Homelessness & the Brain

Bill Griesar, Ph.D.
Psychology, PSU, NW Noggin
3800 homeless in metro area

SOURCE: Point in Time Count (2015), A Home for Everyone (collaboration Between City of Portland, City of Gresham, Multnomah County, Home Forward)

Mental illness
Chronic schizophrenia
Sexual minority status
Drug use disorders
Veteran status
Rental costs


GRAPH: Willamette Week (June 9, 2015)
Why homelessness and the brain?

• Lack of a safe secure home...
  
  
  
  – *Increases incidents of trauma* (Trauma and post-traumatic stress disorder among homeless adults, Austr NZ J of Psychiatry (2008))
  
  – *Decreases nutritional intake* (Nutrition for homeless populations, Publ Health Nutrition (2016))
  
Community outreach & education

NW Noggin is currently collaborating with P:ear on a proposed event to address links between affordable housing and the brain.

**SUMMER 2017**

*Why?* To connect students (from PSU, OHSU,...) studying sleep, anxiety, depression, resilience, emotional regulation, drugs, adolescent brain development and other topics with valuable members of our community who lack a home, for a public presentation of data, artwork & testimony illuminating links between homelessness and the brain...
P:ear helps to address...

Social isolation, **Stress** (safe space, art, education)

**Nutrition** (partnerships with area restaurants)
Missing: SLEEP

**EEG:** Sleep Stages
NREM and REM

**Neuromodulation**
Dopamine
Norepinephrine
Serotonin
Acetylcholine
Dreams can be “hyper-emotional and bizarre, with logical constraints removed”
-Robert Stickgold (2017)
Sleep and the glymphatic system

Jeffery Iliff, OHSU

Limited lymphatic system in the brain

How is waste cleared from the CNS?

*Lack of sleep, lack of clearance, increased risk of disease?*
Lack of sleep makes you negative

Yoo et al (2007), Curr Biol

Sleep deprived subjects selectively better able to recall negative words than neutral or positive words they’d studied earlier

ALSO: greater amygdala response to negative words than their more alert subjects; and less functional connectivity with medial OFC...

PREFRONTAL – AMYGDALA DISCONNECT:
Stronger negative emotional response, and less inhibitory control
Lack of sleep impairs memory

Sleep enhances procedural memories
Subjects trained on a **sequential finger tapping task** did better if allowed to sleep after training, instead of spending the same amount of post-training time awake...

Walker et al. (Neuron (2002))

Trained sequence
\[ T = [4 \ 1 \ 3 \ 2 \ 4] \]
Sleep: get “gist,” drop details

Sleep promotes lasting changes in selective memory for emotional scenes, Payne et al (2012)

Positive association between REM and selective consolidation of central, negative aspects of complex scenes

Increase in memory for emotional objects
Decrease in memory for neutral backgrounds
Sleep improves insight

Weather prediction task
Subjects presented with cards, each probabilistically linked to a particular outcome ("rain," "sun"). Better w/sleep...

Basal Ganglia

Djonlagic et al (2009)
Sleep and schizophrenia

Do NOT improve on finger tapping task

BUT: Much worse sleep
Fewer sleep spindles
Better sleep = better memory

Eszopiclone improved sleep in schizophrenics, increasing the incidence of sleep spindles. This also restored the memory benefits of sleep! (Cenk Tec et al (2014))
And PTSD..?

Trauma Resolution and Sleep-Dependent Memory Evolution

The normal resolution of trauma requires:

- Normalizing emotional memories
- Separating emotions from their contexts
- Extracting gist representations and rules
- Integrating the trauma memory with older memories
- Gaining insight

This memory processing occurs preferentially in REM sleep, which guide the evolution of memories over time.

Next steps

• **Welcoming graduate participants studying...**
  – Neuroscience of sleep
  – Neuroscience of anxiety, depression
  – Neuroscience of stress
  – Neuroscience of drug action/effect
  – Psychology of social engagement
  – Psychology of social isolation
  – Psychology of resilience
  – Psychology of trauma/PTSD

• **Welcoming homeless**
  – Sleep data
  – Artwork, testimony,...

• **Welcoming clinicians/outreach professionals**

• **Public forum date..? July 2017..?**