OMB No. 0925-0001 and 0925-0002 (Rev. 10/2021 Approved Through 09/30/2024)

BIOGRAPHICAL SKETCH

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NAME: Jason Chein

eRA COMMONS USER NAME (credential, e.g., agency login):

POSITION TITLE: Professor of Psychology, Department of Psychology, Temple University

EDUCATION/TRAINING

| INSTITUTION AND LOCATION | DEGREE  (if applicable) | Completion Date  MM/YYYY | FIELD OF STUDY |
| --- | --- | --- | --- |
| Temple University | B.A. | 05/1997 | Psychology, Comp. Sci. |
| University of Pittsburgh | M.S. | 05/2001 | Cognitive Psychology |
| University of Pittsburgh | Ph.D. | 04/2004 | Cognitive Neuroscience |
| Princeton University | Postdoc | 01/2006 | Cognitive Neuroscience |

1. **Personal Statement**

**I am a Professor in the Cognition & Neuroscience area of the Department of Psychology at Temple University, and the Director of the Temple University Brain Research & Imaging Center. My research explores the development, training, and deployment of self-regulatory control processes in the service of adaptive decision making and behavior, especially under conditions of distraction and socio-emotional arousal. My work addresses issues of concern for basic foundational science as well as topics that have direct translational and applied relevance, including studies on the central mechanisms of working memory and cognitive control, the enhancement of working memory and cognitive control through training, the normative development of executive control and its role in adolescent decision-making, and the links between self-regulation, cognitive and affective functioning, and digital media technology habits. My research uses a convergent methodologies approach that features functional and structural brain imaging using magnetic resonance imaging, used alongside traditional behavioral experimentation, and training studies, as well as the complementary use of psychometric methods, brain stimulation, electroencephalography, eye-tracking, and patient/clinical group studies.** I bring extensive expertise in brain imaging methods, individual differences research, development, and decision making under uncertainty, which are directly relevant to William Mitchell’s F99/K00 application and broader training goals. I am also routinely involved in highly collaborative, interdisciplinary work, and I am part of an ongoing collaborative project with the applicant’s supervisor and primary sponsor (Dr. Chelsea Helion) and have collaborated extensively with both of his consultants (Dr. David V. Smith and Dr. Laurence Steinberg).

***Ongoing and recently completed projects that I would like to highlight include:***

**R01HD098097** **Chein (PI)** **09/01/2021-08/31/2026**

Title: *Origins and Outcomes of Smartphone and Social Media Habits Across Development*

Role: *Principal Investigator*

Goal: Track the psychological and brain processes that explain individual differences in involvement with digital media and the consequent interactions with cognitive and socioemotional development

**PA Dept of Health (PACURE) Fossati (PI)**  **07/15/2020-06/30/2024**

Title: *Vascular contributions to mechanisms and biomarkers of Alzheimer’s disease*

Role: *Co-Investigator*

Goal: Combine blood-based biomarkers and structural MRI indices to explore the interrelations between vascular function and the progression of Alzheimer’s.

**R01DC013063**  **Reilly** **(PI)** **2/1/2021-1/31/2024**

Title*: Early Detection and Treatment of Emerging Cognitive-Linguistic Impairment in Minority Cognitive Aging and Primary Progressive Aphasia*

Role: Co-Investigator

Goal: Use integrated eye-tracking and brain imaging methods to form a predictive model of emerging cognitive-linguistic deficits within a vulnerable sample

**R21DA043568 Murty (PI) 6/01/2019 – 05/31/2022**

Title: *Influence of reward on memory consolidation in adults and adolescence*

Role: Co-Investigator

Goal: Explore how reward cues presented during learning impact memory encoding and subsequent retrieval after a period of sleep consolidation

**R01MH107495-01 Olino (PI) 04/01/2016-01/31/2022**

Title: *Developmental changes in reward responsiveness: Associations with depression risk markers*

Role: Co-Investigator

Goal: Examine how change in responsivity to social and non-social reward during the transition from childhood into adolescence might relate to the emergence of depressive symptomology

**R01AA024433 Hicks (PI) 7/01/2017-6/30/2022**

Title: *Developmental and peer effects on the neurobiology of cognitive control and reward processes*

Role: Co-Investigator

Goal: Explore reward and control processing in adolescents who are at risk for the development of alcohol use disorders.

**R03DA046733 Smith (PI) 05/01/2019 – 04/30/2020**

Title: *Aberrant Reward Sensitivity: Mechanisms Underlying Substance Use*

Role: Co-Investigator

Goal: Examine the interrelationship between developmental deviation in reward-relevant processing and substance use disorders.

**Citations**

1. Chiu, M. & **Chein, J.M.** (2022). Digital media and the developing brain, in the Handbook of Adolescent Digital Media Use and Mental Health. Mitch Prinstein, Jacqueline Nesi, and Eva Telzer (Eds.). Cambridge University Press, UK.
2. Sazhin, D., Frazier, A., Haynes, C., Johnston, C., Ka-Yi Chat, I., Dennison, J., Bart, C., McCloskey, M., **Chein, J.,** Fareri, D., Alloy, L., Jarcho, J., Smith, DV. (2020). The Role of Social Reward and Corticostriatal Connectivity in Substance Use. *Journal of Psychiatry and Brain Science, 5 e200024.*
3. Sherman, L., Smith, A., Rosenbaum, G., Botdorf, M., Patrianakos, J., McCloskey, M., Steinberg, L., & **Chein, J.** (2019). The Interactive Effects of Peers and Alcohol on Functional Brain Connectivity in Young Adults. *Neuroimage*, 197, 264-272.
4. \*Icenogle, G., Steinberg, L., Olino, T., **Chein, J.** †Shulman, et al. (2017). Puberty Predicts Approach but not Avoidance Behavior on the Iowa Gambling Task. *Child Development,* 88(5), s 1598–1614*.* DOI: 10.1111/cdev.12655

**B. Positions, Scientific Appointments, and Honors**

Positions and Scientific Appointments

2018-present Professor, Temple University, Dept. of Psychology

2015-present Director, Temple University Brain Research & Imaging Center

2015-present Member, Institute of Digital Media and Child Development

2015 Ad Hoc Study Section Member, NIH EUREKA study section

2014-2020 Associate Editor for *Cognitive Affective & Behavioral Neuroscience*

2013-2017 Network Scholar, MacArthur Foundation Research Network on Law & Neuroscience

2012-2018 Associate Professor, Temple University, Dept. of Psychology

2006-2012 Assistant Professor, Temple University, Dept. of Psychology

2006-2010 Collaborating Researcher, Princeton University Neuroimaging Institute

2004-2006 Postdoctoral Fellow, Princeton University

2002 Adjunct Faculty Member, Department of Biology, Chatham College

**Selected Honors**

Lindback Award for Distinguished Teaching (2014)

Network Scholar of the MacArthur Foundation Research Network on Law & Neuroscience (2013-2016)

Tim Post Award for Research Excellence (University of Pittsburgh, 2001)

Temple University Alumni Gallery of Success (Temple University, 2001)

Center for the Neural Basis of Cognition Fellowship (National Science Foundation, 1998)

National Science Foundation Graduate Student Fellowship, Honorable Mention (1998)

College of Arts & Sciences Graduation Ceremony Speaker (Temple University, 1997)

President’s Scholar (Temple University, 1997)

Phi Beta Kappa National Honor Society (1997)

General Alumni Award For Academic Achievement (Temple University, 1997)

**C. Contributions to Science**

(Note: \* denotes a current or former student or fellow under my supervision)

**Brain Development and Decision Making.** As people mature from pre-adolescence into adulthood, the brain systems that support working memory and cognitive control undergo important changes. These changes result in behavioral improvements in the ability to control impulses and to behave in a deliberative, goal-directed manner. Around the time of puberty, brain regions that process emotions and rewards (affective processing) also undergo substantial reorganization, causing changes in the way that emotionally arousing and potentially rewarding events are perceived. A major focus of my research over the last eight years has been to understand how the asynchronous development of cognitive control and affective processing systems impacts the mental calculus of decision making, with a particular focus on how psychosocial context affects the interaction between these systems. Across an extended series of experiments using behavioral and neuroimaging methods, my colleagues and I have demonstrated that adolescents take more risks, and are more reward seeking, when in the company of their peers, and that this phenomenon is specifically linked to the relative engagement of interacting brain networks. The initial neuroimaging study in this series, published in 2011 in Developmental Science, has been widely cited. In follow-up work, my colleagues and I have shown that this phenomenon cannot be explained as the result of explicit or implicit peer pressure, and is even evident in rodents, suggesting that it likely reflects an evolutionarily conserved process through which the presence of age-mates increases appetitive, exploratory, and risky behaviors.

* \*Rosenbaum, G., Venkatraman, V., Steinberg, L., **Chein, J**. (August, 2021). Do adolescents always take more risks than adults? A within-subjects developmental study of context effects on decision making and processing. *PLOS One. PMC8328301*
* \*Smith, A., \*Rosenbaum, G., \*Botdorf, M., Steinberg, L., & **Chein, J.** (2018). Peers Influence Adolescent Reward Processing, But Not Response Inhibition. *Cognitive Affective Behavioral Neuroscience, 18(2), 284-295. DOI 10.3758/s13415-018-0569-5. PMID: 29470796*
* \*Botdorf, M., \*Rosenbaum, G., \*Patrianakos, J., Steinberg, L., & **Chein, J.** (2017). Adolescent Risk-Taking is Predicted by Individual Differences in Cognitive Control over Emotional, but Not Non-Emotional, Response Conflict. *Cognition & Emotion, 31(5), 972-979. PMID: 27050317*
* **Chein, J.,** \*Albert, D., \*O’Brien, L., \*Uckert, K., & Steinberg, L. (2011). Peers increase adolescent risk taking by enhancing activity in the brain’s reward circuitry. Developmental Science, 14, F1–F10. PMCID: PMC3075496

2. **Basic mechanisms of working memory and cognitive control.** My earliest contributions to the fields of cognitive psychology and cognitive neuroscience focused on the mental machinery supporting two related constructs: working memory – the mental workspace in which we maintain, update, and manipulate information in the service of ongoing cognitive performance, and cognitive control – the ability to maintain and flexibly update mental representations in the service of goal-directed behavior. I continue to use a combination of convergent and complementary techniques, including traditional behavioral experiments, psychometric (individual differences) methods, and fMRI, to advance an understanding of these important cognitive capacities, and to adjudicate between alternative theoretical models. I have also conducted influential research on the relationship between working memory and cognitive control, on the involvement of these capacities in the broader landscape of higher-order cognition (e.g., problem solving, decision-making), and on the diminishing recruitment of working memory and cognitive control as one becomes more proficient, and automatic, in executing a task.

* \*Samper, J, Morrison, A, & **Chein, JM.** (Dec, 2021)**.** Doubts about the role of rehearsal in the irrelevant speech effect. *Experimental Psychology,* 68(6).
* \*Morrison, A.M., \*Rosenbaum, G.R., Fair, D.A., & **Chein, J.M**. (2016). Variation in Strategy Use Across Measures of Verbal Working Memory. *Memory & Cognition, 44,* 922-936*. PMID: 27038310*
* \*Morrison, A., Conway, A., & **Chein, J.** (2014). Primacy and Recency Effects as Indices of the Focus of Attention. Frontiers in Neuroscience, 24(8), 6. doi: 10.3389/fnhum.2014.00006. PMID: 24478672
* **Chein, J.M**., Moore, A.B., & Conway, A.R.A. (2011). Domain general mechanisms of complex working memory span. Neuroimage, 54, 550-559. PMID: 20691275

**Training working memory and control to improve cognitive functioning**. Over the last decade I have also been a central participant in a field of research exploring the ability to improve general cognitive functioning by using training to increase the capacity of working memory and the ability to control the focus of one's attention. While prior research had suggested that people tend to improve only on the very specific tasks that they practice, my lab has conducted instrumental research adding weight to the notion that repeated working memory and attention control "workouts" can produce more far reaching, and generalizable, gains. In my lab we have developed novel, theory-driven, techniques for training central cognitive faculties, and have investigated the efficacy and scope of generalization from different forms of training. One of the working memory training procedures that I developed, based on a complex working memory span task, has become one of the major training paradigms in the field. In 2011, my student and I published a highly influential review of the literature on working memory training, which has already been cited nearly 1000 times.

* Green, CS, Bavelier, D, Kramer, AF, Vinogradov, S, Ansorge,, U, Ball,, KK, Bingel,, U, **Chein, JM**, et al. (2019). Improving Methodological Standards in Behavioral Interventions for Cognitive Enhancement. *Journal of Cognitive Enhancement*. 3(1), 2-29. DOI: 10.1007/s4146.
* \*Rosenbaum, G., \*Botdorf, MA., Steinberg, L., & **Chein, JM.** (2017). Working Memory Training in Adolescents Decreases Laboratory Risk Taking in the Presence of Peers. *Journal of Cognitive Enhancement. Enhancement, 1(4), 513-535. PMCID: PMC5813817*
* \*Morrison, A.B. & **Chein, J.M.** (2011). Does working memory training work? The promise and challenges of enhancing cognition by training working memory. Psychonomic Bulletin & Review, 18(1), 46-60. PMID: 21327348
* **Chein, J.M.** & \*Morrison, A.B. (2010). Expanding the mind’s workspace: Training and transfer effects with a complex working memory span task. Psychonomic Bulletin & Review, 17(2), 193-199. PMID: 20382919

**Links between mobile technology habits, self-regulatory control, and reward.** Smartphones and related mobile technologies are recognized as flexible and powerful tools that can augment human cognition, but there is also a growing perception that habitual involvement with these devices may have a negative and lasting impact on users’ ability to think, remember, pay attention, and regulate emotion. A current direction for research in my lab is to explore the potential cognitive impacts of smartphone-related habits. Our findings from thus far demonstrate links between patterns of mobile technology use, self-regulatory control, reward and sensation seeking, and the ability to delay gratification, as well as associations between mobile technology habits and the specific neural pathways that subserve reward and self-regulatory processing. These findings, along with our 2017 review of research on the potential cognitive impacts of mobile technology habits has attracted a very wide readership, and has been featured in a number of media pieces.

* \*Wilmer, H.H., \*Hampton, W., Olino, T., Olson, I., & **Chein, J.M**. (2019) Wired to be connected? Links Between Mobile Technology Engagement, Intertemporal Preference, and Frontostriatal White Matter Connectivity. *Social Cognitive Affective Neuroscience, 14(4), 367–379. PMID: 31086992*
* \*Wilmer, HH, †Sherman, LE, & **Chein, JM**. (2017). Smartphones and Cognition: A review of research exploring the links between mobile technology habits and cognitive functioning. *Frontiers in Psychology, 8, 605.* DOI: 10.3389/fpsyg.2017.00605. PMCID: PMC5403814
* \*Wilmer, H. & **Chein, J.** (2016). Mobile Technology Habits – Patterns of Association Among Device Usage, Intertemporal Preference, Impulse Control, and Reward Sensitivity. *Psychonomic Bulletin & Review,* 23(5), 1607-1614. PMID: 26980462

Complete List of Published Work May Be Reviewed at: <http://www.ncbi.nlm.nih.gov/pubmed/?term=(Chein+J%5BAuthor%5D+OR+Chein+JM%5BAuthor%5D)>