Talya Sadeh

April 5th, 2020

CURRICULUM VITAE

• **Personal Details**
Name: Talya Sadeh
Date and place of birth: March 18th 1979, Netanya, Israel
Address and telephone number at work: Department of Cognitive and Brain Sciences, Ben-Gurion University, Be'er Sheva. Phone: 052-5196464
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https://orcid.org/0000-0002-0717-8034

• **Education**

B.A.	2002-2004	The Hebrew University of Jerusalem
		Cognitive Science and English Linguistics
M.A. and Ph.D.	2005-2012	Tel Aviv University, Psychology Department
		Names of advisor: Prof. Yonatan Goshen-Gottstein
		Title of thesis: The Neural Correlates of Recognition and Cued Recall: In search of a dissociation between mnemonic processing of contextual and item information"

• **Employment History**

2016-present	Lecturer, Department of Cognitive and Brain Sciences, Ben-Gurion University of the Negev, Israel
2013-2016	Post-Doctoral Fellow, Rotman Research Institute, Baycrest; Supervisor: Dr. Morris Moscovitch
2006-2012	Research assistant to Dr. Anat Maril, Psychology and Cognitive Science Departments, The Hebrew University of Jerusalem

• **Professional Activities**

(a) <u>Positions in academic administration</u> (departmental, faculty and university)

2017-present   Head of undergraduate teaching committee

(b) <u>Ad-hoc reviewer for journals</u>:

Journal of Cognitive Science

Proceedings of the National Academy of Sciences (PNAS)

Learning & Memory

Trends in Cognitive Science

Child Development

Cortex

Scientific Reports

Neuropsychologia

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Journal of Neuroscience

Consciousness and Cognition

Journal of Experimental Psychology: Learning, Memory and Cognition

Journal of Behavior Therapy and Experimental Psychiatry

(c) Reviewer for Grant agencies:

German-Israeli Foundation for Scientific Research and Development (GIF)

U.S.-Israel Binational Science Foundation (BSF)

Israel Science Foundation (ISF)

• **Educational activities**

(a) Courses taught

Undergraduate courses:
Cognitive Psychology (Instructor, The Open University)
Analysis of Variance (Teaching assistant, Tel-Aviv University)
Physiological Psychology (Teaching assistant, The Interdisciplinary Center, Herzlia)
Social Aspects of Episodic Memory
Current Topics in Cognitive Sciences
Research Workshop in Human Memory
Guided Research

Graduate courses:
Memory Processes and Impairments
Functional Neuroanatomy

(b) Research students

Yonatan Stern, MA (completed in 2018)

Dan Halunga, MA (completed in 2019)

Ayelet Thein, MA (completed in 2019)

Miriam Dissen Ben-Or, MA (completed in 2019)

Avi Gamoran, MA (joint supervision with Michael Gilead, expected completion: 2020)

Dana Vaknin, MA (expected completion: 2021)

Zohar Rotem, MA (joint supervision with Michael Gilead, expected completion: 2021)

• **Awards, Citations, Honors, Fellowships**

(a) Honors, Citation Awards (including during studies)

2006   Scholarship for participations in the Vivian Smith Advanced Studies
              Institute of the International Neuropsychological Society

2010   The Adams Super Center Travel Scholarship for participation in the 17th
              Annual Cognitive Neuroscience Society (CNS) Meeting

2010   Neurobiology Travel Scholarship from the Rabin-Neurobiology/Price
              dreamer/Cuenca Institutes and the MRI/Strauss Computational
              Neuroimaging Center for participation in the 17th Annual Cognitive
              Neuroscience Society (CNS) Meeting

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2010   Academic Excellence Award from the Social Sciences Faculty, Tel-Aviv University

2011   Academic Excellence Award from the Psychology Department, Tel-Aviv University

2011   Third place prize for best publication in Marcel Adams Competition for Ph.D. and M.A. neuroscience students. Awarded for the article: Cooperation between the Hippocampus and the Striatum Supports Episodic Memory (published in Journal of Cognitive Neuroscience in 2011)

2011   David and Paulina Trotzky Foundation Scholarship

2011   Academic Excellence Award from the Social Sciences Faculty, Tel-Aviv University

2010-2013   The Levy Edersheim Gitter Institute for Neuroimaging PhD Scholarship

2012   The manuscript "Putting Humpty together and pulling him apart: Accessing and unbinding the hippocampal item-context engram" (Sadeh, Maril, Bitan & Goshen-Gottstein, 2012) was selected and evaluated by Dr. Howard Eichenbaum, a Member of the Faculty of 1000 (F1000), as one of the top 2% of published articles in biology and medicine in 2012

2014   Cognitive Neuropsychology Student Travel Prize from the journal "Cognitive Neuropsychology" for outstanding research by an early-stage researcher in the field of cognitive neuropsychology; $750

Fellowships

2013-2014   Yad-Hanadiv (Rothschild) Post-doctoral Fellowship ($60,000)

2016-2019   Azrieli Faculty Fellowship, the Azrieli Foundation (2016-2019) Funds cover 50% of the University's cost associated with my remuneration and benefits.

• **Scientific Publications**

H-index 6 (source: ISI, web of Science, Jan 25th, 2020), 153 citations in total.

141 total citations excluding self-citations.

(a) Refereed articles and refereed letters in scientific journals

(sources: ISI, April 2020. 5-year IF)

Published:

1. **Sadeh, T**[S]**.** Shohamy, D. [C] Levy D. R. [S], Reggev N. [S], & Maril A[PI]. (2011). Cooperation between the Hippocampus and the Striatum during Episodic Encoding. *Journal of Cognitive Neuroscience*, 23, 1597-1608. (Citations: 59, **IF**=3.68; **Q1** Psychology, Experimental, 18 of 88)

2. Maril A. [PI], Avital R. [S], Reggev N. [S], Zuckerman M. [S], **Sadeh T.** [S], Sira, L. B. [C], & Livneh, N. [S] (2011). Event congruency and episodic encoding: A developmental fMRI study. *Neuropsychologia*, 49, 3036-3045. (Citations: 25, **IF**=3.42; **Q1** Psychology, Experimental, 21 of 88)

3. **Sadeh T.** [S], Maril A. [PI], Bitan T. [PI], & Goshen-Gottstein Y[PI]. (2012). Putting Humpty together and pulling him apart: Accessing and unbinding the hippocampal item-context engram. *NeuroImage*, 60, 808-817. (Citations: 10, **IF**=6.92; **Q1** Neurosciences, 36 of 267)

4. **Sadeh T.** [S], Maril A. [PI], & Goshen-Gottstein Y[PI]. (2012). Encoding-related brain activity dissociates between the recollective processes underlying successful recall and recognition: A subsequent-memory study. *Neuropsychologia*, 50, 2317–2324. (Citations: 5, **IF**=3.42; **Q1** Psychology, Experimental, 21 of 88)

5. **Sadeh T.** [PD], Ozubko J.D. [PD], Winocur G. [C], & Moscovitch M [PI]. (2014). How we forget may depend on how we remember. *Trends in Cognitive Science*, 18, 26-36. (Citations: 19, **IF**=20.24; **Q1** Psychology, Experimental, 1 of 88)

6. **Sadeh T.** [PD], Moran R. [S], & Goshen-Gottstein Y [PI]. (2015). When items 'pop into mind': Variability in temporal-context reinstatement in free-recall. *Psychonomic Bulletin & Review*, 22, 3: 779-790. (Citations: 13, **IF**=3.78; **Q1** Psychology, Experimental, 9 of 88)

7. **Sadeh, T.** [PD], Ozubko, J. D. [PD], Winocur, G. [C], & Moscovitch, M [PI]. (2016). Forgetting Patterns Differentiate Between Two Forms of Memory Representation. *Psychological Science*, 27(6), 810-820. (Citations: 18, **IF**=7.35; **Q1** Psychology, Multidisciplinary, 8 of 137)

8. * **Sadeh T.** [PI], Moran R. [PD], Stern, Y [S]. & Goshen-Gottstein Y [PI]. (2018). A Remember/Know Examination of Free-recall Reveals Dissociative Roles of Item- and Context-Information over Time. *Scientific Reports* (Citations: 3, **IF**=4.53; **Q1** Multidisciplinary Sciences, 15 of 69)

9. * **Sadeh, T.** [PD], Chen, J. [PI], Goshen-Gottstein, Y. [C], & Moscovitch, M. [PI] (2019). Overlap between hippocampal pre-encoding and encoding patterns supports episodic memory. *Hippocampus*. (Citations: 1, **IF**=3.7; **Q2** Neurosciences, 112 of 267)

10. * **Sadeh, T.** [PD], Dang, C. [S], Gat-Lazer, S. [PD], & Moscovitch, M. [PI] (2019). Recalling the firedog: Individual differences in associative memory for unitized and nonunitized associations among older adults. *Hippocampus*. (**IF**=3.7; **Q2** Neurosciences, 112 of 267)

11. * **Sadeh, T.** [PI], Pertzov, Y. [PI] (2019). Scale invariant characteristics of forgetting: towards a unifying account of hippocampal forgetting across short and long timescales. *Journal of Cognitive Neuroscience*. (Citations: 0, **IF**=3.68; **Q1** Psychology, Experimental, 18 of 88)

12. *Stern Y. [S], Katz R. [S], and **Sadeh, T.** [PI]. (2020). Explicit Sequence Memory in Recall of Temporally-structured Episodes. *Scientific Reports*. (Citations: 0, **IF**=4.53; **Q1** Multidisciplinary Sciences, 15 of 69)

(b) <u>Commentaries</u>

13. * **Sadeh, T.** [PI] (2019). Fluency: a trigger of familiarity for relational representations? – a commentary on Bastin et al. *Behavioral and Brain Sciences*. (**IF**=21.75; **Q1** Behavioral Sciences, 1 of 53)

(c) <u>Unrefereed professional articles and publications</u>

Sadeh T. [S], Moran R. [S], & Goshen-Gottstein Y. [PI] (2011). Temporal Contiguity Effects in Free-Recall Reveal Differential Reliance on Contextual Processing for Remember Vs. Know Judgments. In Algom, D., Zakay, D., Chajut, E., Shaki, S., Mama, Y., & Shakuf, V. (Eds.) (2011) Fechner Day 2011. Raanana, Israel: International Society for Psychophysics

• **Lectures and Presentations at Meetings and Invited Seminars**

(a) <u>Invited plenary lectures at conferences/meetings</u>

2017 *Sadeh T., Ozubko J.D., Winocur G., & Moscovitch M. "The Representation Theory of Forgetting: Both Decay and Interference matter". The EPS Forgetting Workshop. The University of Edinburgh, Scotland (http://forums.psy.ed.ac.uk/forgettingworkshop/?page_id=2071).

2017 *Sadeh T., Ozubko J.D., Winocur G., Chen J. & Moscovitch M. "How Do Pre- and Post-Encoding Processes Affect Episodic Memory? "Conference on Memory, The Israeli Alzheimer's Association, Tel-Aviv, Israel

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2018   *Sadeh T., Ozubko J.D., Winocur G., & Moscovitch M. "The Representation Theory of Forgetting: Both Decay and Interference matter". Mini-symposium titled "The Neurobiology of Forgetting", Neuroscience 2018, San Diego, CA

(b)   Presentation of papers at conferences/meetings

2008   Sadeh T., Levy R.D., Reggev N., Zuckerman M., & Maril A. "Mnemonic operations of the rostral prefrontal cortex: A subsequent-memory & reinstatement study". The 4th Tel-Aviv Human Brain Mapping Meeting. Tel-Aviv, Israel (poster presentation)

2009   Sadeh T., Maril A. & Goshen-Gottstein Y. "Putting Context in Context: The Mnemonic Role of the Parahippocampal Cortex". The 5th Tel-Aviv Human Brain Mapping Meeting. Tel-Aviv, Israel 2009 (oral presentation)

2009   Sadeh T., Maril A. & Goshen-Gottstein Y. "Dissociating between the processes mediating recall and recognition using neuronal signatures of item and context information". Annual Meeting of the Psychonomic Society. Boston, USA (poster presentation)

2010   Sadeh T., Maril A. & Goshen-Gottstein Y. "Putting Context in Context: The Mnemonic Role of the Parahippocampal Cortex in Contextual Processing". Cognitive Neuroscience Society Annual Meeting. Montreal, Canada (poster presentation).

2011   Sadeh T., Maril A., Bitan T. & Goshen-Gottstein Y. "Putting Humpty together and pulling him apart: Accessing and unbinding the hippocampal item-context engram". The Israel Society for Neuroscience (ISFN) Annual Meeting. Eilat, Israel (oral presentation)

2012   Sadeh T., Maril A., Bitan T. & Goshen-Gottstein Y. "Putting Humpty together and pulling him apart: Accessing and unbinding the hippocampal item-context engram". Brain Plasticity Symposium. Tel-Aviv, Israel (poster presentation)

2013   Sadeh T., Moran A., & Goshen-Gottstein Y. "Is temporal-context free to be recalled? Variability in temporal-context reinstatement in free-recall." Annual Meeting of the Psychonomic Society. Toronto, Canada (poster presentation).

2014   Sadeh T., Gilboa A., Maril A., Moscovitch M. and Goshen-Gottstein Y., "From the lab to real life: bridging a gap between Laboratory episodic memory and memory for real-life events", Cognitive Neuroscience Society Annual Meeting, Boston, USA (poster presentation).

2014   Sadeh T., Ozubko J., Winocur G. and Moscovitch M. "Forgetting patterns dissociate between two forms of memory", Rotman Research Institute Conference. Toronto, Canada (poster presentation)

2014   Sadeh T., Ozubko J.D., Winocur G., & Moscovitch M., "How we forget may depend on how we remember", The Israel Society for Neuroscience (ISFN) Annual Meeting. Eilat, Israel, (oral presentation)

2016   Sadeh T., Gilboa A., Gat-Lazer S., Christa Dang C. & Moscovitch M. I recall the Firedog: Paradoxically enhanced memory for new compound words among individuals with memory decline, The 6th International Conference on Memory, Budapest. Hungary (poster presentation)

2016   Sadeh T., Ozubko J.D., Winocur G., Moran R., Goshen-Gottstein Y. & Moscovitch M., "Testing the Dual-Factor Theory of Forgetting: Both Interference and Decay Matter", The 6th International Conference on Memory, Budapest, Hungary (oral presentation)

2017   *Sadeh T., Ozubko J.D., Winocur G., Moran R., Goshen-Gottstein Y. & Moscovitch M., "Testing the Representation Theory of Forgetting: Both Interference and Decay Matter", The Fourth Israeli Conference on Cognitive Research, Akko, Israel. (oral presentation)

2018   *Sadeh T., Chen J., Goshen-Gottstein Y. & Moscovitch M., "Spontaneous Pre-encoding Activation of Neural Patterns Predicts Memory ", The Fifth Israeli Conference on Cognitive Research, Akko, Israel. (oral presentation)

2018   *Sadeh T., Chen J., Goshen-Gottstein Y. & Moscovitch M., "Spontaneous Pre-encoding Activation of Neural Patterns Predicts Memory", The 2018 Context and Episodic Memory Symposium, Pennsylvania, Philadelphia, USA (oral presentation)

2020   *Siton S., Greenwald-Levin M., Halunga D. & Sadeh T. It's about Time: Delay-Dependent Forgetting of Item- and Contextual-Information, The Seventh Israeli Conference on Cognitive Research, Akko, Israel. (oral presentation)

(c)   <u>Presentation at informal seminars</u>

2016   Sadeh T., Ozubko J.D., Winocur G., & Moscovitch M. "Decay over time or interference from other memories? Causes of forgetting may be determined by the underlying memory representations". Toronto Area Memory Group, Toronto, Canada (oral presentation)

(d)   <u>Seminar presentations at universities and institutions</u>

2014   Sadeh T., Gilboa A., Maril A., Moscovitch M. and Goshen-Gottstein Y., "The Time of our Lives: Neural Mechanisms Supporting Temporal Organization of Episodic Memory", Ebbinghaus Empire Series, Department of Psychology, University of Toronto, Toronto, Canada

2015   Sadeh T., "How do we remember and why do we forget? Linking two theoretical frameworks of memory", Krembil Research Institute, University Health Network, Toronto, Canada

2015   Sadeh T. "How do we remember and why do we forget? Linking two theoretical frameworks of memory", Rotman Rounds, Baycrest Centre, Toronto, Canada

2017   *Sadeh T. "How Do Pre- and Post-Encoding Processes Affect Episodic Memory?", Tel-Aviv University

2017   *Sadeh T. "How Do Pre- and Post-Encoding Processes Affect Episodic Memory?", The Hebrew University of Jerusalem

• **Research Grants**

2009-2010   Israel Foundations Trustees: Research Grant for Doctoral Students in the Social Sciences *The Neural Correlates of Recognition and Cued-recall: In search of a dissociation between mnemonic processing of contextual and item*

information.
PI: Talya Sadeh $9,000

*2016-2020   Azrieli Foundation research grant. *Decay over time or interference from other memories? Mechanisms of forgetting may be determined by the underlying memory representation*.
PI: Talya Sadeh, $210,000 ($52,500 annually)

*2017-2020   Israel Science Foundation grant. *A Behavioural and Neural Examination of the Representation Theory of Forgetting*.
PI: Talya Sadeh, $180,500 ($60,167 annually)

*2017-2020   Israel Science Foundation equipment grant. *Equipment for neurocognitive memory research*.
PI: Talya Sadeh, $103,000

• **Present Academic Activities**
    Research in progress
     Expected date of completion in parenthesis

Dissen M., Amit Y. & Sadeh T. Interference in memory: a matter of encoding, not retrieval (Spring 2020)

Gamoran A., Gilead M. & Sadeh T. Characterizing the subjective nature of temporally-structured episodes. (Spring 2020)

Sadeh T., Siton S., Geier K., Slavat N. & Moscovitch M. How does divided-attention during free recall affect learning with and without distraction? (Summer 2020)

Sadeh T., Siton S., Nirenberg Y., Ilan K. & Can patterns of eye-movements predict recall? (Fall 2020)

Sadeh T., Levy D. & Singer A. A Re-examination of the Think/No-Think Paradigm (Fall 2020)

Sadeh T., Alain C. & Moscovitch M. Neural Signatures of contextual and non-contextual recall: An ERP study. (Fall 2020)

Dissen M., Amit Y. & Sadeh T. Are non-hippocampal mnemonic representations sensitive to interference? (Winter 2021)

Gamoran A., Siton S. & Sadeh T. Are hippocampal mnemonic representations sensitive to decay? (Winter 2021)

Vaknin D., & Sadeh T. Context Dependency Effects at Pre- and Post-encoding (Summer 2021)

    Papers submitted for publication (indicate journal)

Siton S., Greenwald-Levin M., Halunga D. & Sadeh T. It's about Time: Delay-Dependent Forgetting of Item- and Contextual-Information (invited revision in *Cognition*)

• **Additional Information**
  Academic Activities:

2016   Chair of session: Retrieval processes III, The 6th International Conference on Memory, Budapest, Hungary

2018-present   Coordinator of Zlotowski seminar

Community Service and Activities:
2017   Lecture to high school students, organized by "BeShaar" NGO

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2018   Lecture to the Beer Sheva older adults' community, organized by "Atidim" NGO

2018   Interview in Rino Zror's & Liad Mudrik's radio program on "Galatz" radio station

2020   Interview in "Gilui Daat" radio program on "Galatz" radio station

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• **Synopsis of research, including reference to publications and grants in above lists**

I am a cognitive neuroscientist investigating the underpinnings of **episodic memory**: the unique human capacity to mentally go back in time and relive events from our past. My research is guided by theoretical frameworks which I have developed with my colleagues, and which have already impacted the field of forgetting research. This reflects my aspiration to make significant theoretical contributions, which can guide further empirical memory research. I now describe each of the three major research areas my lab investigates, with the support of grants from the ISF and the Azrieli Foundation.

<u>Uncovering the principles of memory organization and retrieval: Temporal structure and beyond</u>

During our lifetime, we store an enormous amount of information in memory. I strive to understand how the brain organizes these memories so as to subsequently retrieve them efficiently. When recalling past events, we typically do so in a manner which resembles the unfolding of the events over time, but this central aspect of retrieval dynamics is poorly understood. Therefore, one aim of this line of research is to investigate whether temporal order is fundamental to memory organization. A challenge in this investigation is that when memories are retrieved in the context of autobiographical narratives, as they typically are, their temporal, sequential structure is confounded with an orderly, or schematically-consistent sequence (e.g., "the door opened" followed by "a man entered the room"). Therefore, an unresolved puzzle is whether temporal-structure is an epiphenomenon of orderly narratives, or whether it is a core principle of memory organization, which serves to bridge between discrete, and even arbitrary, events.

In my lab we attempt to address the challenge of disentangling temporal structure from a schematically-consistent sequence. To do so, we examine memory for random words, for which no narratives exists. We probe temporal structure by capitalizing on established behavioural effects pertaining to temporal aspects of retrieval, such as the tendency to recall clusters of items which were studied within temporal proximity of each other. We have found that the spontaneous formation of temporally-structured episodes enhances explicit sequence memory for information within the episode, as opposed to pieces of information that are not part of a temporally-structured episode (Stern, Katz & Sadeh, accpeted). A related project examines the subjective associations that are linked to information that is part of a temporally-structured episode (Gamoran, Gilead & Sadeh, in progress).

Additional work in the lab explores organization of memory along non-temporal dimensions, such as semantic, visual and spatial information. We ask if such types of information may drive recall even if they are not explicitly retrieved (Siton, Nirenberg, Ilan & Sadeh, in progress). For instance, in the spatial domain, we have found, using eye-tracking measurements, that during recall of an item individuals look towards the location in which that item appeared during study, even when no visual cues are provided.

Stretching the question of memory organization even further, I am fascinated by the idea that memories can sometimes come to mind with no apparent organization underlying their retrieval. These memories seem to be devoid of context, such as when we recall a sentence someone said, but cannot recall who said it, where or when (Sadeh, 2019). I shall, therefore, refer to these memories as non-contextual. We ask whether non-contextual recall relies on a distinct cognitive process, and if so, whether we can characterize this process. We have reported systematic, behavioural, differences between retrieval which is judged by participants to be accompanied by contextual details as compared to retrieval which is not (Sadeh, Moran & Goshen-Gottstein, 2014). These differences pertain to reliance on temporal-structure. We have extended these findings to temporal structure of longer time scales (minutes as opposed to seconds; Sadeh, Moran, Stern & Goshen-Gottstein, 2018). In that study we further show that non-contextual recall relies on semantic information. Finally, using a novel memory paradigm, we have obtained evidence that older adults with decreased performance on standardized memory tests, show enhanced recall performance in a memory task that does not rely primarily on recollection of details or structure (Sadeh, Dang, Gat-Latzer & Moscovitch, 2019). My interest in this this last line of research stems not only from scientific curiosity, but also from its

prospects to research and treatment of memory disorders associated with aging and neurodegenerative disease. These memory disorders are characterized by an impaired ability to reinstate contextual details which could have provided a structure, whether temporal or otherwise, to memories. Therefore, an improvement in memory ability would be expected if one were to boost those non-structured, non-contextual aspects of recall, which might be relatively spared.

How we forget may depend on how we remember

Why do we forget things we once remembered? For years, researchers have attempted to adjudicate between two possibilities. The first is that forgetting occurs because, like colours that fade, memories decay over time. The second possibility is that similar memories interfere with one another.

We have proposed the ***Representation Theory of Forgetting*** according to which forgetting can occur either due to decay or due to interference, depending on the brain structures and processes supporting memory (Sadeh, Ozubko, Winocur & Moscovitch, 2014; Sadeh and Pertzov, 2019). The hippocampus, a structure important for memory, has unique properties which enable it to distinguish between similar memories through pattern separation. Therefore, memories relying on the hippocampus, such as those that are recollected, are not likely to interfere with one another. However, these memories fade and decay quickly. Another structure which supports memory, the Perirhinal cortex (PRc), does not have a good ability to distinguish between similar patterns. Therefore, memories relying on this structure, such as memories based on familiarity, are more likely to interfere with each other. One of the reviewers of our work has written that "This theoretical proposal may turn out to be one of the most important advances in the study of memory and forgetting of the past decade."

We have thus far obtained behavioural evidence in support of our novel prediction that memories relying on the hippocampus undergo different forgetting processes than those relying on the PRc (Sadeh, Ozubko, Winocur and Moscovitch, 2016; Sadeh, Moran, Stern and Goshen-Gottstein, 2018). We found that context-dependent memory representations, which are presumed to be hippocampal-based memories, are prone to the effects of decay, but not of interference, whereas for non-contextual memories, which are presumed to be supported by extra-hippocampal structures, the reverse is true. We have submitted a manuscript summarizing three behavioural experiments providing novel evidence for the specific effects of delay on hippocampus-based, contextual memory representations, as well as elucidating what types of information are particularly sensitive to decay (Siton, Greenwald-Levin, Halunga & Sadeh, under review). In addition, we are writing up a manuscript on an interference study, whose results show that interference occurs during encoding, not retrieval (Dissen, Amit & Sadeh, in preparation for submission). Finally, we use fMRI to substantiate the Representation Theory of Forgetting by directly testing the neural basis on which it rests. We are running two fMRI studies: one examining the neural correlates of decay (Gamoran, Siton & Sadeh, in progress) and one examining the neural correlates of interference (Dissen, Amit & Sadeh, in progress).

Is memory affected not only by post-learning processes (e.g., decay and interference), but also by processes that occur *prior* to learning?

In this line of research, we ask whether the mnemonic fate of an experience depends not only on post-encoding processes like decay and interference, but also on processes occurring *prior to* encoding. We hypothesize that the scaffold of a memory engram is spontaneously laid even before the experience occurs. Recent studies have revealed that in rodents, hippocampal representations spontaneously elicited prior to acquisition of new information are reinstated during successful encoding—a phenomenon known as **pre-play**. Using multivoxel pattern-analysis of fMRI data, we have provided a first demonstration for similar effects in humans, which we term the **pre-encoding effect** (Sadeh, Chen, Goshen-Gottstein & Moscovitch, 2019)**.** In an extension of this work, we are collecting behavioural evidence to show that an overlap between pre-encoding and encoding contexts will be associated with better memory performance, as compared to a condition in which the pre-encoding and the encoding contexts are different from each other (Vaknin & Sadeh, in progress).

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• **Teaching Statement** (NOT to exceed two single-spaced pages)

I find great satisfaction in teaching at the Departments of Cognitive and Brain Sciences and of Psychology at Ben-Gurion University. This is an opportunity to teach and work with the most talented and creative students, many of whom proceed to advanced degrees. I enjoy teaching both undergraduate and graduate courses, in which I put a special focus on discussion and interactions between students and myself.

The main principle which guides me in my teaching is that learning is most effective when students actively participate in their knowledge acquisition. I, therefore, make the best effort to create a positive, interactive learning environment, which is rich in discussion and, when possible, allows for independent learning through research and self-tutorials. I have found affirmation for my teaching style in the feedback from students, trainees and co-instructors who find my classroom personality supportive and engaging. I attribute this to my openness to ideas and my optimistic and encouraging perspective.

Knowledge dissemination has always been important to me. Even before starting graduate school, I was a team member in an initiative promoting innovation in education, with a special emphasis on neuroscience. My experience in this initiative has had significantly impacted my perspectives on teaching. The aim of this initiative, named "Hi-Teach", was to make accessible to pre-university students, especially those from underprivileged backgrounds, topics which were not part of the official curriculum at school. The approach we took was to develop programs that encourage students to learn through active participation, such as research, writing, and creation of multimedia projects. A major part of this initiative was the development of an interactive e-module for self-learning of topics in neuroscience. This e-module was subsequently endorsed by the Israeli Ministry of Education and was implemented in public grade schools all over Israel. This program provided children with a unique opportunity to be exposed to state-of-the-art technologies and scientific knowledge. I was involved in developing Hi-Teach's learning programs, as well as in implementing them in schools and other learning environments (e.g., summer camps). I continued my knowledge dissemination activities into my Ph.D. studies. I took part in several teaching activities in psychology, statistics and neuroscience.

One aspect of teaching that I particularly enjoy is discussions and interactions with students. I encourage students to ask questions and think critically. My evaluation of students' understanding of the material is based, to a large extent, on these discussions and interactions, which are conducted both in class and in written assignments the students perform during the course.

I will continue to encourage active participation of the students, which I believe is crucial for providing a positive and effective learning environment. I hope to improve this aspect by encouraging an even larger proportion of the students to engage in class discussions (and not only the strongest students, as is sometimes the case). I will accomplish this by putting a major emphasis on discussion, and, when appropriate, working in small teams. Most importantly, I will continue to strive to create a positive atmosphere in class, which has thus far proved to be successful in encouraging students to be engaged and active in their learning experience. One major challenge for my future teaching activities is to be able to apply this form of active learning also to courses including a larger number of students than I have taught so far, and which I will probably teach in the coming years.