

# Jason S. Tsukahara, Ph.D.

Post-Doctoral Researcher

School of Psychology, Georgia Institute of Technology

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## Employment

### Post-Doctoral Researcher, Attention & Working Memory Lab

Georgia Institute of Technology

2023 - Present

Atlanta, GA, USA

- Principal Investigator: Randall Engle, Ph.D.

## Education

### Doctor of Philosophy, Cognition and Brain Science

Georgia Institute of Technology

2014-2022

Atlanta, GA, USA

- Advisor: Randall Engle, Ph.D.

### Master of Arts, General Experimental Psychology

California State University San Bernardino

2012-2014

San Bernardino, CA, USA

- Advisor: Hideya Koshino, Ph.D.

### Bachelor of Art, Behavioral Neuroscience

Western Washington University

2006-2011

Bellingham, WA, USA

## Research Interests

My research is primarily concerned with understanding the nature of attention control. My education and experience of working in different research labs has allowed me to approach the study of attention control from various perspectives; experimental, individual differences, and neuroscience. My research interests include but are not limited to:

- The nature of individual differences in attention control
- Tracking the focus of attention with pupillometry and mind wandering reports
- The role of the locus coeruleus norepinephrine system in attention control
- The role of functional connectivity within and between brain networks to individual differences in attention control and higher-order cognitive abilities
- The possibility of training attention

## Submitted and Preprints

Count: 2

**Tsukahara, J.S., & Engle, R.W.** (2023, *in review*). Sustaining the focus of attention and how it relates to performance in complex cognitive tasks. *Submitted to Journal of Experimental Psychology: Learning, Memory, and Cognition*. <https://psyarxiv.com/wd5kz/>

Burgoyne, A.P., Mashburn, C.A., **Tsukahara, J.S.**, Pak, R., Coyne, J.T., Foroughi, C., Sibley, C., and Engle, R.W. (2022, *in review*). Attention Control Measures Improve the Prediction of Performance in Navy Trainees. *Submitted to Journal of Experimental Psychology: Applied*.

## Journal Articles

Count: 13

Draheim, C., **Tsukahara, J.S.**, & Engle, R.W. (2023). Replication and extension of the toolbox approach to measuring attention control. *Behavior Research Methods*. <https://doi.org/10.3758/s13428-023-02140-2>.

Citations: 0

Burgoyne, A.P., **Tsukahara**, J.S., Mashburn, C.A., Pak, R., & Engle, R.W. (2023). Nature and Measurement of Attention Control. *Journal of Experimental Psychology: General*. <https://dx.doi.org/10.1037/xge0001408>.

**Citations: 1**

Burgoyne, A.P., Mashburn, C.A., **Tsukahara**, J.S., & Engle, R.W. (2022). Attention control and process overlap theory: Searching for cognitive processes underpinning the positive manifold. *Intelligence*, 91, 101629. <https://doi.org/10.1016/j.intell.2022.101629>. **Citations: 9**

Burgoyne, A.P., Mashburn, C.A., **Tsukahara**, J.S., Hambrick, D.Z., & Engle, R.W. (2021). Understanding the relationship between rationality and intelligence: A latent-variable approach. *Thinking and Reasoning*. <https://doi.org/10.1080/13546783.2021.2008003>. **Citations: 2**

**Tsukahara**, J.S., & Engle, R.W. (2021). Fluid intelligence and the locus coeruleus-norepinephrine system. *Proceedings of the National Academy of Sciences*, 118(46) e2110630118. <https://doi.org/10.1073/pnas.2110630118>. **Citations: 13**

Martin, J.D., **Tsukahara**, J.S., Draheim, C., Shipstead, Z., Mashburn, C., Vogel, E.K., & Engle, R.W. (2021). The visual arrays task: Visual storage capacity or attention control?. *Journal of Experimental Psychology: General*. Advanced online publication. <https://dx.doi.org/10.1037/xge0001048> **Citations: 5**

**Tsukahara**, J.S., Draheim, C., & Engle, R.W. (2021). Baseline pupil size is related to fluid intelligence: A reply to Unsworth et al. (2021). *Cognition*, 215. <https://doi.org/10.1016/j.cognition.2021.104826>. **Citations: 3**

**Tsukahara**, J.S., & Engle, R.W. (2021). Is baseline pupil size related to cognitive ability? Yes (under proper lighting conditions). *Cognition*, 211. <https://doi.org/10.1016/j.cognition.2021.104643>. **Citations: 19**

Draheim, C., **Tsukahara**, J.S., Martin, J.D., & Engle, R.W. (2021). A toolbox approach to improving the measurement of attention control. *Journal of Experimental Psychology: General*, 150(2), 242-275. <https://doi.org/10.1037/xge0000783>. **Citations: 59**

Borges, U., Pfannenstiel, M., **Tsukahara**, J., Laborde, S., Klatt, S., & Raab, M. (2021). Transcutaneous vagus nerve stimulation via tragus or cymba conchae: Are its psychophysiological effects dependent on the stimulation area? *International Journal of Psychophysiology*, 161, 64-75. <https://doi.org/10.1016/j.ijpsycho.2021.01.003>. **Citations: 19**

Burgoyne, A.P., **Tsukahara**, J.S., Draheim, C., Engle, R.W. (2020). Differential and experimental approaches to studying intelligence in humans and non-human animals. *Learning and Motivation*. 10.1016/j.lmot.2020.101689. **Citations: 8**

**Tsukahara**, J.S., Harrison, T.L., Draheim, C., Martin, J., & Engle, R.W. (2020). Attention control: The missing link between sensory discrimination and intelligence. *Attention, Perception, & Psychophysics*. <https://doi.org/10.3758/s13414-020-02044-9>. **Citations: 21**

**Tsukahara**, J.S., Harrison, T.L., & Engle, R.W. (2016). The relationship between baseline pupil size and intelligence. *Cognitive Psychology*, 91, 109-123. <http://dx.doi.org/10.1016/j.cogpsych.2016.10.001>. **Citations: 90**

## Chapters

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Count: 2

Burgoyne, A.P., Martin, J.D., Mashburn, C.A., **Tsukahara**, J.S., Draheim, C., & Engle, R.W. (in press). Measuring individual differences in working memory capacity and attention control and their contribution to language comprehension. In J. S. Schwieter & E. Z. S.Wen (Eds.), *The Cambridge handbook of working memory and language*.

Mashburn, C.A., **Tsukahara**, J.S., & Engle, R.W. (2020). Individual differences in attention control: Implications for the relationship between working memory capacity and fluid intelligence. In R.H. Logie, V. Camos, & N.

## Popular Writing and Interviews

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**Tsukahara**, J.S., Burgoyne, A.P., & Engle, R.W. (2021, June 2). Pupil Size Is a Marker of Intelligence, *Scientific American*. Link to article

**Tsukahara**, J.S. (2021, July 6). *Pupil Size and Intelligence* [Radio interview]. BYU Radio Top of Mind with Julie Rose. Link to broadcast

**Tsukahara**, J.S. (2021, July 4). *It's in your eyes: pupil size a marker of intelligence* [Radio interview]. Radio New Zealand Sunday Morning with Jim Mora. Link to broadcast

**Tsukahara**, J.S. (2021, June 10). *Could the size of one's pupils be an indicator of cognitive ability?* [Radio interview]. KPCC AirTalk with Larry Mantle. Link to broadcast

## Professional Presentations

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Count: 26

**Tsukahara**, J.S., Mashburn, C.A., & Engle, R.W. (2023). The role of attention control in inspection time tasks. **Poster** accepted to the 64th annual meeting of the Psychonomic Society, San Francisco, CA, USA.

Seeburger, D.T., **Tsukahara**, J.S., & Engle, R.W. (2023). Brain network synchronization of individuals with differential cognitive abilities. **Poster** accepted to the 64th annual meeting of the Psychonomic Society, San Francisco, CA, USA.

Charbonneau, B., González-Espinar, F.J., Burgoyne, A.P., **Tsukahara**, J.S., Mashburn, C.A., Engle, R.W., & Hutchison, K. (2023). Predicting Reading Comprehension with Novel Attentional Control Squared Tasks. **Poster** accepted to the 64th annual meeting of the Psychonomic Society, San Francisco, CA, USA.

Engle, R.W., **Tsukahara**, J.S. (2022). Attention Control: Transition from theory to application. **Talk** presented at the 63rd annual meeting of the Psychonomic Society, Boston, MA, USA.

**Tsukahara**, J.S., & Engle, R.W. (2022). A novel measure of individual differences in sustained attention and its relation to attention control. **Poster** presented the 63rd annual meeting of the Psychonomic Society, Boston, MA, USA.

Burgoyne, A.P., **Tsukahara**, J.S., Mashburn, C.A., Engle, R.W. (2022). Three-Minute Tests of Attention Control: Reliable and Valid Predictors of Complex Task Performance. **Poster** accepted to the 63rd annual meeting of the Psychonomic Society, Boston, MA, USA.

**Tsukahara**, J.S., & Engle, R.W. (2022). Individual differences in visual working memory capacity: Are we measuring what we think we are measuring?. **Talk** presented at the 113th Annual meeting of the Southern Society for Philosophy and Psychology, Mobile, AL, USA.

**Tsukahara**, J.S., & Engle, R.W. (2021). Inspection time, processing speed, and attention control. **Poster** presented at the 62nd Annual meeting of the Psychonomic Society, Virtual.

**Tsukahara**, J.S., & Engle, R.W. (2019). Individual differences in baseline pupil size: Why lighting conditions matter. **Poster** presented at the 60th Annual meeting of the Psychonomic Society, Montréal, Canada. <https://osf.io/7fntm/>

Draheim, C., **Tsukahara**, J. S., Martin, J. D., Mashburn, C. A., & Engle, R. W. (2019). Attention control is a unitary concept when measured with accuracy-based tasks. **Poster** presented at the 60th annual meeting of the Psychonomic Society, Montréal, Canada.

Draheim, C., Martin, J. D., **Tsukahara**, J.S., Mashburn, C. A., & Engle, R. W. *Measurement of Attention Control* **Paper** presented at the 59th meeting of the Psychonomic Society, New Orleans, LA.

- Tsukahara, J.S., & Engle, R.W. (2018).** Pupil size as an indicator of arousal and task focus. **Poster** presented at the 59th Annual meeting of the Psychonomic Society, New Orleans, LA.
- Tsukahara, J.S., Harrison, T. L., Hicks, K. L., Draheim, C., Martin, J. D., & Engle, R. W. (November 2017).** *Measuring attention control: Can we do better?* **Poster** presented at the 58th annual meeting of the Psychonomic Society, Vancouver, Canada.
- Harrison, T. L., Hicks, K. L., Draheim, C., **Tsukahara, J.S., & Engle, R. W. (November, 2016).** *Sensory discrimination, working memory, and fluid intelligence.* **Paper** presented by Engle, R.W. at the 57th annual meeting of the Psychonomic Society, Boston, MA.
- Tsukahara, J.S., & Engle, R.W. (November, 2016).** *Mind wandering in low and high demanding tasks: Frequency vs. degree of disengagement.* **Poster** presented at the 57th annual meeting of the Psychonomic Society, Boston, MA.
- Tsukahara, J.S., Harrison T.L. & Engle, R.W. (2016).** *More than meets the eye: Converging evidence from pupillometry, locus coeruleus function, and resting-state functional connectivity.* **Paper** presented by Tsukahara, J.S. at the North Georgia Regional Memory Meeting, Atlanta, GA.
- Tsukahara, J.S., Harrison, T.L., & Engle, R.W. (April, 2016).** *More than meets the eye: The relationship between pupil size and intelligence.* **Poster** presented at the Callosum Conference.
- Tsukahara, J.S., Harrison, T.L., & Engle, R.W. (2015).** *The eyes have it: The relationship between pupil size and intelligence.* **Paper** presented by Engle, R.W. at the 56th annual meeting of the Psychonomic Society, Chicago, IL.
- Tsukahara, J.S., & Koshino, H. (November, 2014).** *Does working memory capacity have the same effect on the Simon task as working memory load?* **Poster** presented at the 55th annual meeting of the Psychonomic Society, Long Beach, CA.
- Koshino, H., Veltri, G.A., **Tsukahara, J.S., Alderson, E. (November, 2014).** *Effects of working memory and perceptual load on Simon interference.* **Poster** presented at the 55th annual meeting of the Psychonomic Society, Long Beach, CA.
- Tsukahara, J.S. (2014, June).** *The effect of working memory capacity and working memory load on the Simon task.* **Paper** presented at the 1st annual Learning Research Institute conference, California State University, San Bernardino, CA.
- Tsukahara, J.S. (2014, June).** *Perceptual load effect in the Simon task.* **Paper** presented at the 3rd annual student Research Symposium “Meeting of the Minds”, California State University, San Bernardino, CA.
- Tsukahara, J.S., Rivera, L., & Koshino, H. (April, 2014).** *The effects of perceptual load on a Simon task.* **Poster** presented at the 94th annual Western Psychological Association convention, Portland, OR.
- Koshino, H., **Tsukahara, J.S., Rivera, L. Veltri, G.A., Cross, T., Alderson, E. (April, 2014).** *Effects of perceptual load and working memory on a Simon task.* **Poster** presented at the 94th annual Western Psychological Association convention, Portland, OR.
- Koshino, H. & **Tsukahara, J.S. (November, 2013).** *Relative effectiveness of attention capture between color singleton and working memory.* **Poster** session presented at the 54th annual meeting of the Psychonomic society, Toronto, Canada.
- Tsukahara, J.S., Banerjee, S., & Koshino, H. (April, 2013).** *Interaction between Simon and Flanker effects.* **Poster** session presented at the 93rd annual Western Psychological Association convention, Reno, NV.

## Grants and Awards

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### Larry S. O’Hara Fellowship

2022

*This award is given to top graduate students in the College of Sciences at Georgia Tech.*

## Office of Naval Research Grant

2022

*A Latent Variable Investigation of Cognitive Ability, Locus Coeruleus, and Functional Connectivity of Brain Networks. Grant application written by Jason S. Tsukahara for the PhD preliminary examination, awarded to Randall W. Engle.*

## Best Graduate Student Paper Award

2022

*School of Psychology, Georgia Institute of Technology*

# Teaching Experience

## PRIMARY INSTRUCTOR

### PSYC 4031: Applied Experimental Psychology

Georgia Institute of Technology

*Taught research methods, statistics, R, JASP, and provided support and guidance on group research projects.*

Spring 2022

### PSYC 6020: Graduate Level Statistics II Lab

Georgia Institute of Technology

*Taught regression and general linear model in R and SPSS; Course design; weekly labs*

Spring 2019

### Intro to Experimental Psychology Lab Section

California State University

*Taught experimental design, manuscript writing in APA format, oversaw student experiments*

Fall 2013 - Spring 2014

### Supplemental Instructions to Psychological Statistics

California State University

*Provided additional instruction in undergraduate level statistics*

Winter 2013 - Spring 2013

## GUEST LECTURER

### Guest Lecture: Cognitive Psychology

Lawrence University, Virtual

*Lectured on my research on sensory discrimination and intelligence. Lecture recording available at: <https://www.youtube.com/watch?v=fhU7NM90AYQ>*

Spring 2022

### Guest Lecture: Introduction to I/O Psychology

Georgia Institute of Technology

*Lectured on an introduction to research on intelligence*

Fall 2017

### Introduction to Psychology

Georgia Institute of Technology

*Teaching practicum; Guest Lecture: Research Methodology, Attention and Consciousness, Thinking and Intelligence*

Fall 2016

# Open-Source Software and Website Management

## R PACKAGES

### pupillometry

<https://dr-jt.github.io/pupillometry>

*An R package to preprocess pupil data*

### semoutput

<https://dr-jt.github.io/semoutput>

*An R package to create nice looking output for CFA and SEM analysis using lavaan and semPlot*

### englelab

<https://englelab.github.io/englelab/>

*An R package for processing complex-span and attention control tasks from the EngleLab*

## WEBSITE MANAGEMENT

### Attention and Working Memory Lab Website

<https://englelab.gatech.edu>

*Design and Manage Lab Website*

# Technical Skills

## RESEARCH METHODS

*My primary experience is in design of research experiments using both individual differences and experimental approaches, as well as designing experiments to measure baseline and task-evoked changes in pupil size.*

Individual differences

Functional magnetic resonance imaging (fMRI)

Experimental manipulation

Electroencephalography (EEG)

Pupillometry

## STATISTICAL METHODS

General linear model (*Regression, ANOVA*)

Structural equation modelling

Factor analysis (*Principal components, Exploratory factor analysis*)

Multilevel modelling

## PROGRAMMING

*My primary programming experience is in creating experimental tasks, data management and processing, statistical analysis, and website design.*

### Experimental Tasks

E-Prime

### Data Management and Analysis

R (*see open-source software section*)

PsychoPy

SPSS (*statistical analysis tool*)

### Website and Graphic Design

HTML; CSS

Adobe Illustrator; Adobe Lightroom

## Graduate Coursework

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Cognitive Psychology

Statistical Analysis I (*ANOVA*)

Intelligence (*seminar*)

Statistical Analysis II (*regression*)

Neuroimaging (*seminar*)

Multivariate Statistics

Life-Span Developmental Psychology

Psychometric Theory

Biopsychology

Structural Equation Modeling

Transcranial Magnetic Stimulation (*seminar*)

Item Response Theory

Teaching Practicum

Psychological Testing

Learning and Motivation

Research Methods

Personal and Social Psychology

## Professional Service

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### Peer-reviewed for:

*Current Psychology - Behavioral Research Methods - Journal of Experimental Psychology: Human Perception and Performance - Quarterly Journal of Experimental Psychology - Psychological Research - Applied Optics - International Journal of Psychophysiology - Gerontology - Psychological Science - Psychophysiology - Psychonomic Bulletin and Review - Journal of Experimental Psychology: Learning, Memory, and Cognition - Attention, Perception, and Psychophysics - Biological Psychology - Cognitive, Affective, and Behavioral Neuroscience - Cognition - Journal of Experimental Psychology: General - Current Directions in Psychological Science - Attention, Perception, and Psychophysics*

### Reviewed grants for:

*GSU/GT Center for Advanced Brain Imagin*