool was used to convert ΔFosB or c-Fos positive nuclei to black against a white background, and the ImageJ count function was employed to quantify the number of positive cells/mm<sup>2</sup> in each slice in each brain region of interest (see Supplementary Fig. S2). All image processing was conducted by an observer blind to which treatment each individual had received.

We confirmed that the enduring effects on ΔFosB expression in the amygdala and hippocampus demonstrated in response to predator-induced fear (Fig. 2) were specific to these regions, by additionally assaying ΔFosB expression in the medial caudal nidopallium (see Supplementary Fig. S1), an auditory processing area in the songbird brain<sup>55</sup>. We followed all the same procedures as just described regarding assaying ΔFosB expression in the amygdala and hippocampus 7 days after experimental cue exposure. In contrast to the significant effects seen in the amygdala and hippocampus (Fig. 2), there was no evidence of an enduring treatment effect on ΔFosB expression in the medial caudal nidopallium ( $F_{1,8} = 1.3$ ,  $P = 0.279$ ,  $n = 6$  predator and 6 non-predator individuals).

**Statistical analyses.** We conducted two-way ANOVAs with playback treatment and sex as fixed factors. In our test of enduring effects on behaviour our dependent variable was the change in time each individual spent 'vigilant and immobile', in the 1 minute before, vs. the 1 minute after, the start of the first conspecific alarm call; this being a repeated-measures value, which thereby controls for individual differences in fearfulness<sup>29,56,57</sup>. In our tests of effects on neuronal activation we calculated averages per individual of the number of ΔFosB or c-Fos immunoreactive cells/mm<sup>2</sup> across all slices, in each brain area, and used these averages in our analyses. In testing effects on neuronal activation we conducted separate ANOVAs on each brain region (amygdala and hippocampus). Following our ANOVAs concerning the short-term effects on neuronal activation of hearing the various playback treatments in the subsidiary experiment, we conducted Dunnett's post-hoc tests comparing each treatment with the control (non-predator vocalizations). Prior to analysis, all data were Box–Cox transformed and tested for normality and homogeneity of variances. All descriptive results reported (means ± SE) are untransformed or back transformed to the original units. Analogous to statistically controlling for individual variation by analyzing the change in each individual's response in our test for an enduring treatment effect on behaviour, we included sex in our analyses to statistically account for this as a potential source of individual variation. There were no significant sex or treatment by sex effects (all  $p > 0.30$ ), and we accordingly only report treatment effects in the *Results*.

## Data Availability

Relevant data is provided as Supplementary Information.

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### Acknowledgements

Thanks to A. Gould, M. Rebuli J. Smets and J. Hrynkiewicz for assistance. Funding was provided through Discovery Grants to LYZ and SAM-S from the Natural Sciences and Engineering Research Council of Canada.

### Author Contributions

All authors conceived the study. E.C.H. and L.E.W. conducted the field work, E.C.H. and S.A.M.-S. developed and performed the assays and L.E.W. assessed the behaviour; aided by the other authors. L.Y.Z., E.H. and M.C. analyzed the data, and L.Y.Z. and M.C. drafted the manuscript, with editorial contributions from the other authors.

### Additional Information

Supplementary information accompanies this paper at <https://doi.org/10.1038/s41598-019-47684-6>.

**Competing Interests:** The authors declare no competing interests.

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# Thompson: Simone Biles and the most human meaning of courage



(Laurence Griffiths / Getty Images)

By Marcus Thompson II Jul 28, 2021 from *The Athletic*

This really comes down to courage.

In the sports landscape, courage is this idea of persevering through adversity. It is facing fear, staring down the potential for failure. It is refusing to be thwarted by pain, doubt or opposition. It is overcoming.

A special honor is reserved for those who triumph through adversity. Michael Jordan's "Flu Game" when he dominated despite food poisoning. Brett Favre producing an all-time gem while grieving the death of his father. Skylar Diggins-Smith playing a WNBA season while pregnant. Kirk Gibson hitting a World Series game-winning home run when he could barely run. Byron Leftwich being carried to the line of scrimmage by Marshall teammates because his leg was broken. Willis Reed running through the tunnel to return to play through injury for the Knicks.

This is why we love sports. They are displays of human resolve being tested by circumstances. We get to live vicariously through athletes' discipline, their work ethic, their willpower and, yes, their courage. The grandness and longevity of the Olympics prove the trial of human capacity has long been riveting theater.

This is where I admit I might be the wrong person to posit on this subject. People will have their thoughts about Simone Biles' decision to pull out of the gymnastics team final. Certainly, criticism is part of the game. But as much as I love sports, my perspectives aren't governed by its culture, nor are my definitions crafted by its unwritten rules. And the way sports confines the meaning of courage, while perennially entertaining, I find to be more theatrical than relatable.

Moments like these make me think more than anything, try to prune from the drama of sports that which is metaphoric for life. In doing so, I found connectivity with the courage of Biles. Because the moments when I've had to summon my courage never look as glorious as when Buster Douglas upset Mike Tyson. The opposite, actually. They are often lonely, dark, ugly.

Well, there was that time I did a backflip off of the tall diving board at the Emeryville High pool when I was 12. But most often, the reasons I need courage are less storybook than adversity, less heroic than physical pain or a tangible opposition. Instead, I usually need courage to face something even more uncomfortable and decidedly less dramatic a spectacle.

Reality.

Waking up Tuesday to learn Biles withdrew from the gymnastics team final (and on Wednesday, she withdrew from the individual all-around too) in Tokyo was shocking. This Olympics felt like the coronation of Biles the legend. She was going to be the first to do the Yurchenko double pike, plus a few of her signature moves, rack up the gold medals and take her seat among the icons. So the revelation of her not leading Team USA to gold? Wow.

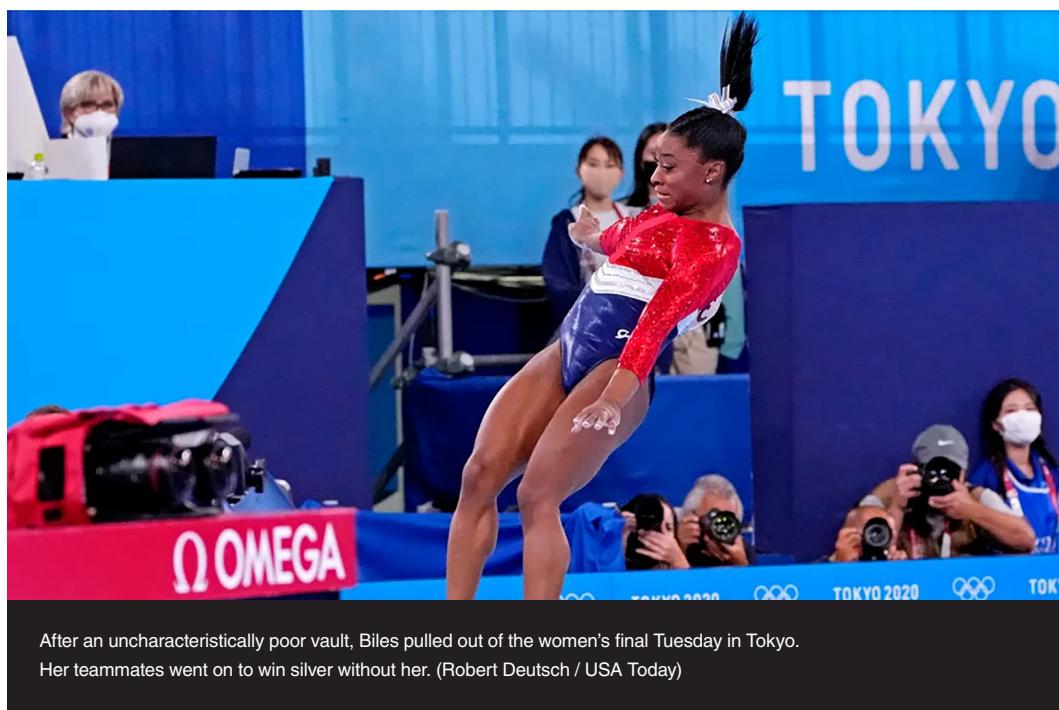
Her reason was even more stunning.

“I was fighting all those demons.”

“I just don’t trust myself as much as I used to.”

“Never felt like this before.”

“No, the mental is not there.”



After an uncharacteristically poor vault, Biles pulled out of the women's final Tuesday in Tokyo.  
Her teammates went on to win silver without her. (Robert Deutsch / USA Today)

The jarring element was who this was coming from. This is Simone Biles. The same woman who dares the most daunting routines. The same woman who dominated the World Championships with kidney stones. The same woman who competes in gymnastics on broken toes. The same woman who named herself as a survivor of a sexual assault ring, volunteering her fame as advocacy for survivors.

With Biles, courage can be presumed. What she is revealing is an execution of it that simply doesn't fit the culture of sports.

Out of curiosity, and to help me find my words, I queried a couple of close friends, people of faith, on whose wisdom I often lean. The question was simple:

"The key ingredient to courage is vulnerability," one responded. "If the action is not vulnerable, it is not courageous."

Bingo. That's the Goliath in the human arena not built for glory. That's the adversity most commonly faced in modern society. Vulnerability. The ability to look truth dead in the eye and not blink. To accept the repercussions of being raw and real. There are levels to this.

Why didn't Simone just say she had an injury? Why would she reveal the reason for her inability to continue as she did instead of citing, say, flu-like symptoms?

We know this much: You don't hear professional athletes admit to their pride being hurt. Many have conjured an injury because they couldn't live up to the moment, and no one says it.

Sports' culture dictates that Biles was supposed to power through the doubt, face the anxiety and deliver us a moment for which we can endow her with that special honor we bequeath to the courageous. But what Biles did was look right in the face of a foe we all know well and don't like to acknowledge.

Reality.

I know this nuance of courage, the part that requires looking at yourself and having that hard conversation. *I can't do it. I am overwhelmed. I do need help. I am failing. I'm not as together as I portray.* Mirrors can make formidable opponents.

It's harder than ever to own up to weakness and fragility. It's more difficult now to declare insufficiency. Watch "The Social Dilemma" to see what young people these days are facing. The pressures for modern athletes raised on smartphones are different monsters than those faced by any generation before them. Not only is there no escape from the constant commentary, but it is also laced with vitriol. Today's unfiltered sports discourse is as uncivil and unsavory as it's ever been, courtesy of an online ecosystem with a lower baseline of respect. Facing reality is tough in a world decorated by facades, where escapism is sport and socializing is but an ego competition perpetuated by our media obsession.

Maybe what we're learning from Biles, and from Naomi Osaka, and from a host of NBA and NFL stars, is that this is all too much. Even for the gladiators.

I don't presume to know Simone or what she's going through. Knowing parts of her life story, I can imagine some traumas, emotions and complexes exist that her millions of dollars can't wash away. But I'd bet she knew her decision would be met with derision. I'm pretty sure when the thoughts were about how to explain her sudden departure from the competition, she understood that telling the truth would get her labeled a quitter. She knew she was bucking against the ingrained culture and the condemnation would come because she's dealt with this dynamic her whole career.

Like many 24-year-olds who can't put down their phone, she knew she was going to see the backlash, and hear it, and answer for it. She knew this would scuff the pristine narrative that followed her to Tokyo. For such a media darling and one of the faces of these Olympic games, the PR move would've been to find an understandable reason to explain what was happening.

Yet she opted for vulnerability.

Maybe one day, we will look back at this moment as an important one in an era when athletes are reclaiming their right to be something more real than just invincible gladiators. Maybe their candor about the anxiety of their life, in this world driven by social media and the 24-hour news cycle, is necessary for us to rethink our culture.

Absolutely nothing is wrong with the athletes who power through. They deserve the glory. I'm a sucker for a story of overcoming adversity. Nothing is quite so stirring of the spirit as watching one beat the odds, conquer the obstacles and come out victorious. For sure, the other gymnasts who stepped up and won silver after losing the star of their team exhibited courage worthy of praise. Again, this is what we love about sports.

At the same time, the difficulty of what Biles did is not lost. The valley where one finds their frailty is low. But she didn't run. Instead, she went toe-to-toe. With disappointment. With frustration. With failure. With the frightening prospect of being transparent. With the reality that, on this occasion, she was not that one. She endured it all and did what she thought was the right thing.

Such doesn't come with the glory of sport, but it's courage nonetheless.

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