IRB Protocol# 2000030825

NCT05920161

CONSENT FOR PARTICIPATION IN A RESEARCH STUDY

YALE UNIVERSITY

Study Title: Influence of Stress on Learning and Memory
Principal Investigator (the person who is responsible for this research): *Nicholas Turk-Browne (100 College Street) and Elizabeth Goldfarb (2 Church Street South)*

Research Study Summary:

- We are asking you to join a research study.
- The purpose of this research study is to understand how stress influences the brain and different kinds of learning
- Study activities will include:
    - Undergoing fMRI scanning
    - Making responses to visual and/or auditory stimuli presented on a screen in the MRI scanner
    - Complete some questionnaires related to the study
    - Undergo a mild to moderate stressor (e.g. submersion of your arm in cold water), or you will undergo the respective control condition (e.g., submersion of your arm in warm water). You will be told before the task to which condition you are assigned.
    - Have your video recorded during certain parts of the task. You will be informed if and when you are being recorded by the experimenter during the task.
    - Providing saliva samples: We will collect saliva samples by asking you to hold a salivette under your tongue for about two minutes. This is in order to measure salivary levels of the hormones cortisol and alpha- amylase over the course of the protocol.
    - Female participants may be asked about their use of hormone-based contraceptives and their current menstrual cycle status and asked to fill out an additional short questionnaire.
- Your involvement will require approximately 1-3 hours over the course of two consecutive days. Specifically, the first session will take approximately 1-2 hours, and the second session will take approximately 0.5-1 hour.
- There may be some risks from participating in this study, including risks posed by the magnetic field, incidental findings and loss of confidentiality. We will take care to minimize the above-mentioned risks, including extensive screening before participation, hearing protection, strict data access and anonymization (see Risk Section below for more details).
- The study may have no benefits to you. However, we hope that our results will add to the knowledge about how stress influences different kinds of learning and memory. This work has potential benefits for the treatment of stress-related clinical disorders.
- Taking part in this study is your choice. You can choose to take part, or you can choose not to take part in this study. You also can change your mind at any time. Whatever choice you make will not have any effect on your relationship with Yale University
- If you are interested in learning more about the study, please continue reading, or have someone read to you, the rest of this document. Ask the study staff questions about anything you do not understand. Once you understand the study, we will ask you if you wish to participate; if so, you will have to sign this form.

APPROVED BY THE YALE UNIVERSITY IRB 12/6/2023

Why is this study being offered to me?
We are asking you to take part in a research study because you are between the ages of 18-45, fluent in English, have a BMI between 18-35, and have indicated that you have no contraindications for the MRI scanner.

Who is paying for the study?
This study is being funded by Yale University and the National Institutes of Health.

What is the study about?
The purpose of this study is to understand how acute stress influences different forms of learning and memory. Additionally, we are interested in how stress influences the brain systems involved in learning and memory.

What are you asking me to do and how long will it take?
If you agree to take part, your participation in this study will involve your participation across two consecutive days.

Day 1. If you consent to participate in this study, you will begin with a short screening procedure. The instructions for the cognitive task will be explained to you in detail by a researcher before you get into the scanner. You will have the opportunity to ask questions.

You will answer questionnaires about your demographic information, stress levels, and some aspects of your medical history (i.e., medication/drug use, and menstrual cycle status). You will either undergo a mild to moderate stressor (e.g., submersion of your arm in cold water), or you will undergo the respective control condition (e.g., submersion of your arm in warm water). You will be told before the task to which condition you are assigned.

During the scanning session, you will be provided with hearing protection, and will lie on the scanner bed, which will then be slowly moved into the bore of the MRI machine. We will then collect several images of your brain while you perform one or more tasks (e.g., viewing/hearing characters, shapes, photographs, fractals, tones, artificial speech and/or videos). These will be used to identify the location and time course of brain activity. You may be asked to provide some response to the things that you see, including button presses. We may also use an eye tracker to record your eye movements. Scanning sessions will last up to 2 hours, including preparation time. You will be given the opportunity to take breaks between blocks to minimize fatigue.

Day 2. You will be asked to return on a second day, in which we expect participation to last up to one hour. This session may occur at the same location as the scanner in BrainWorks or at the Turk-Browne lab in 100 College Street. You will view stimuli and make responses on a computer during this session.

On both days, you will be asked to give saliva samples at very points in time throughout your participation. We will collect saliva samples by asking you to hold a salivette under your tongue for about two minutes. This is in order to measure salivary levels of cortisol and alpha- amylase, which are used as a marker for stress, over the course of the protocol.

In total, the study will take approximately one to three hours of your time (1-2 hours on day 1 and 0.5-1 hour on day 2) over the course of two days.

Are there any risks from participating in this research?

If you decide to take part in this study, you may experience some boredom or fatigue during the computer-based tasks. To alleviate this, there will be breaks throughout the task.

If your video is recorded during the task, your image will be identifiable.

You may also experience some mild discomfort when submerging your arm in cold water. You will be provided a paper towel and time to rest after submerging your arm.

Magnetic resonance imaging (MRI) uses magnetic fields and radio waves to take pictures of the body. MRI is very safe, with no known long-term ill-effects. Hundreds of millions of people have safely had MRI scans.

MRI uses a strong magnet, which can pull strongly on some metals. These metals must not be brought into the scan room. They could be pulled towards the magnet and cause serious injury if they hit you. People entering the scan room must remove all metal from their body, clothing and pockets. This includes jewelry, hearing aids, watches, cell phones, keys, coins, and wallets.

We will ask you to fill out an MRI safety form to check if you have anything in your body which might be dangerous in the MRI. **It is very important that you fill out this form accurately and ask if you are unsure about anything**. Some metal objects could also heat up during the MRI, burning you. Electrical devices such as pacemakers could go wrong or stop working.

You must also tell us if you are wearing anything that could contain metal. For example, some medication patches have a metal backing. Some clothing can contain metal fibers that could also heat up during the MRI. We will provide you with clothes to change into if needed.

During the MRI scan, you may feel uncomfortable or worried. When the MRI scanner is collecting scans, it makes loud tapping, buzzing, and beeping noises. Without protection, this could damage your hearing. We will give you with earplugs and/or headphones to reduce the sound to a safe level. While the scanner is making noises, we will not be able to hear you. We will give you a squeeze bulb for you to contact us.

The MRI scan is intended for research and not to find disease. The researchers are not qualified to medically interpret your scan. If we do see something that may be a concern, we will let you know. You can then decide if you want to discuss this with your doctor. The investigators and Yale University are not responsible for any treatment that you receive based on these findings. The pictures collected in this study are not a healthcare MRI exam and will not be made available for healthcare purposes.

Loss of confidentiality is a risk in any research study. To keep your personal information secure, data will be collected using an ID number, so there will be no identifying information stored with the data. Data will be transferred over secure networks or on portable devices with encryption.

How can the study possibly benefit me or others?

You may not benefit from taking part in this study.
We hope that our results will add to the knowledge about how stress influences learning and memory.

Are there any costs to participation?

You will not have to pay for taking part in this study. The only costs may include transportation and your time coming to the study visits.

Will I be paid for participation?

You will be paid for taking part in this study. You will be paid in cash at the end of your second session (or, earlier, if you withdraw participation before the end of the second session). You will be compensated at the rate of $25 per hour for the MRI session, and $15 per hour for the behavioral session, prorated for your participation time. According to the rules of the Internal Revenue Service (IRS), payments for taking part in a study may be considered taxable income.

How will you keep my data safe and private?

We understand that information about you obtained in connection with your health is personal, and we are committed to protecting the privacy of that information. All of your responses will be held in confidence. Only the researchers involved in this study and those responsible for research oversight (such as representatives of the Yale University Human Research Protection Program, the Yale University Institutional Review Boards, and others) will have access to any information that could identify you that you provide. We will share it with others if you agree to it or when we have to do it because U.S. or State law requires it. For example, we will tell somebody if we learn that you are hurting a child or an older person.

The information from your study participation will be de-identified at the earliest reasonable time after we receive it, meaning we will replace your identifying information with a code that does not directly identify you. The principal investigator will retain the ability to link you to your coded information, but this link will be kept secure and available only to select members of the research team. fMRI data will be stored on a secured Yale computer cluster that is managed and certified for compliance with HIPAA (Health Insurance Portability and Accountability Act) by the Yale Center for Research Computing. Backups of these data may be burned to DVDs at the scanner, and these will be secured in a locked cabinet in the Turk-Browne lab space. Electronic consent forms and demographic information will be stored on the HIPAA-aligned Yale Qualtrics server. Other digital data from this study will be stored on password-protected computers with full-disk encryption and/or on a secured server. Paper records and other media will be stored in a locked cabinet in our lab space.

We may record your video. If video is recorded, your image will be identifiable. Video will be stored on password-protected, encrypted computer and storage devices and will be destroyed within seven days of your participation.

Identifiers will be removed from your identifiable private information (i.e., MRI scans). After such removal, the information could be used for future research studies or distributed to another investigator for future research studies without additional informed consent.

This research is covered by a Certificate of Confidentiality from the National Institutes of Health. The researchers with this Certificate may not disclose or use information, documents, or biospecimens that may identify you in any federal, state, or local civil, criminal, administrative, legislative, or other action, suit, or proceeding, or be used as evidence, for example, if there is a court subpoena, unless you have consented for this use. Information, documents, or biospecimens protected by this Certificate cannot be disclosed to anyone else who is not connected with the research except, if there is a federal, state, or local law that requires disclosure (such as to report child abuse or communicable diseases but not for federal, state, or local civil, criminal, administrative, legislative, or other proceedings, see below); if you have consented to the disclosure, including for your medical treatment; or if it is used for other

scientific research, as allowed by federal regulations protecting research subjects. The Certificate cannot be used to refuse a request for information from personnel of the United States federal or state government agency sponsoring the project that is needed for auditing or program evaluation by NIH which is funding this project or for information that must be disclosed in order to meet the requirements of the federal Food and Drug Administration (FDA). You should understand that a Certificate of Confidentiality does not prevent you from voluntarily releasing information about yourself or your involvement in this research. If you want your research information released to an insurer, medical care provider, or any other person not connected with the research, you must provide consent to allow the researchers to release it. The Certificate of Confidentiality will not be used to prevent disclosure for any purpose you have consented to in this informed consent document.

Data from this study will be submitted to the National Institute of Mental Health Data Archive (NDA) at the National Institutes of Health (NIH). NDA is a large database where deidentified study data from many NIH studies are stored and managed. Sharing your deidentified study data helps researchers learn new and important things about brain science more quickly than before.

Deidentified study data means that all personal information about you (such as name, address, birthdate and phone number) is removed and replaced with a code number. The study researchers will have to collect your personal information from you in order to make that code number. The code number cannot be used to identify you. The study researchers will never send your personal information to NDA.

It is possible that you will participate in more than one study that sends data to NDA. NDA can connect your data from different studies by matching the code number on your deidentified data from each study. This data matching helps researchers who use NDA data to count you only one time. It also helps researchers who use NDA to better understand your health and behavior without knowing who you are.

During and after the study, the study researchers will send deidentified study data about your health and behavior to the NDA. Other researchers across the world can then request your deidentified study data for different research projects. Every researcher (and the institution to which they belong) who requests your deidentified study data must promise to keep your data safe and promise not to try to learn your identity. Experts at the NIH who know how to keep your data safe will review each request carefully to reduce risks to your privacy. Sharing your study data does have some risks, although these risks are rare. Your study data could be accidentally shared with an unauthorized person who may attempt to learn your identity. The study researchers will make every attempt to protect your identity.

You may not benefit directly from allowing your study data to be shared with NDA. The study data provided to NDA may help researchers around the world learn more about brain science and how to help others who have problems with brain science. NIMH will also report to Congress and on its website about the different studies using NDA data. You will not be contacted directly about the study data you contributed to NDA.

You may decide now or later that you do not want your study data to be added to NDA. You can still participate in this research study even if you decide that you do not want your data to be added to NDA. If you know now that you do not want your data in NDA, please tell the study researcher before leaving the clinic today. If you decide any time after today that you do not want your data to be added to NDA, call or email the study staff who conducted this study, and

they will tell NDA to stop sharing your study data. Once your data is part of NDA, the study researchers cannot take back the study data that was shared before they were notified that you changed your mind. If you would like more information about NDA, it is available on-line at http://nda.nih.gov.

What if I want to refuse or end participation before the study is over?

Taking part in this study is your choice. You can choose to take part, or you can choose not to take part in this study. You also can change your mind at any time. Whatever choice you make will not have any effect on your relationship with Yale University.

Who should I contact if I have questions?

Please feel free to ask about anything you don't understand.

If you have questions later or if you have a research-related problem, you can call the Principal Investigators Elizabeth Goldfarb at 203-737-6365 or Nick Turk-Browne at 203-432-4500.
If you have questions about your rights as a research participant, or you have complaints about this research, you call the Yale Institutional Review Boards at (203) 785-4688 or email hrpp@yale.edu.

Documentation of Informed Consent

Your signature below indicates that you read and understand this consent form and the information presented and that you agree to be in this study.

We will give you a copy of this consent form.

Participant Printed Name	Participant Signature	Date

Person Obtaining Consent Printed Name	Person Obtaining Consent Signature	Date