Preparing Scientific Posters

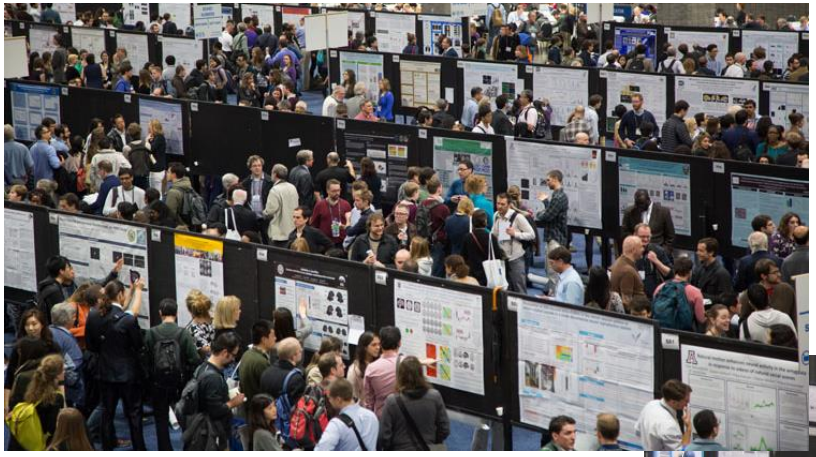
Noa Ofen, PhD

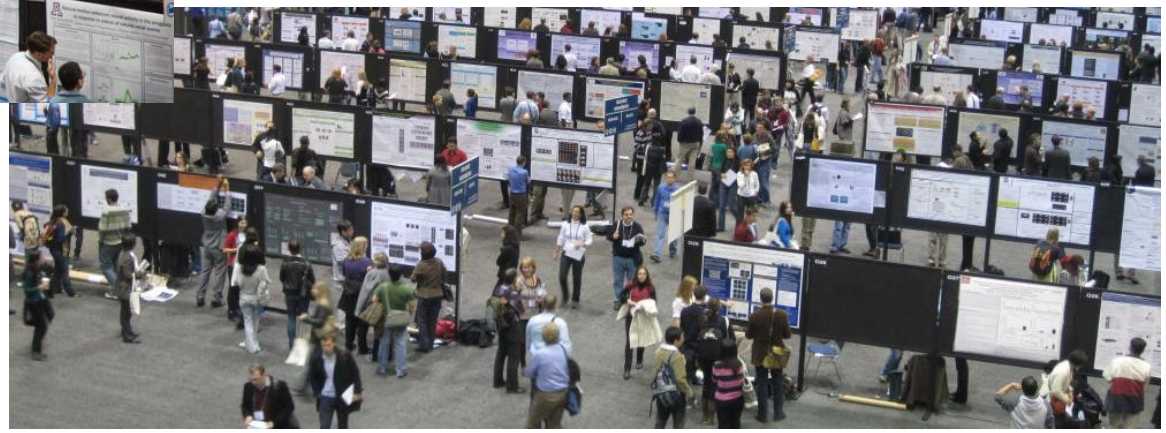
Institute of Gerontology & MPSI
Psychology Department

https://www.utexas.edu/ugs/our/poster

Scientific Poster

Tool to communicate research clearly, concisely, and fairly quickly, with visual elements serving to direct attention to overall rationale and main findings.





Scientific Poster

- Poster with good design, clear written content, along with a strong oral presentation, can help present a strong cohesive message about your research.

- Specific considerations: scientific field, type of meeting (International / National / Regional / Local), audience you target, formats available.

- Tool to advance your conceptualization of your project. Can be used to invite feedback or collaboration.

Investigating Hippocampal Subfield Volumes using High-Resolution Structural MRI in Children/Adolescents and Young Adults

J. Nathan[1,2], A. M. Daugherty[2,3], A. Hardwick[2], J. Stoltman[2], N. Ofen[1,2,3]

[1]Psychiatry & Behavioral Neurosciences, Wayne State SOM, Detroit, MI; [2]Institute of Gerontology and [3]Psychology Department, Wayne State University, Detroit, MI

Smaller Dentate Gyrus Volume Correlates with the Development of Associative Memory

Ana M. Daugherty & Noa Ofen

Institute of Gerontology, Department of Psychology, Department of Pediatrics School of Medicine, Wayne State University, Detroit, Michigan

- Associative memory binds
protracted development thr

- The hippocampus has an e
involved in associative mem
the hippocampus and the r
childhood development.

- Further, the hippocampus i
developmental trajectory ha
children is unknown.

Participants

- Participants: Age 8-25 years;

- All participants were screened
learning disorders, and prema

	To
N	2
% Female	55
Age (years)	18.24
IQ	

Hippocampal Subfield Volu

- All images were acquired on
Verio scanner.

- All regions were visualized o
resolution PD-weighted TSE
The coronal plane: voxel 0.4

- Following rules adapted from
all regions were manually tra
high reliability (ICC(3) ≥ 0.90

- All volumes were corrected f

- Intracranial volume (ICV) wa

Word-Pair Associative Mem

Study Encoding

cat–

Correct (Hit)

Item

cat

Associative

cat—rose

Developmental Differences in Hippocampal Dentate Gyrus Account for Improvement in Associative Memory

Ana M. Daugherty & Noa Ofen

Institute of Gerontology, Department of Psychology, Department of Pediatrics School of Medicine, Wayne State University, Detroit, Michigan

INTRODUCTION

Associative memory, the binding of disparate items into memory, undergoes protracted development through childhood into adulthood (*1*).

The hippocampus has an established role in memory processes, particularly those involved in associative memory (*2*). Further, the hippocampus is composed of several subfields that are believed to be functionally distinct.

Yet, little is known about the development of the hippocampus and the relationship between structure and function during childhood development.

Here we tested the relationship between hippocampal subfield volume and associative memory during development in healthy children and adults.

METHODS

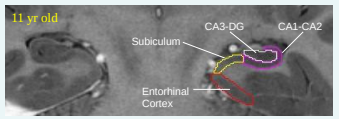
Participants

Sixty-eight participants (47% female), age 8-25 years (*M* = 16.85, *SD* = 5.21). Standardized IQ (*M* = 109.21, *SD* = 11.93) did not correlate with age (*p* = 0.76).

Participants were right-handed and screened for psychiatric and neurological disease, head trauma, learning disorders, and premature birth.

Hippocampal Subfield Volumetry

High-resolution hippocampal PD-weighted TSE images were collected perpendicular to the HC axis (0.4 x 0.4 x 2.0 mm) in a 3T Siemens Verio scanner.



Regions were manually traced with high reliability (AMD; ICC(3) ≥ 0.90, *5*) following rules adapted from (*2-4*).

Volume measures were corrected for ICV: $Volume_{adj} = Volume_{raw} – b(ICV_i – Mean\ ICV)$. Intracranial volume (ICV) was manually measured from a T1 MPRAGE image (0.5 mm^3).

Word-Pair Associative Memory Task

Two Task Blocks

Study

cat—rose
keyboard—giraffe
temper—vessel
26 word-pairs; Counterbalanced list order

Count down by 3 's from 792
Distraction Task for 1 min.

Test

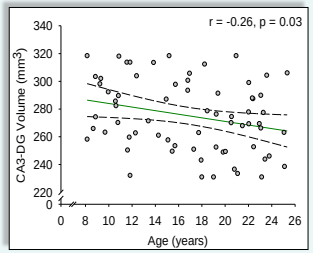
	If Response is "Yes" Correct (Hit)	False Recognition
Item Studied vs. New	cat	hand
Associative Intact vs. Recombined	cat—rose	temper—giraffe

16 forced-choice trials; Counterbalanced test order

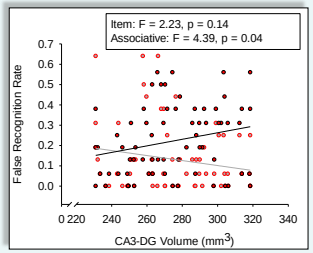
RESULTS

General Linear Modeling: Hit and false recognition rates (averaged across the two task blocks) were entered as dependent variables. Age (mean-centered), sex, and subfield volumes were entered as predictors. Brain and behavioral measures were winsorized to fix non-normality.

Smaller CA3-Dentate Gyrus Volume with Age

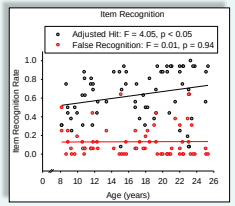


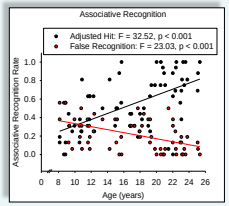
Smaller CA3-Dentate Gyrus Volume with Lower Associative False Recognition



CA1/2 and subiculum volumes were stable across age (*p*s > 0.09) and were unrelated to differences in recognition memory of items or pairs (*p*s > 0.26).

Item and Associative Recognition Improved with Age

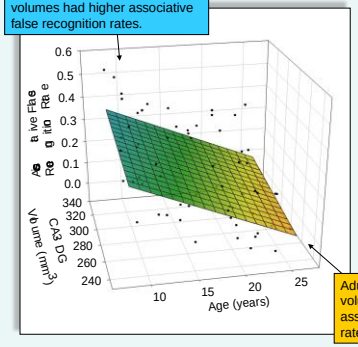




Older participants correctly recognized more items (*p* < 0.05) and word pairs (*p* < 0.001) and were also less prone to false associative recognition (*p* < 0.001).

Smaller CA3-Dentate Gyrus Volume in Adults Partially Accounted for Lower Associative False Recognition Rate

Children with large CA3-DG volumes had higher associative false recognition rates.



Smaller CA3-DG volume accounted for 20% of the age-related improvement in associative recognition (Shared-Over-Simple Variance, *6*)

Adults with small CA3-DG volumes had lower associative false recognition rates.

DISCUSSION

Here, for the first time, we show developmental effects in hippocampal subfields:

- **Reductions in CA3-Dentate gyrus volume from childhood to young adulthood.**
- **Smaller CA3-DG volume was *uniquely* related to and partially accounted for the age-related improvement in associative recognition.**

The dentate gyrus and CA3/4 subfields are uniquely linked to associative memory through an assumed role in pattern separation and pattern completion (*3,4*) and age-related volume reductions in CA3-dentate gyrus have been linked with cognitive decline (*2*).

Our findings suggest the importance of hippocampal subfields in cognitive development.

REFERENCES

[1] Ofen, N. (2012). The development of neural correlates for memory formation. *Neurosci Behav Rev, 36*, 1708-1717.
[2] Shing, Y. L., Rodrigue, K. M., Kennedy, K. M., Fandakova, Y., Bodammer, N., Werkle-Bergner, M., … Raz, N. (2011). Hippocampal subfield volumes: Age, vascular risk, and correlation with associative memory. *Front Aging Neurosci, 3*, 2. doi: 10.3389/fnagi.2011.00002
[3] Mueller, S., Stables, L., Du, A., Schuff, N., Truran, D., Cashdollar, N., & Weiner, M. (2007). Measurement of hippocampal subfields and age-related changes with high resolution MRI at 4t. *Neurobiol Aging, 28(5)*, 719-726.
[4] Mueller, S. G., & Weiner, M. W. (2009). Selective effect of age, APO e4, and Alzheimer's disease on hippocampal subfields. *Hippocampus, 19(6)*, 558-564. doi: 10.1002/hipo.20614
[5] Shrout, P. & Fleiss, J. (1979). Intraclass correlations: Uses in assessing raters reliability. *Psych Bull, 86*, 420-428.
[6] Lindenberger. U. & Potter, U. (1998). The complex nature of unique and shared effects in hierarchical linear regression: Implications for developmental psychology. *Psych Methods, 3(2)*, 218-230.

Acknowledgments
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Preparing a Scientific Poster

❑ Style

- Find a template (Lab / Department / School) you like
- Look at complete posters to get ideas about style

❑ General Stylistic tips:

- Lots of white space
- Elements that are aligned, not too close, evenly spaced
- Limited use of color
- Judicious use of features to differentiate sections: fonts, bolding, size
- Easy-to-read fonts: Sans serif (Helvetica) > serif fonts (Cambria)
- Minimal use of outlines, boxes, color backgrounds
- When possible – use figures and photos

❑ Message

- **Assess**
  - Why are you presenting? Target audience?
- **Develop Content**
  - Title, Authors & Institutional Affiliations
  - Background & Research Question(s)
  - Methods, Results, Discussion, Acknowledgments
- **Organize**
  - Extract important ideas, Create a logical flow
  - Avoid wordiness, unnecessary jargon, and abbreviations
    - Keep text fewer than 10 lines long
    - List info with bullet points
    - Emphasize key words with boldface or italics but avoid underlining)
- **Design**
  - **Page Setup:** 46” – 50” x 40”
  - **Graphics:** Simple, consistent in scale, properly labeled, legible
  - **Text Format:** max. 2 fonts; Title >72 pt.; Headings 30 and 60 pt.; Min. 16 pt.
  - **Colors:** Use a light color for backgrounds and a dark color for text.
  - **White Space:** Divide section logically by using white space. (edit!)

Review

- White Space?
- Legible text/graphics?
- Consistent text/graphics?
- Logical flow?
- Defined research question?
- Defined research methods?
- Clear take home message?
- Credit:
  - Co-authors, affiliations
  - Institute Logos
  - acknowledgements

❑ Communicate

Be Prepared & Engage the Audience

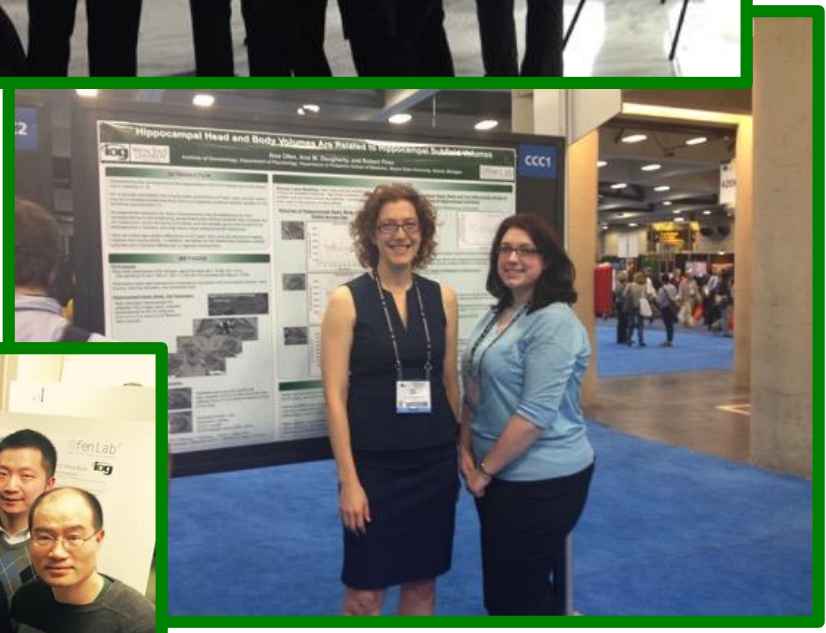
- **One- or two-minute mini speech (the "elevator talk")**
- "Would you like to hear about my research for a minute or two?"
- Offer to answer questions, and if you don't know an answer just admit it and speculate with the person or ask what he/she might do. Point to figures and use them in your explanation.
- Check with your audience to make sure they understand the technical aspects of the explanations (for example, "Are you familiar with… ?")
- Check regularly to make sure they're following what you're saying ("Does that make sense?").

Use Your Voice

- To convey your ideas effectively, you need to speak with confidence.
- High volume, slow, avoid "um," "uh," "like," "you know," "okay"

On the spot

- Mobilize, hang, bring pen/notebook, printouts?
- Dress code


Hippocampal Head and Body Volumes Are Related to Hippocampal Tail Volumes
CCC1


The Role of Prefrontal Cortex in Egocentric Strategy Use
fenLab