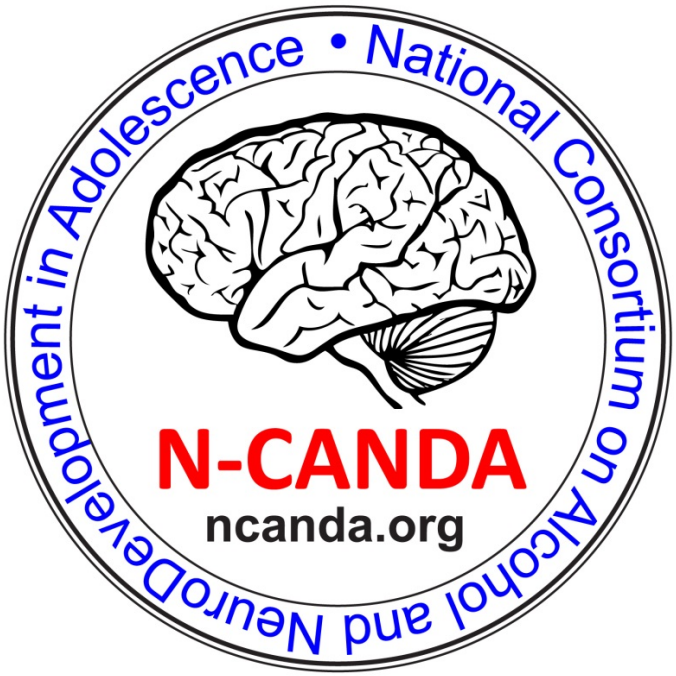
# Early Abstinence-Related Improvements Following Adolescent Heavy Episodic Drinking

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# Recovery from Teen Drinking

- Study design

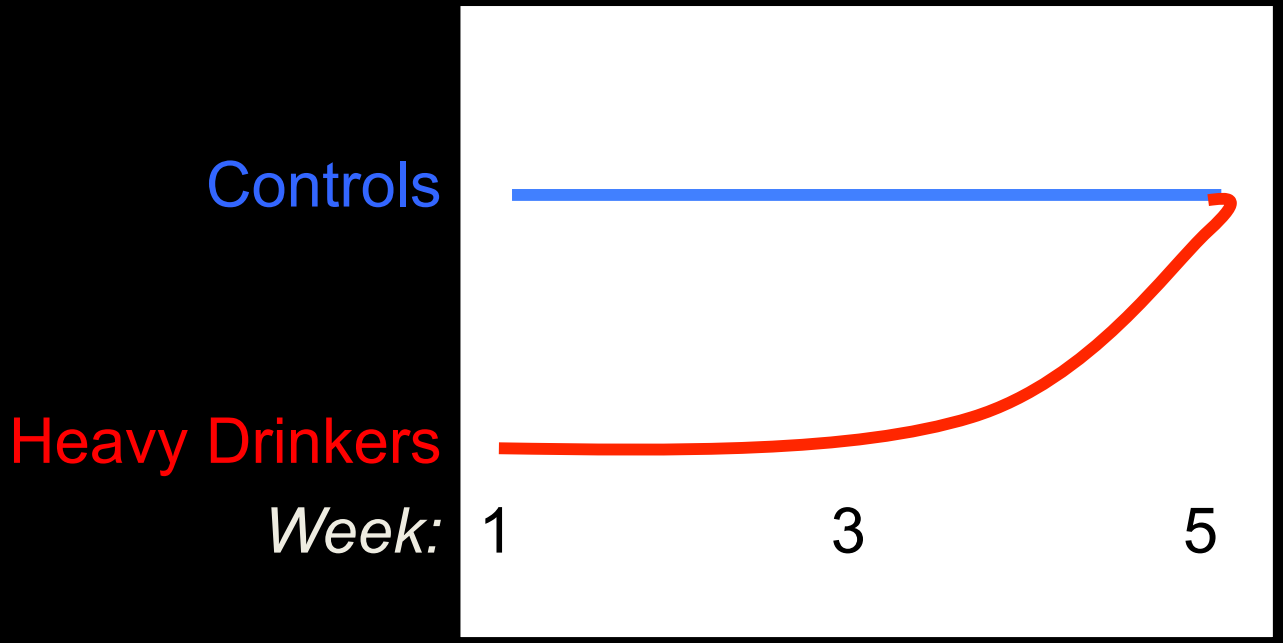
- Neurocognition
- Alcohol cue reactivity
- Negative affect
- Distress tolerance

# Background

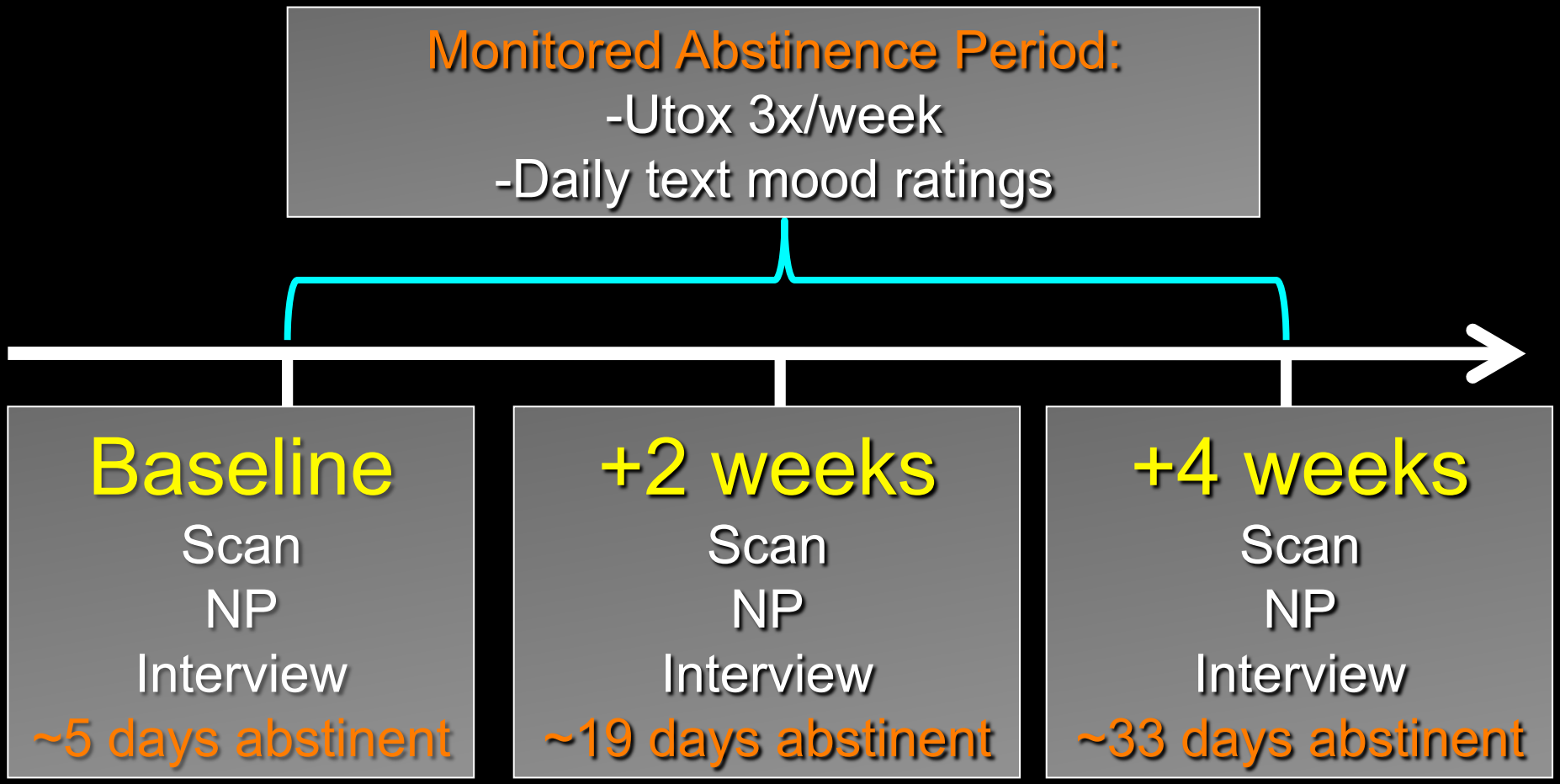
- Adolescent heavy drinking is common
- Linked to problems:
  - Neurocognitive performance
  - Risk taking circuitry
  - Alcohol cue reactivity
  - Affect
  - Distress tolerance
- Recover with abstinence?

# Hypotheses

- Heavy drinkers worse at week 1-3
- Improved after 3 weeks of abstinence



# Design


Monitored Abstinence Period:
-Utox 3x/week
-Daily text mood ratings
Baseline
Scan
NP
Interview
~5 days abstinent
+2 weeks
Scan
NP
Interview
~19 days abstinent
+4 weeks
Scan
NP
Interview
~33 days abstinent

# Participants

| * $p<.05$ | Heavy Drinkers ($n$=39) | Controls ($n$=26) |
|---|---|---|
| Age (range 16-18) | 17.7 | 17.6 |
| % Female | 46% | 46% |
| Grade point average | 3.3 | 3.6 |
| CBCL Externalizing T-score * | 49.0 | 41.5 |
| CBCL Internalizing T-score | 45.6 | 43.5 |
| 5th grade language score | 345.8 | 370.3 |
| 5th grade math score | 342.3 | 394.7 |

# Substance Use

| Heavy Drinkers: | M ±SD |
|---|---|
| Alcohol use occasions, Lifetime | 220 ±174 |
| Binge drinking occasions, Lifetime | 115 ±92 |
| Alcohol withdrawal symptoms, Lifetime | 4 ±2 |
| Max drinks/occasion, Lifetime | 11 ±5 |
| Marijuana use occasions, Lifetime | 59 ±76 |
| Other drug use occasions, Lifetime | 9 ±17 |

# Exclusions

- No guardian
- MRI contraindications
- Prenatal substance exposure
- Hx psychiatric or neurological disorder
- Psychoactive medications
- Left-handed

# Recovery from Teen Drinking

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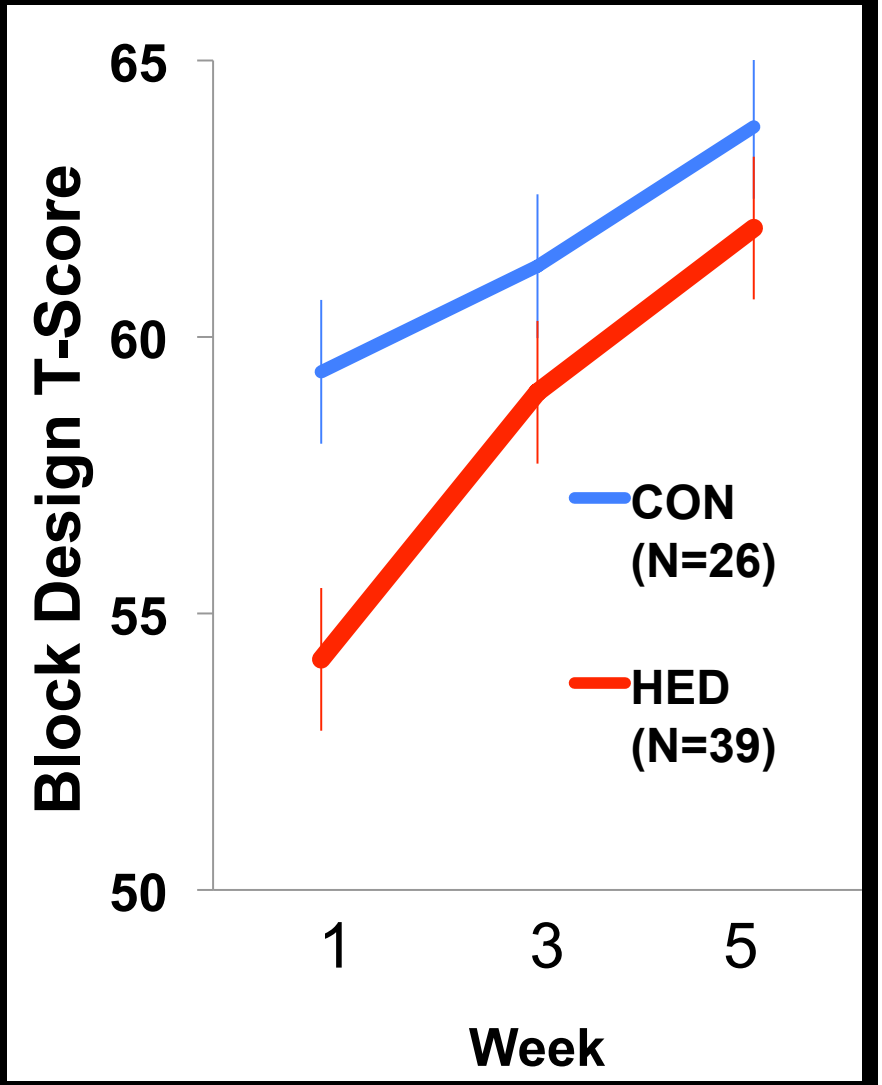
# Recovery of Visuospatial Deficits

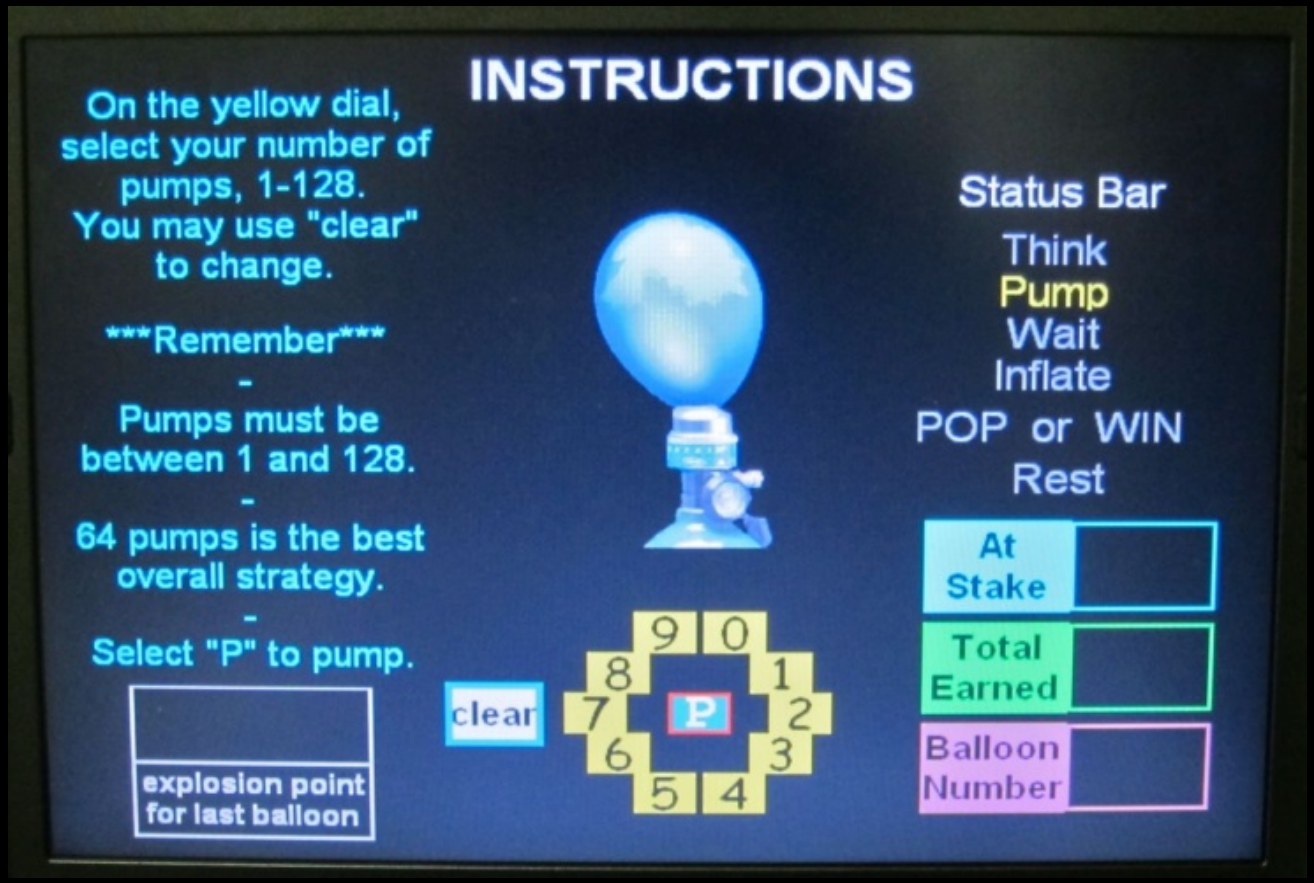
- Linear mixed effects models
- Controlled for:
  - Externalizing behavior
  - FH SUD
- Different domains show different patterns of improvement
  - Improvement beyond practice alone
  - Low power
- ➔NCANDA *N*=850




*Winward et al., under review*

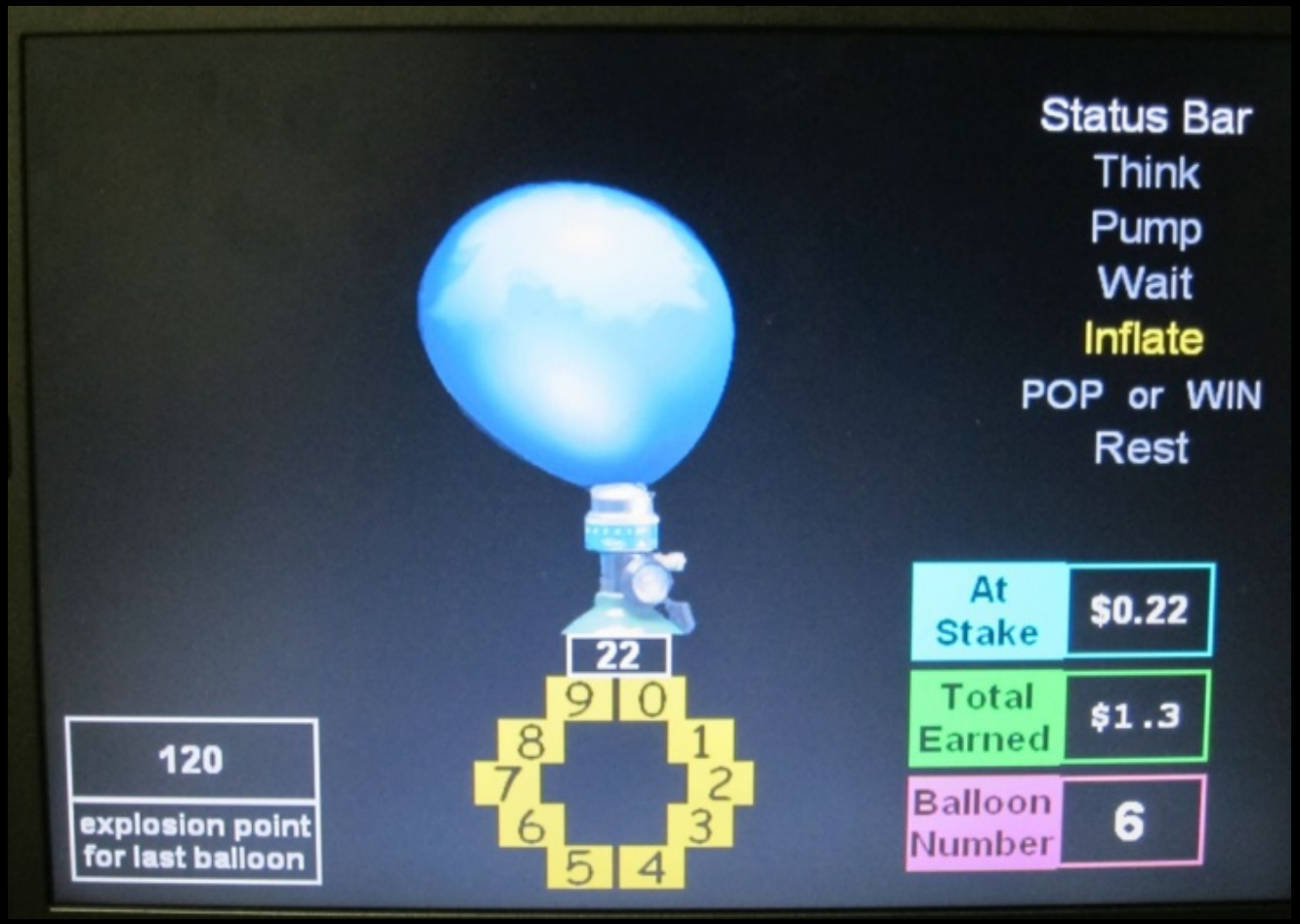
# Balloon Risk Analog Task (BART)

- Rapid event-related design
- 20 balloons; predetermined explosion points



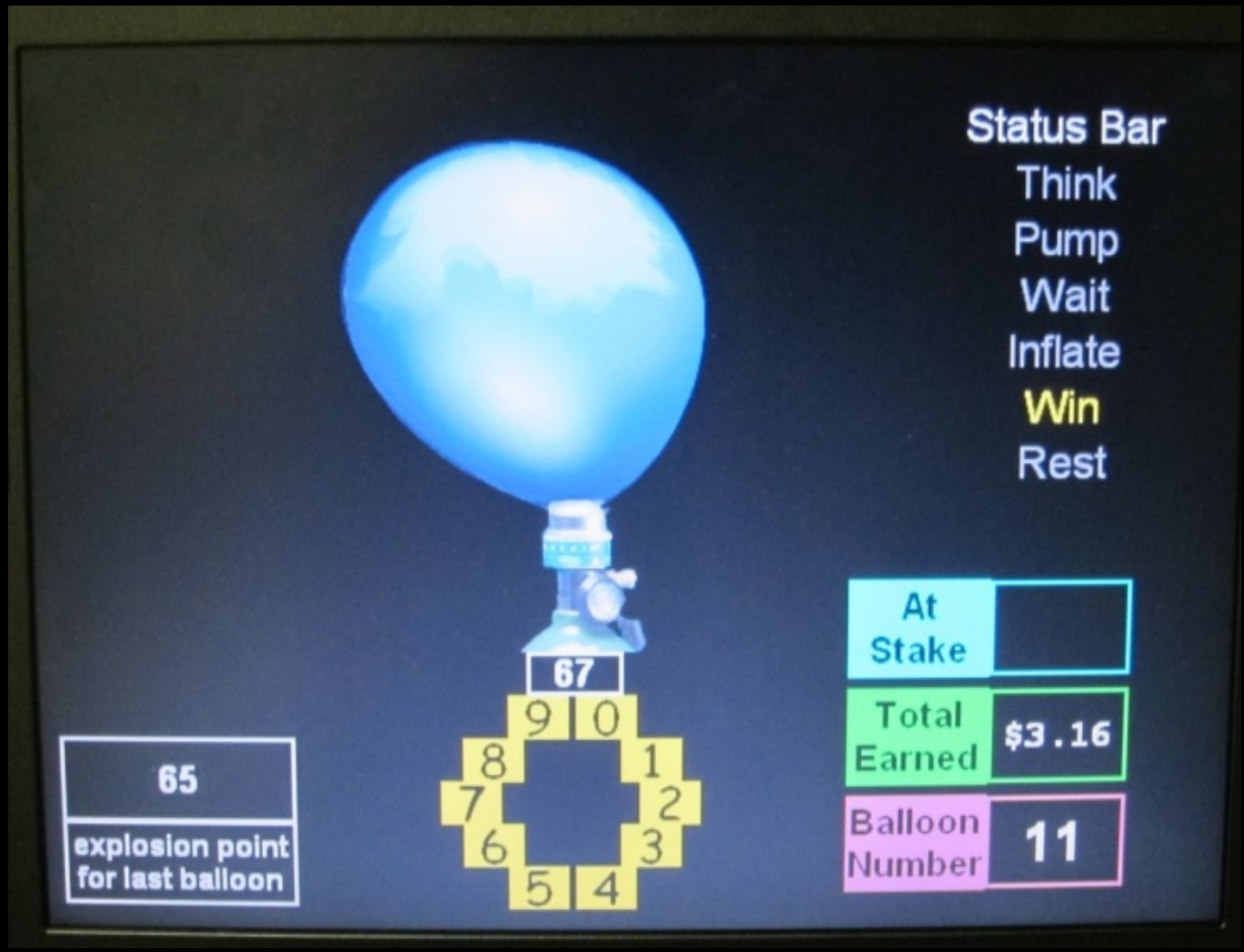

*Lejuez et al., 2002….2013*

# BART: Inflate



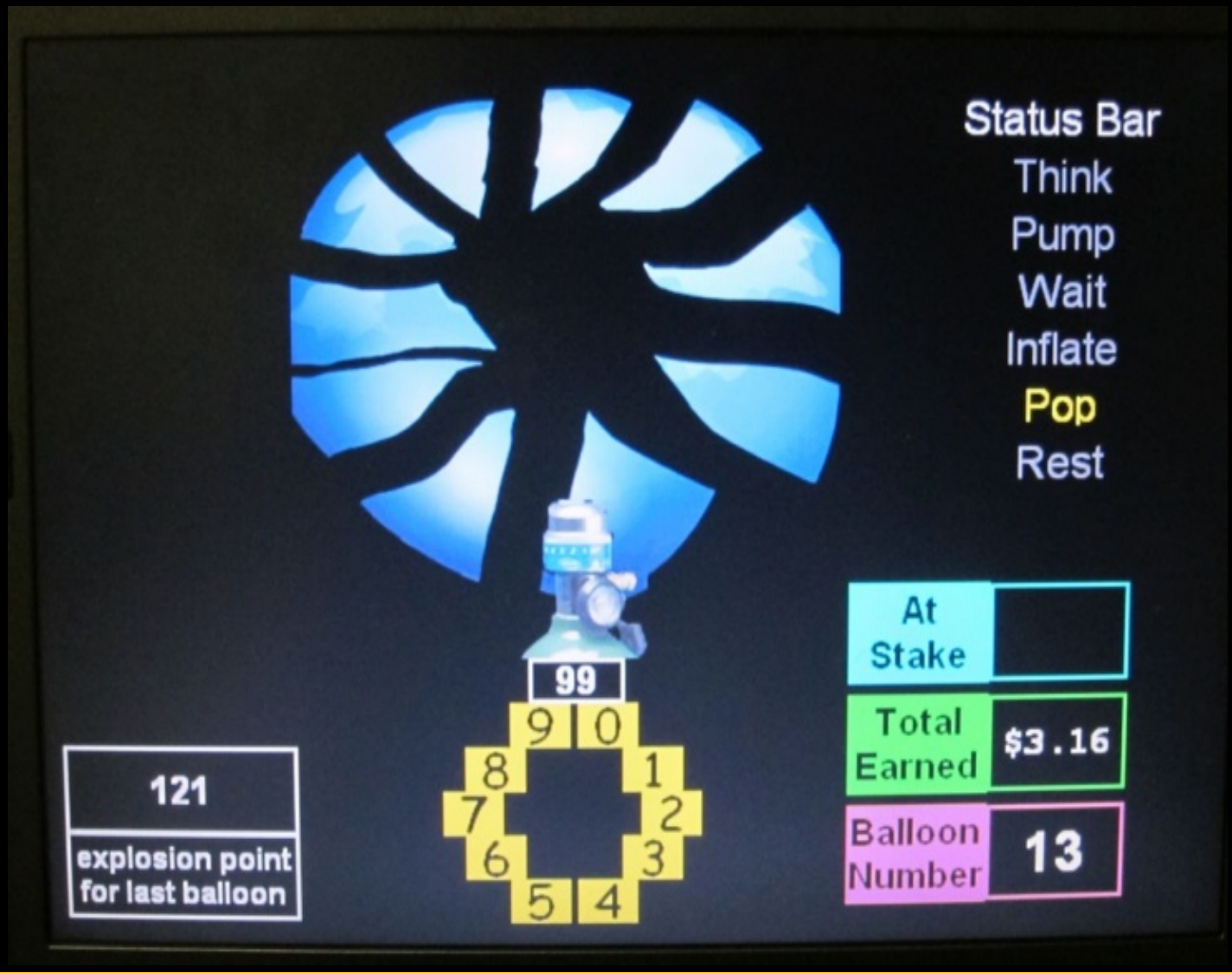

*Lejuez et al., 2002….2013*

# BART: Win!




*Lejuez et al., 2002….2013*

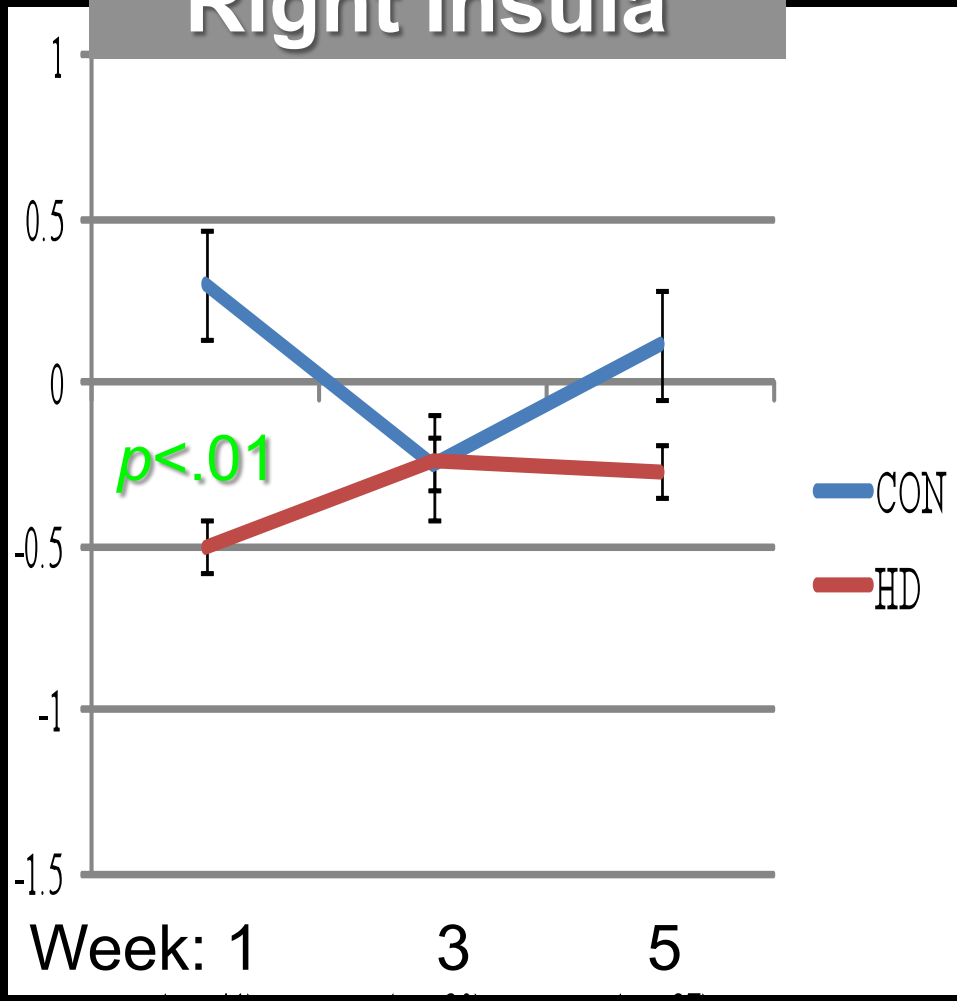
# BART: Pop!



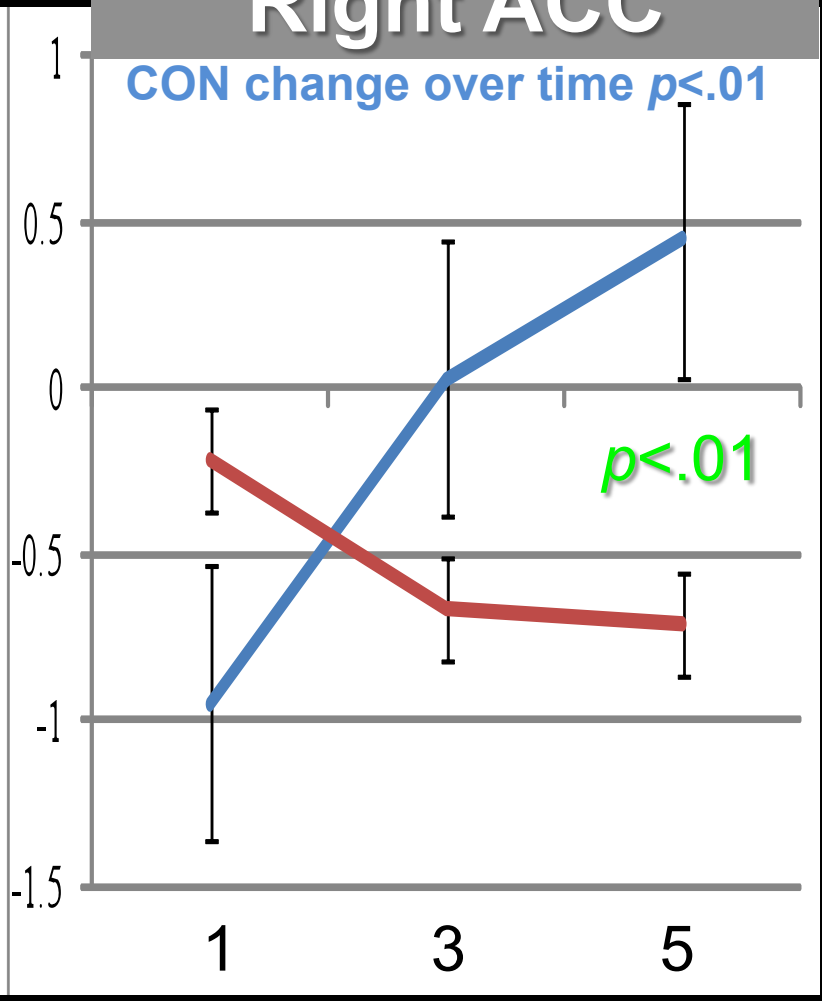

*Lejuez et al., 2002….2013*

# Anticipation

## Right Insula

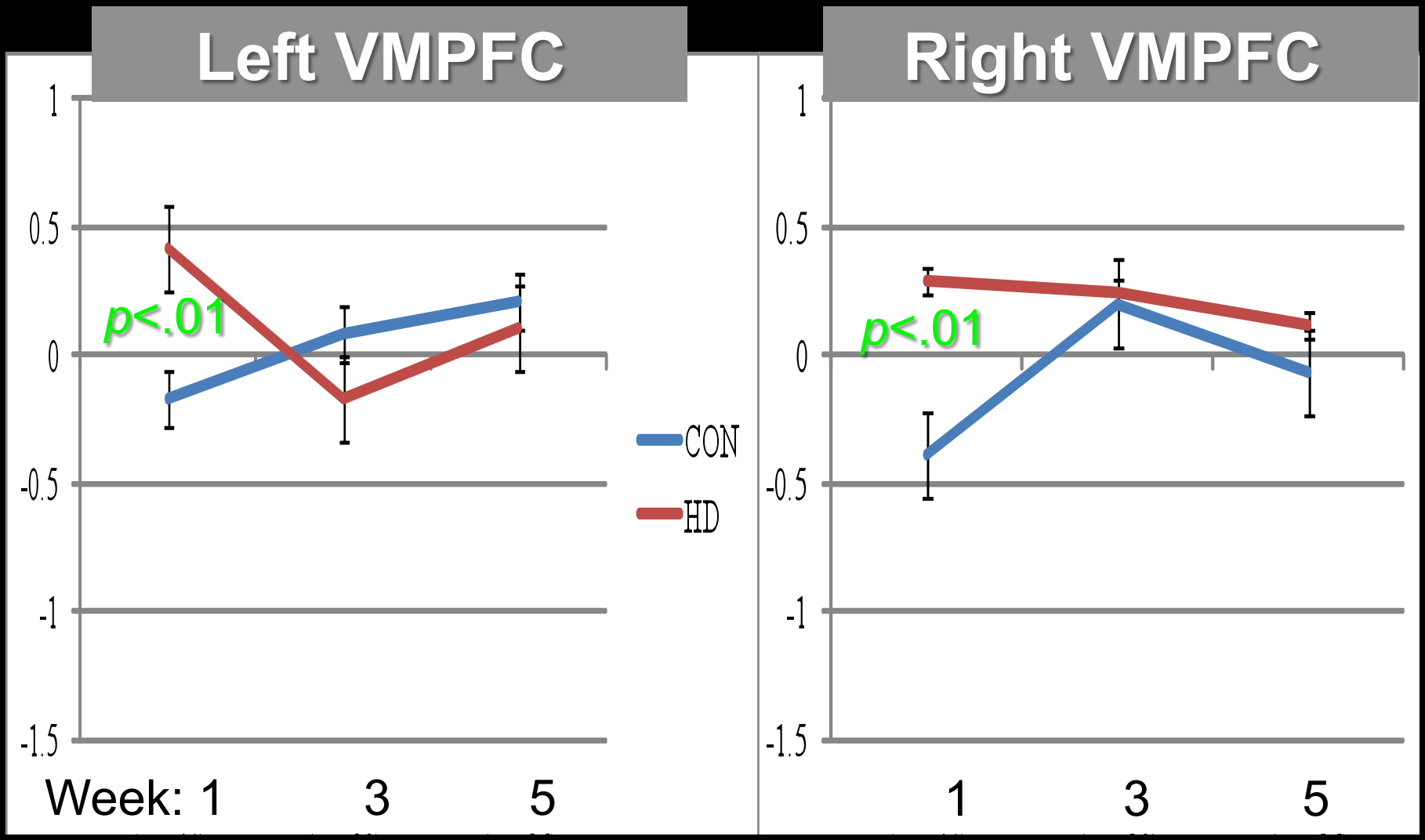



## Right ACC




*Bazinet et al., in preparation*

# Loss Outcome




*Bazinet et al., in preparation*

# FMRI BART: Drinkers

- At baseline, heavy drinkers:
  - ↓insula activation during anticipation
  - ↑VMPFC activation as evaluate negative outcomes
  - No differences after 2-3 weeks of abstinence
- With abstinence:
  - ↓ACC activation during anticipation vs Controls
  - Suggests some neural recovery

*Bazinet et al., in preparation*

# Recovery from Teen Drinking

- ✓ Study design
- ✓ Neurocognitive performance
- Alcohol cue reactivity
- Negative affect
- Distress tolerance

# FMRI: Alcohol Cue Reactivity

- Enhanced response in heavy drinkers
- Reduce with abstinence?

## TASK STIMULI

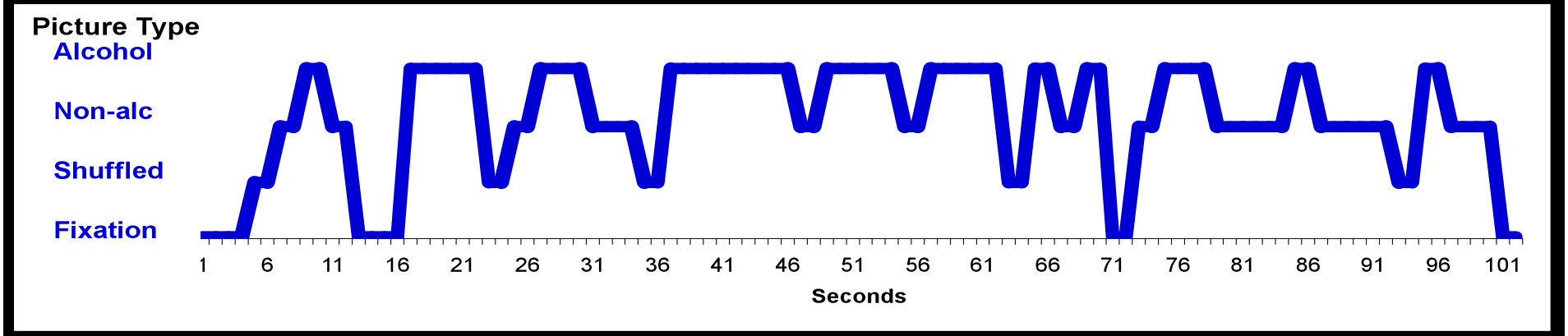
**Shuffled**

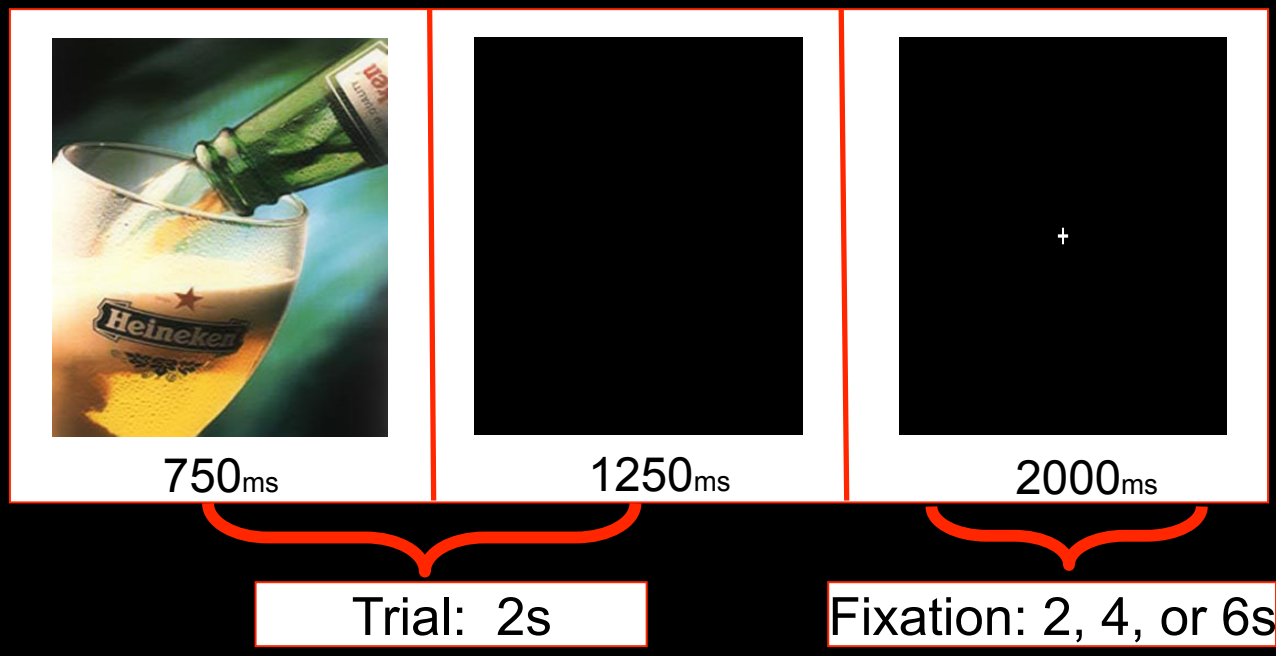
**Non-Alcohol**


**Alcohol**

*Pulido et al., 2010, Addictive Behaviors*

# Alcohol Cue Reactivity Task



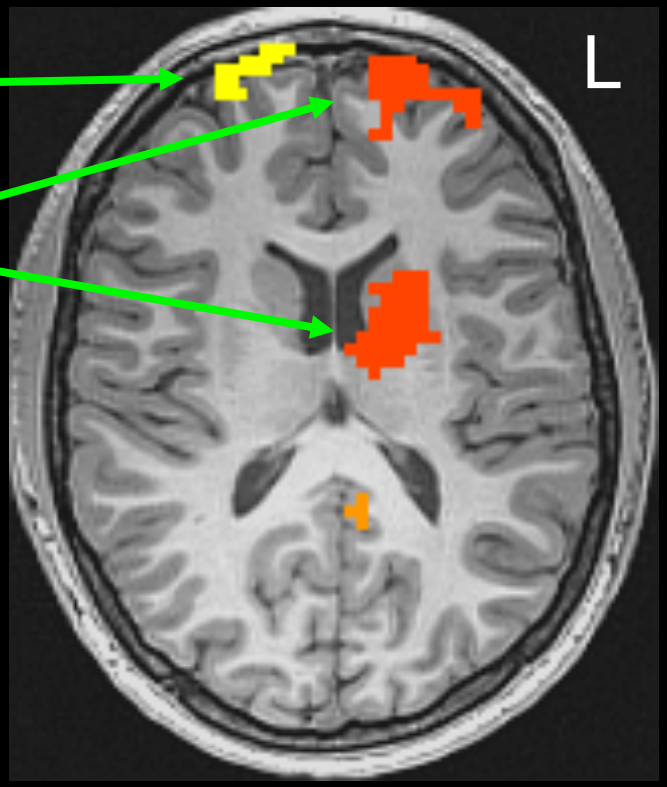




*Pulido et al., 2010, Addictive Behaviors*

# Week 1: Alcohol vs. non-alc cues

**Heavy Drinking** > **Control**
adolescents in 6 regions:

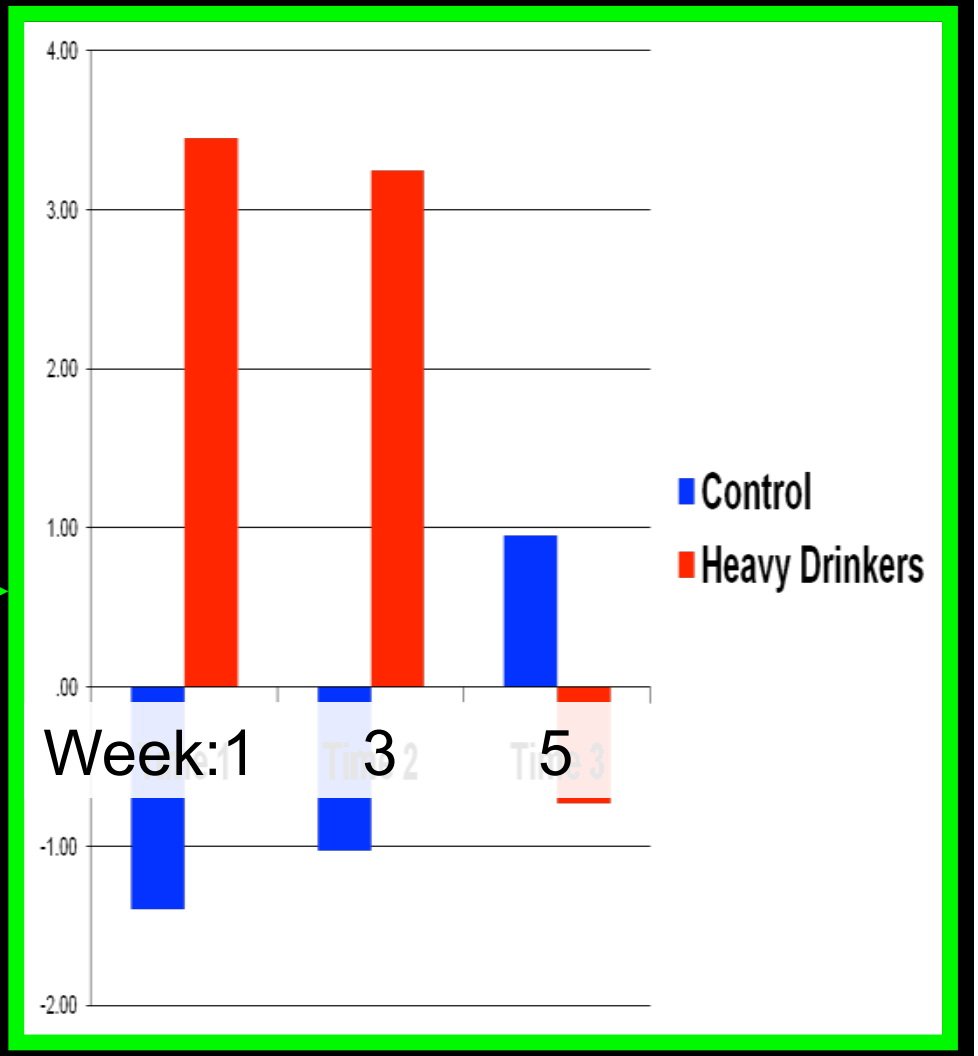
1. Right superior frontal gyrus
2. Left medial frontal/striatum
3. Bilateral cerebellum
4. Left cingulate
5. Left pre/post-central gyrus
6. Left middle temporal gyrus




*Pulido et al., in preparation*

# Weeks 3+: Alcohol vs. non-alc cues

- 3 weeks abstinent:
  - **HED** similar to **Controls** in 5 of 6 brain regions.
  - Right superior frontal, **HED > Controls**
- 5-6 weeks abstinent: no differences

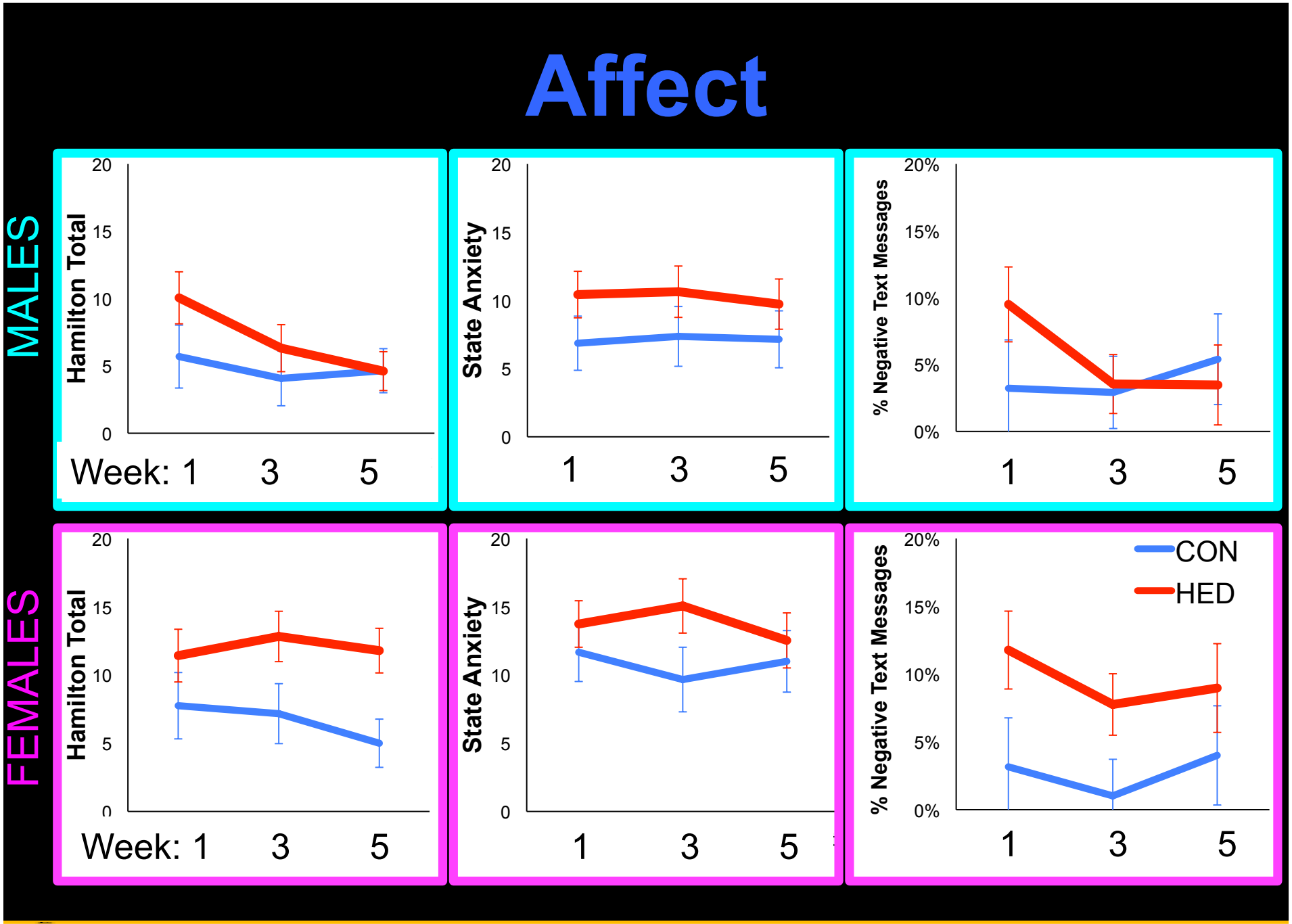



*Pulido et al., in preparation*

# Recovery from Teen Drinking

- ✓ Study design
- ✓ Neurocognitive performance
- ✓ Alcohol cue reactivity
- Negative affect
- Distress tolerance

# Affect

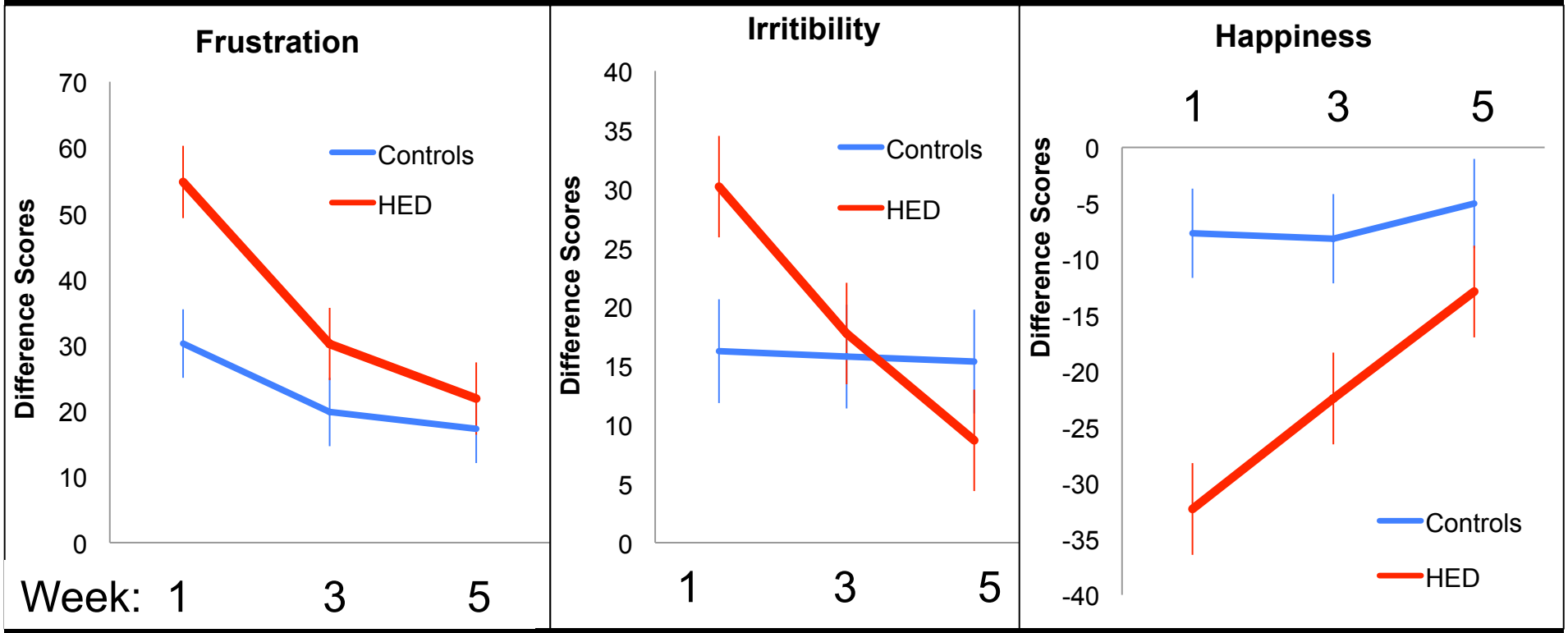



*Bekman et al., 2013, ACER*

# Recovery from Teen Drinking

- ✓ Study design
- ✓ Neurocognitive performance
- ✓ Alcohol cue reactivity
- ✓ Negative affect
- Distress tolerance

# Distress Tolerance: PASAT-D




*Winward et al., in preparation*

# Recovery after 4 Weeks Abstinent

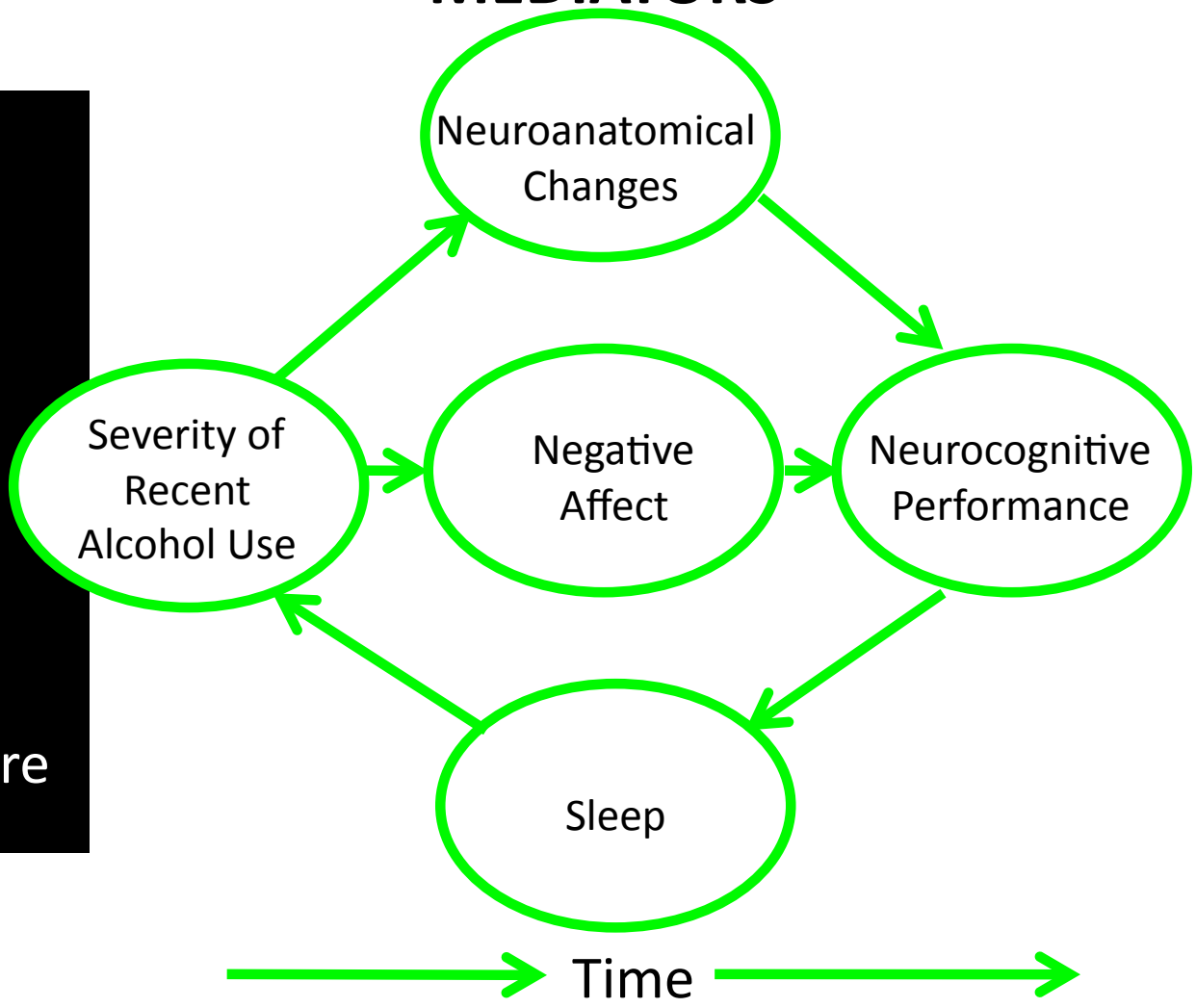
- Neurocognition
  - Some recovery
- Alcohol cue reactivity
  - Full recovery
- Negative affect
  - Recovery for boys, slower for girls
- Distress tolerance
  - Emotional reactivity largely resolve

# Adolescent Neurocognitive Recovery Models

## MODERATORS

- Gender
- Family History
- White Matter Integrity
- Intellectual Baseline
- Externalizing Symptoms
- Internalizing Symptoms
- Lifetime Alcohol Exposure

## MEDIATORS



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