

**LAB-BASED ACQUISITION AND EXTINCTION OF
CONDITIONED DISGUST:
NOVEL METHODS AND CLINICAL IMPLICATIONS**

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GENERALIZATION OF CONDITIONED FEAR AND DISGUST: Individual Differences and Comparisons to Conditioned Fear

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UNIVERSITY
OF MINNESOTA
Driven to Discover®



ANGST Laboratory

Anxiety Neuroscience Grounded in cross-Species Translation

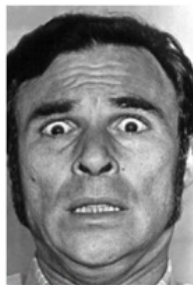
Fear and Disgust

Disgust, like fear, is an affective state that promotes behavioral **avoidance**.

Conditioned disgust can promote **conditioned avoidance** of previously neutral stimuli that cue disgust (CS+). (Adams, Willems & Bridges, 2010; Olatunji, Smits, Connolly, Willems, & Lohr, 2007; Smits, Telch & Randall, 2002)

When conditioned avoidance is excessive, rigid, or dysregulated, it can become maladaptive and lead to psychopathology. (Cisler et al., 2007; Ojserkis et al., 2017; Olatunji et al., 2007)

Run away fast!



Fearful



Disgusted

Back away carefully...

**Disorders Characterized by
Excessive Fear**

Specific phobias (e.g. heights)

Panic disorder

PTSD

Social anxiety disorder

**Disorders Characterized by
Excessive Disgust**

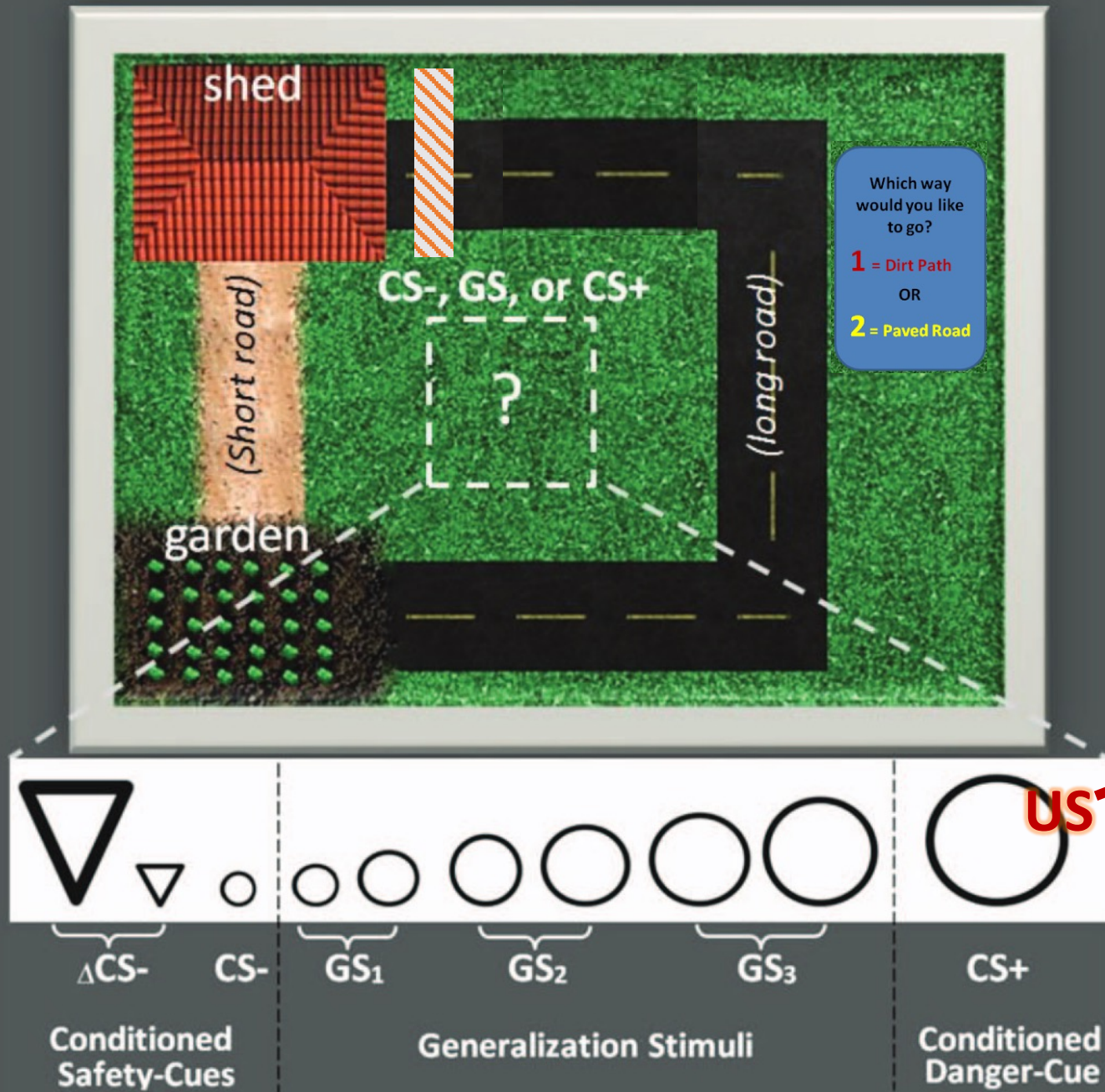
Specific phobias (e.g. blood)

OCD with contamination concerns

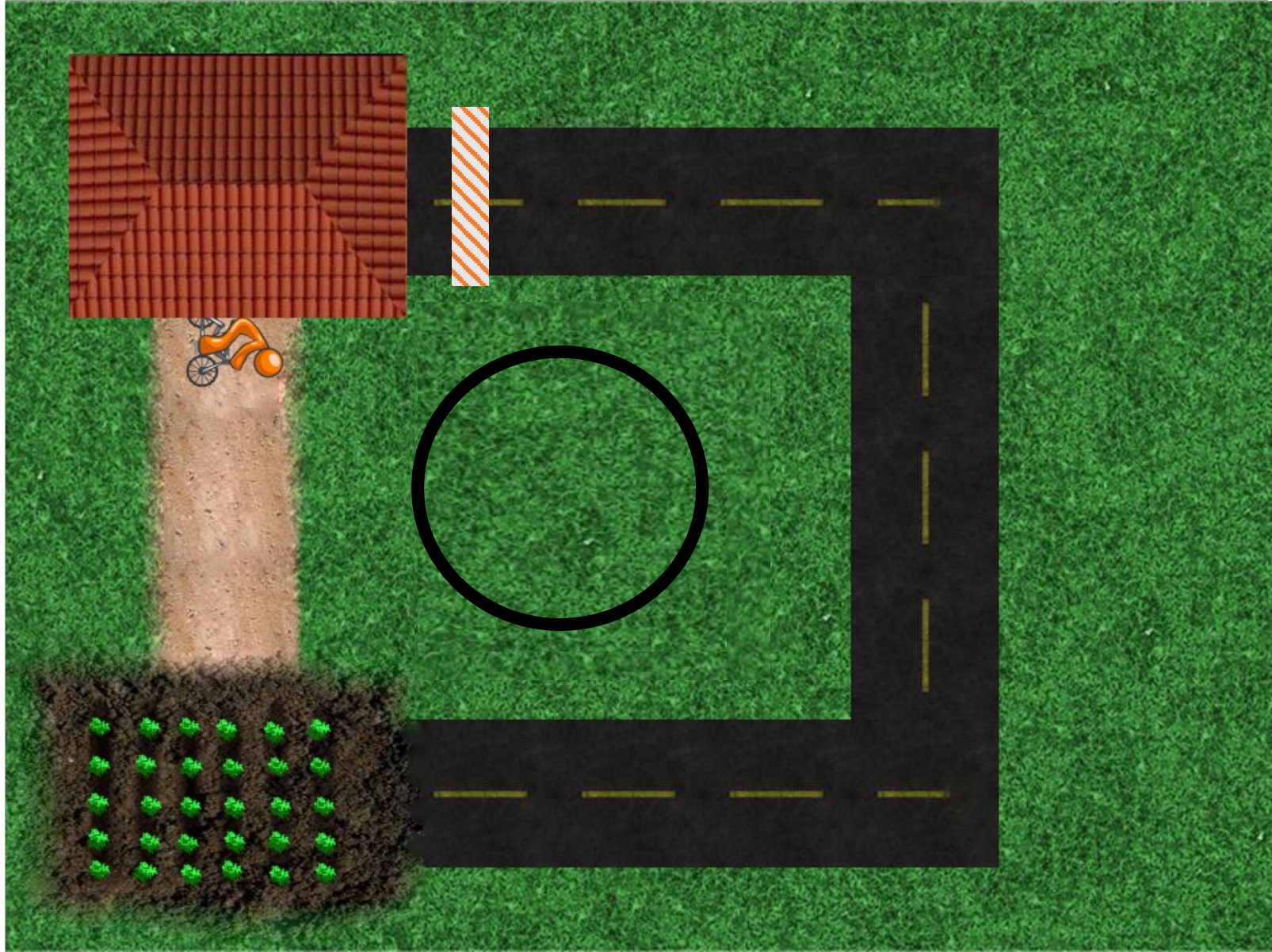
Eating disorders

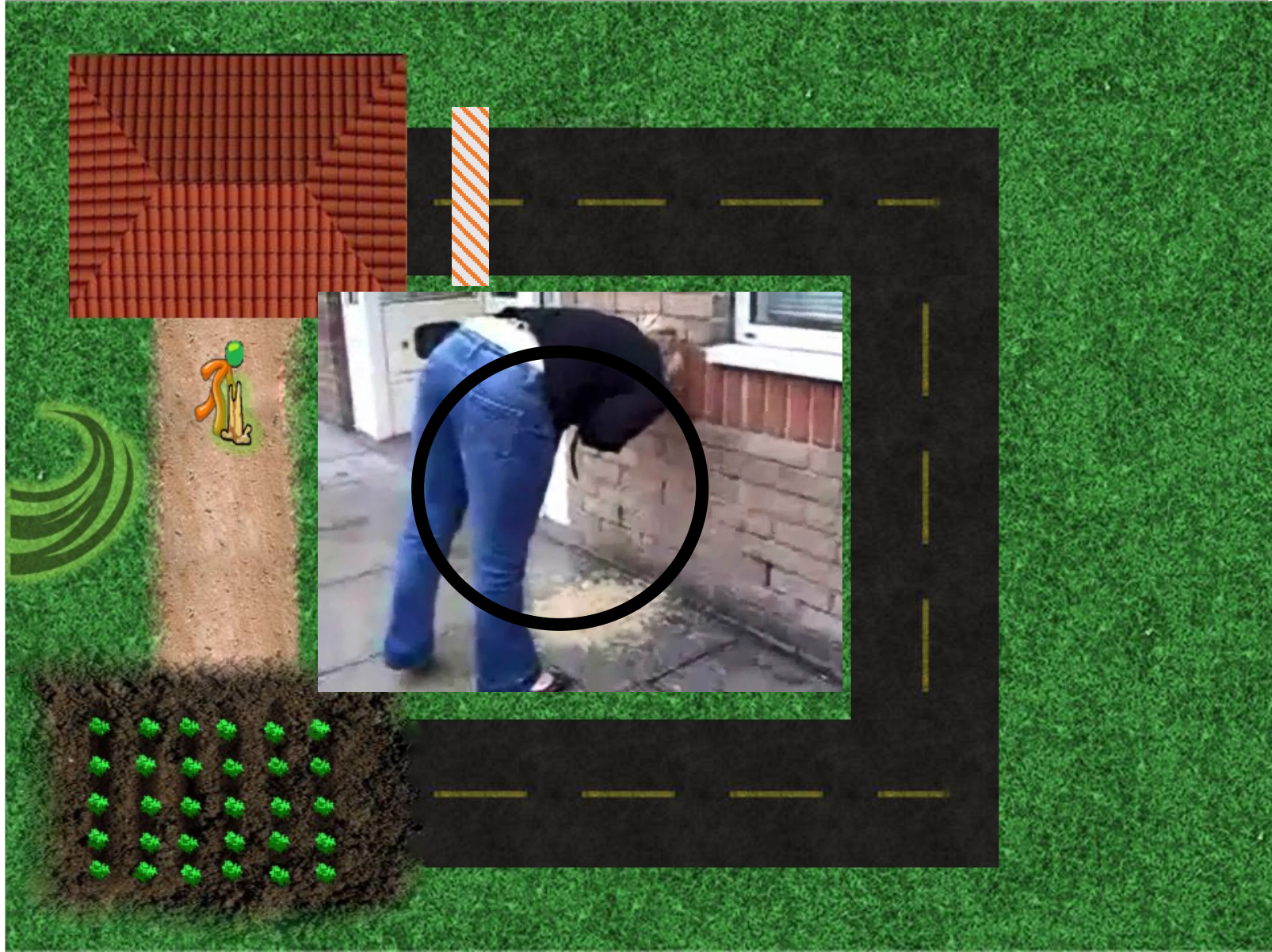
The Present Study

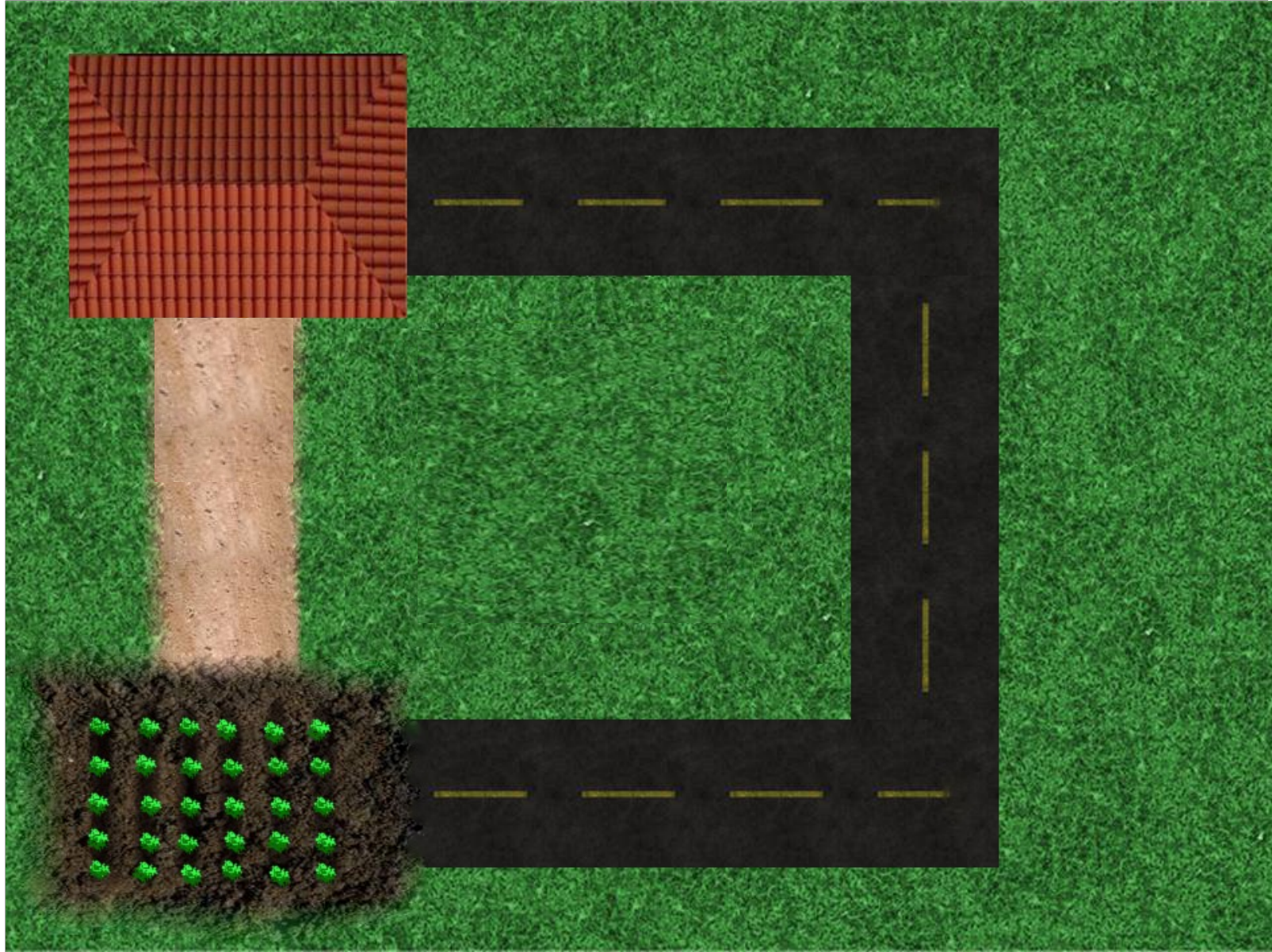
1. Does conditioned disgust generalize to stimuli resembling the disgust cue?
2. If so, does this motivate maladaptive avoidance of disgust-cue approximations?
3. What traits increase the likelihood of adaptive and maladaptive avoidance?

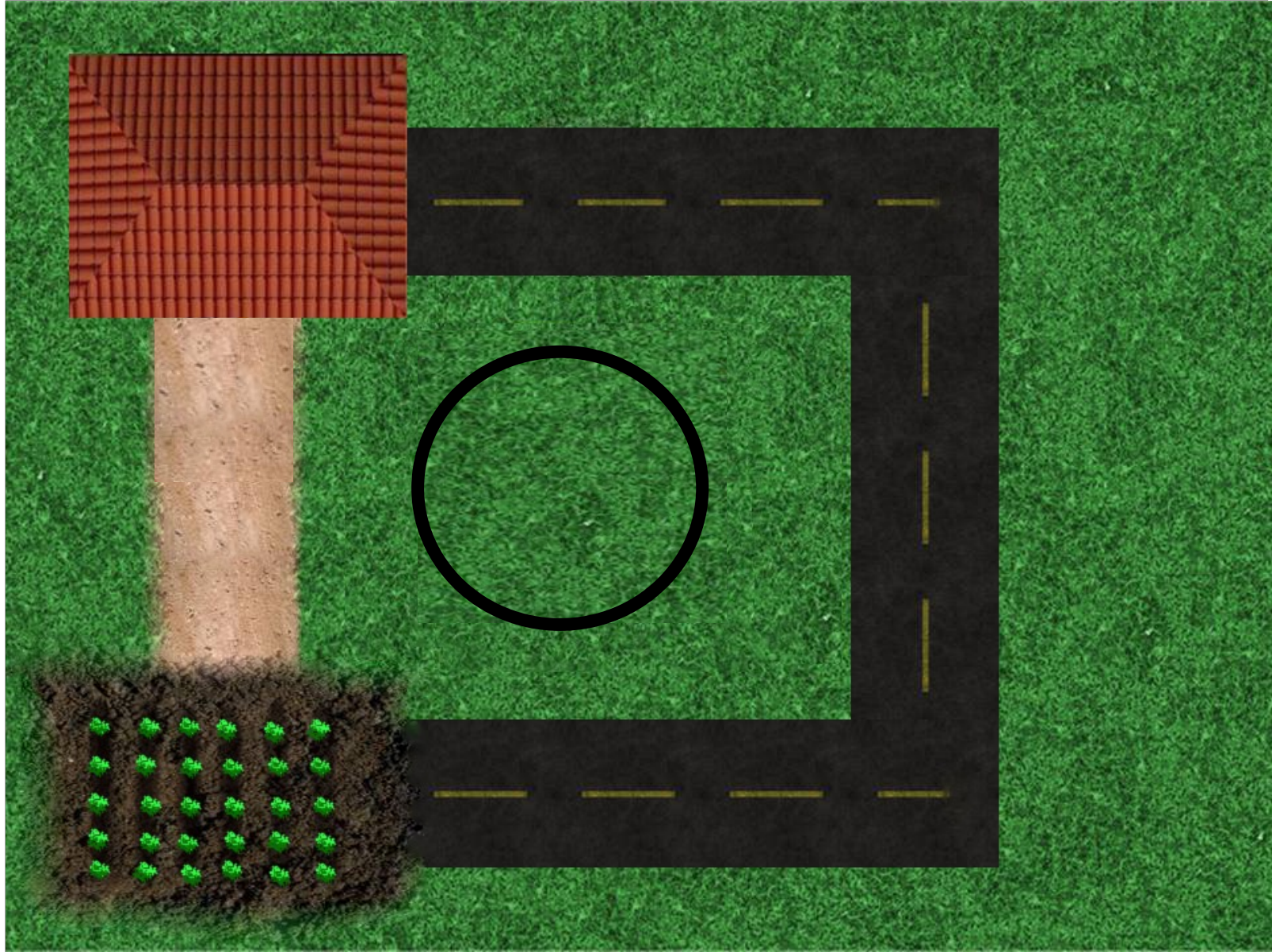


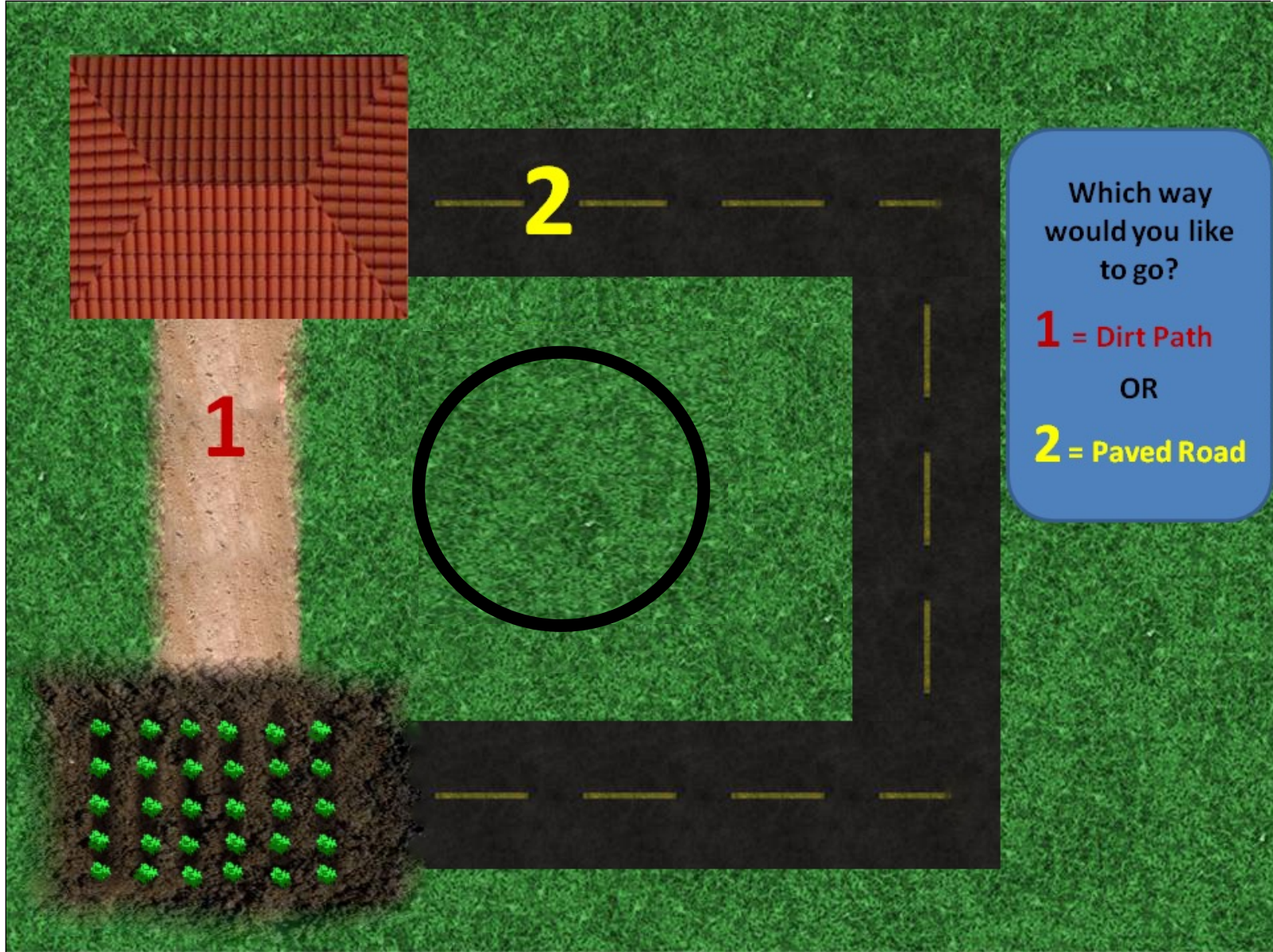
adapted from
 Van Meurs et al., 2014. *Beh Res Ther*











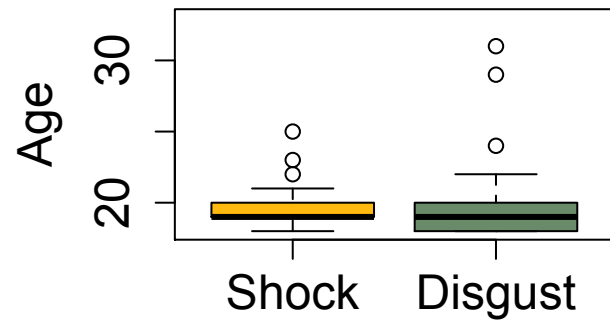
Which way
would you like
to go?

1 = Dirt Path

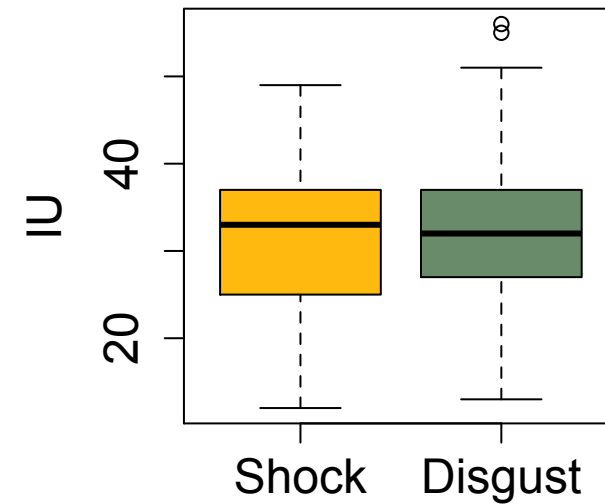
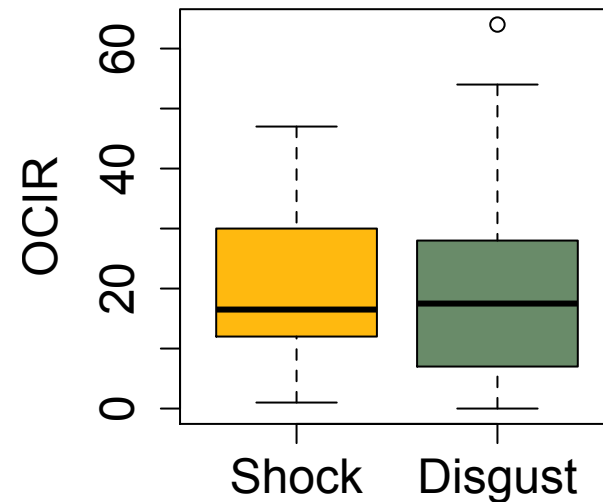
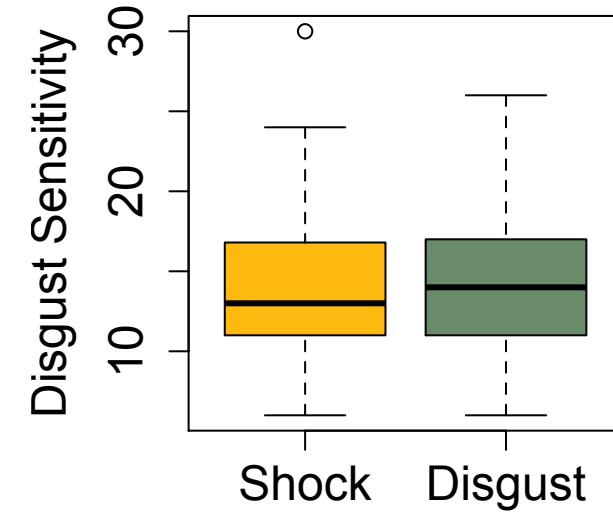
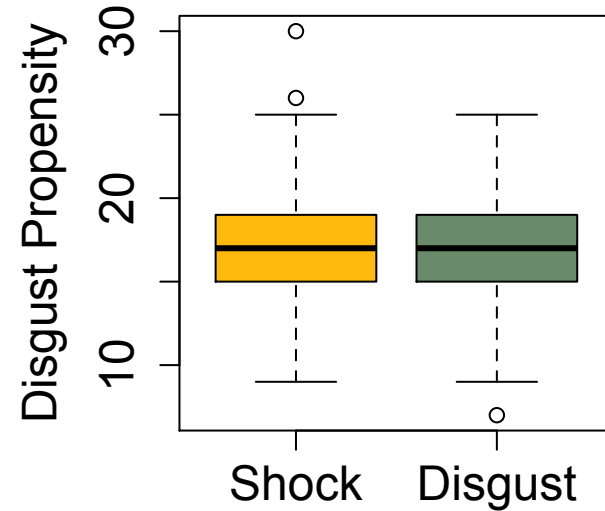
OR

2 = Paved Road

Undergraduate sample quasi-randomized to disgust condition (n=65) or shock condition (n=65)



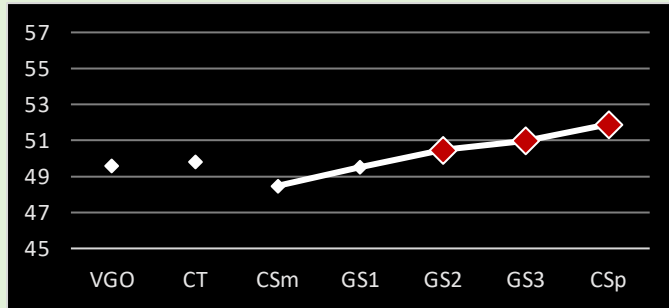
Disgust: 77% female
Shock: 71% female



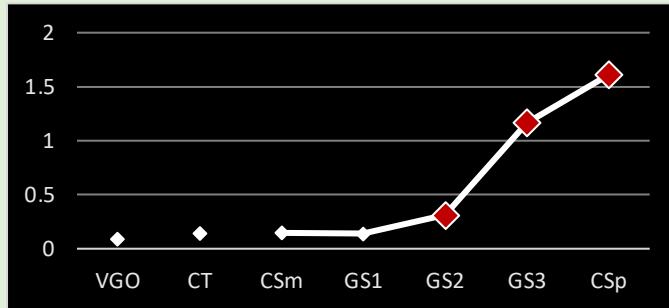
1. Does conditioned disgust generalize to stimuli resembling the disgust cue?

Potentiated Startle (T)

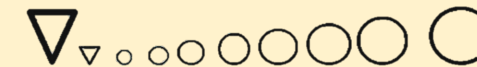
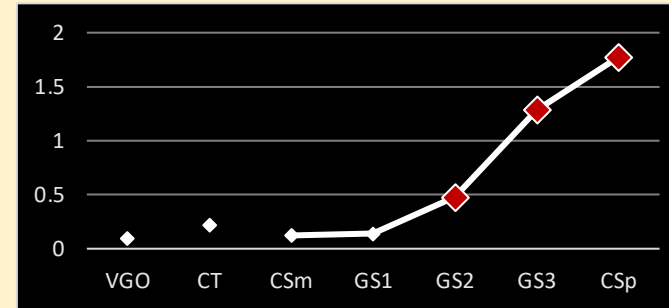
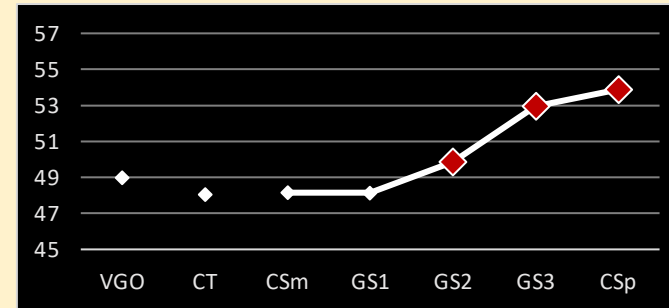
Disgust Condition



Perceived Risk



Shock Condition

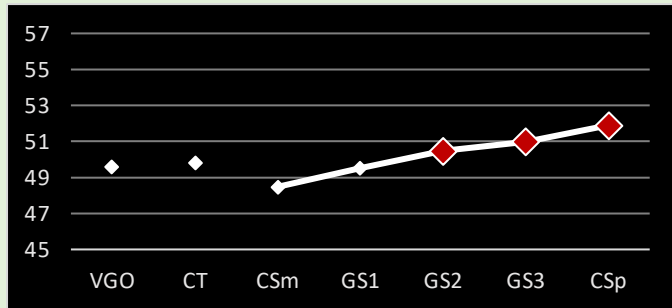


◆ Elevated relative to oCS-, Hochberg-corrected $p < .05$

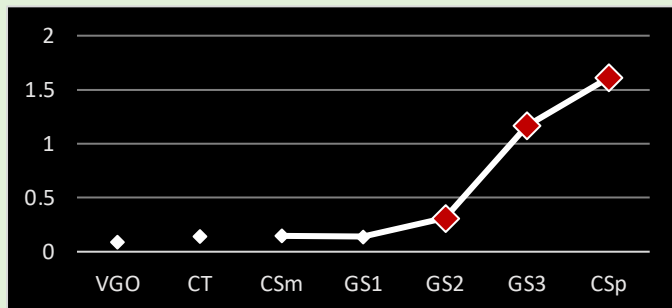
2. Does instrumental *avoidance* also generalize to stimuli that resemble the disgust cue?

Potentiated Startle (T)

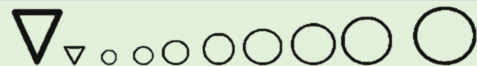
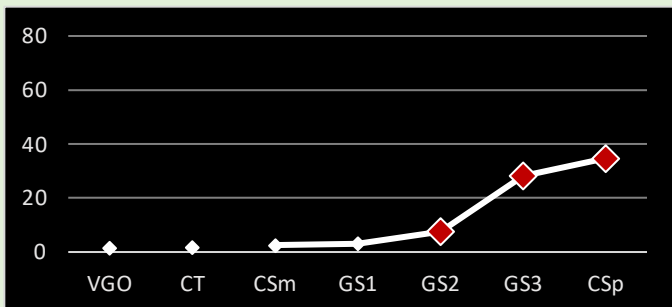
Disgust Condition



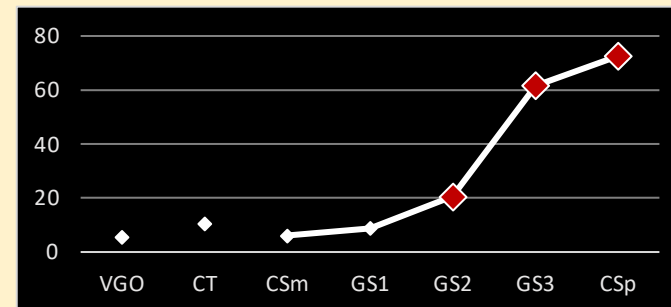
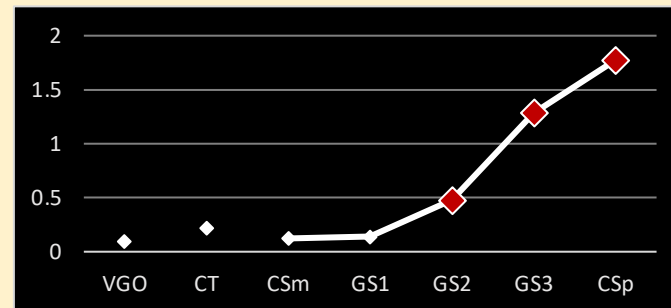
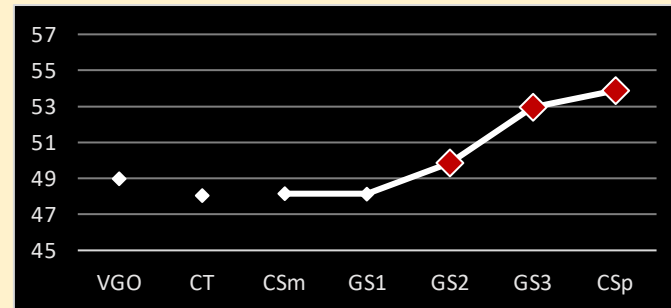
Perceived Risk



Avoidance (%)



Shock Condition



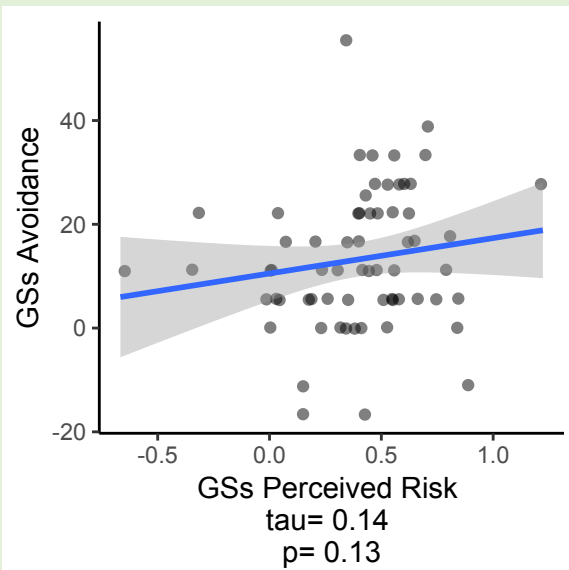
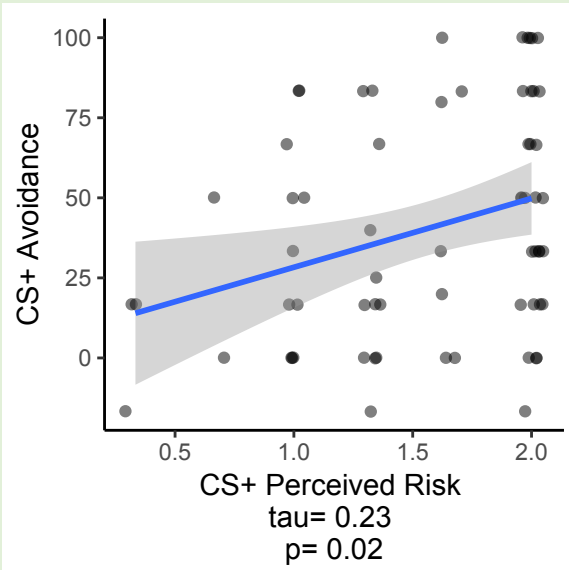
◆ Elevated relative to oCS-, Hochberg-corrected $p < .05$

3. Do Pavlovian disgust and instrumental avoidance covary?

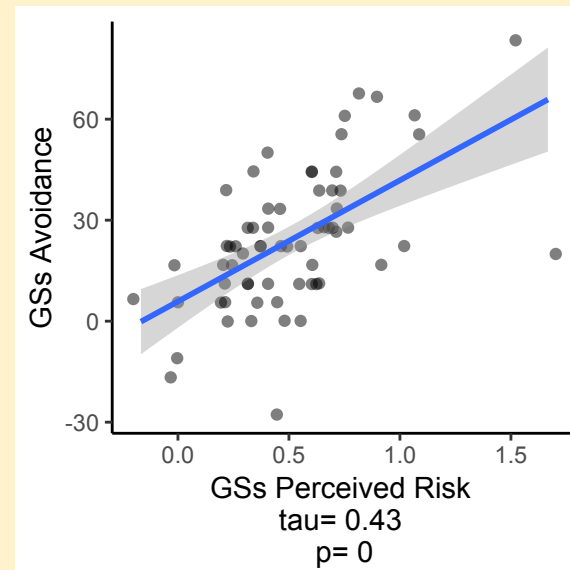
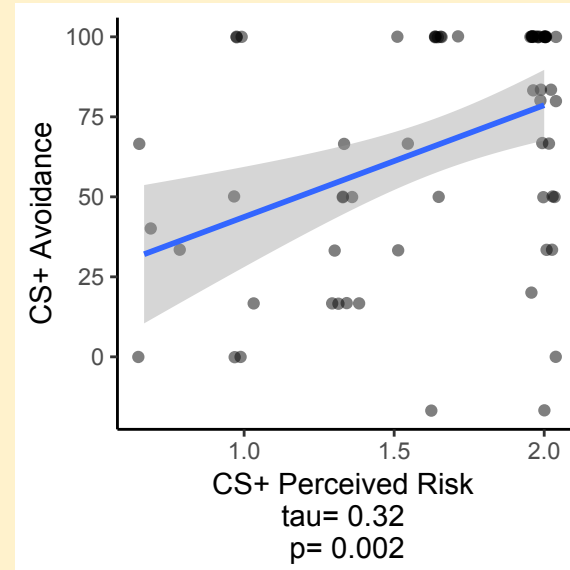
What traits strengthen this covariation?

Pavlovian-Instrumental Covariation

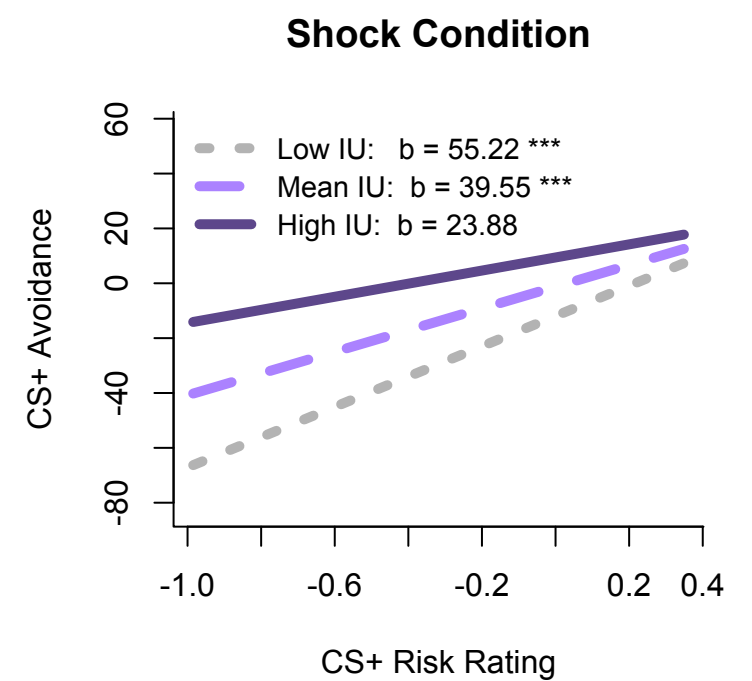
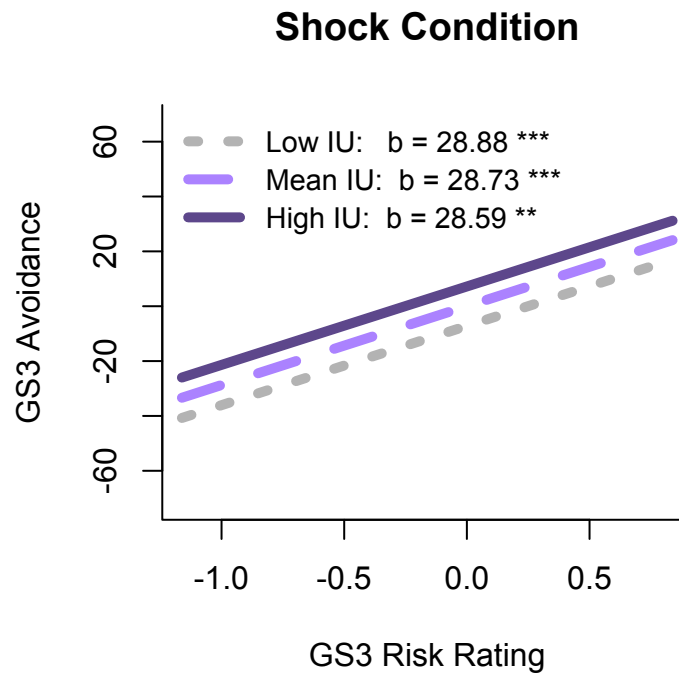
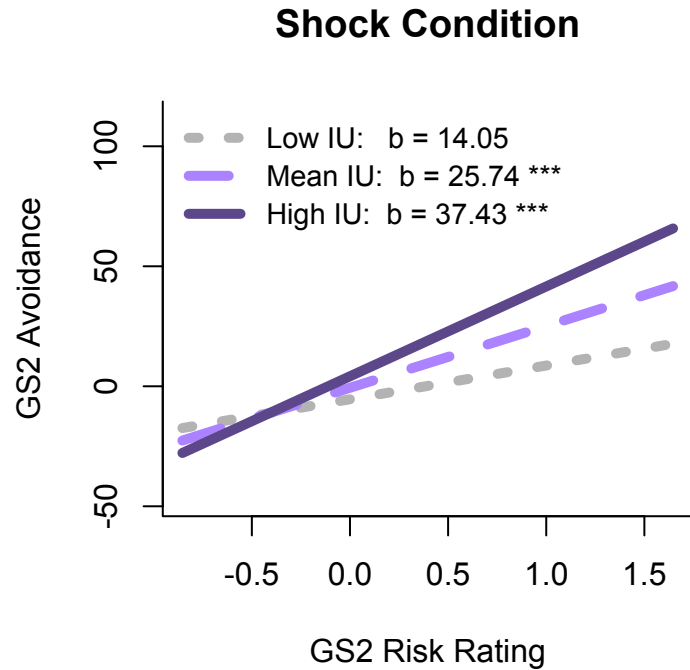
Disgust Condition



Shock Condition

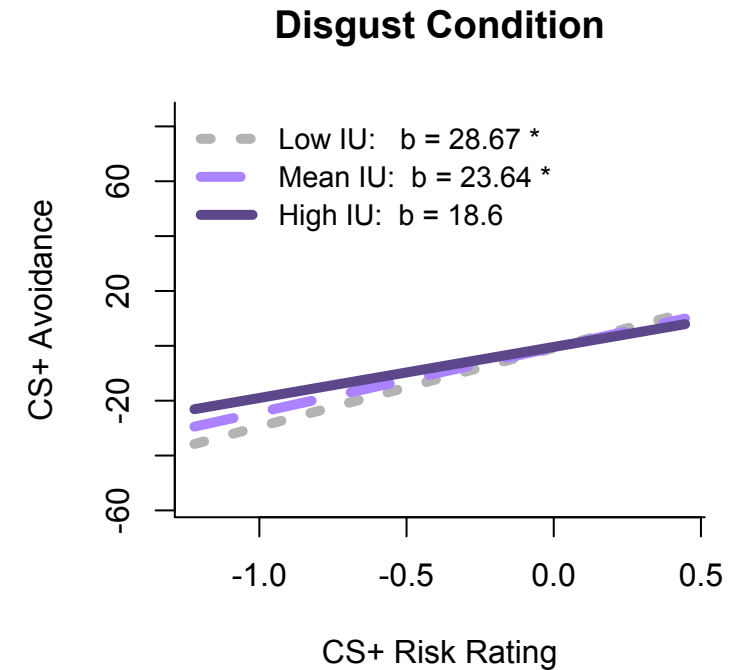
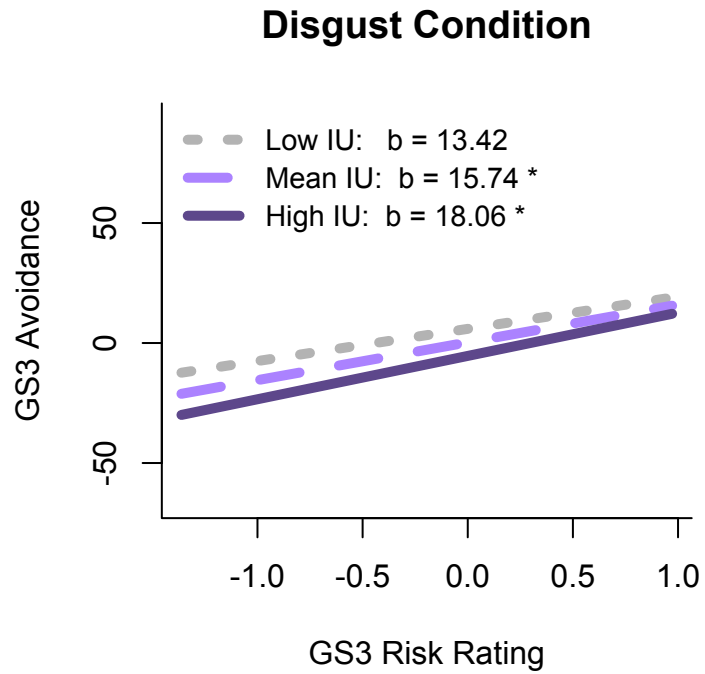
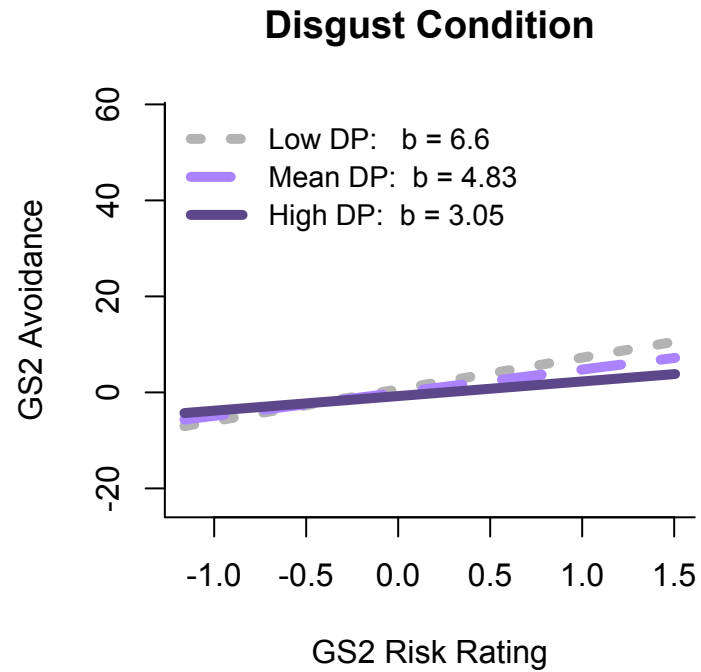


Intolerance of Uncertainty



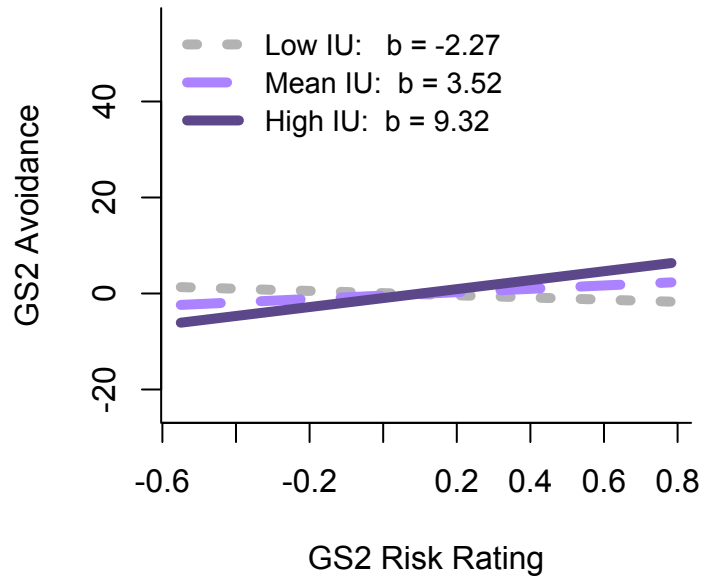
| | | | |
|---------|--|--|---|
| Stim. |  GS2 |  GS3 |  CS+ |
| IU x RR | $\beta=1.49^*$ | n. s. | n. s. |

Intolerance of Uncertainty

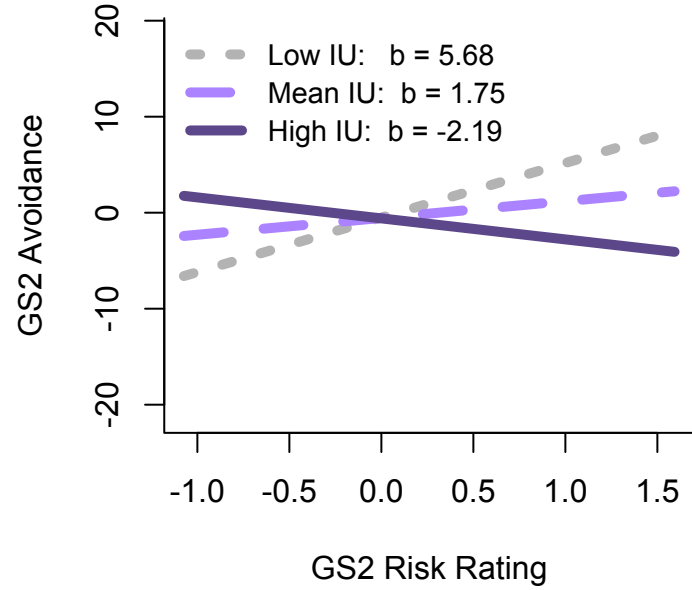


| | | | |
|---------|--|--|---|
| Stim. |  GS2 |  GS3 |  CS+ |
| IU x RR | n. s. | n. s. | n. s. |

Disgust Condition, US Disgust \leq 5
n=40

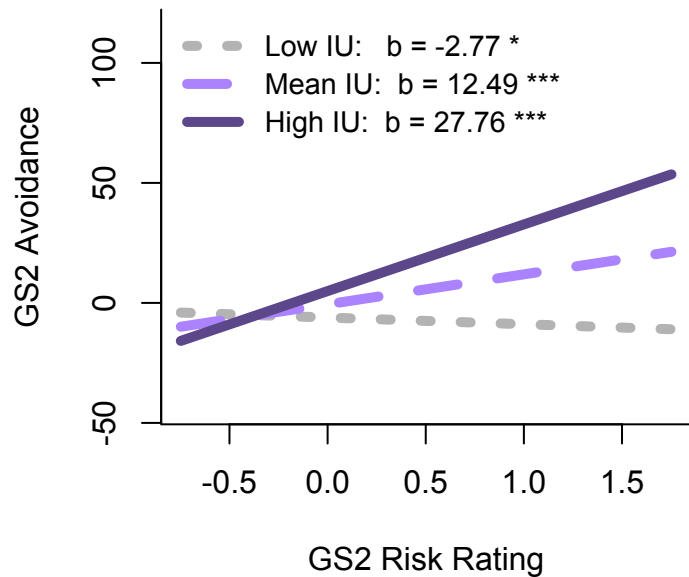


Disgust Condition, US Disgust $>$ 5
n=25

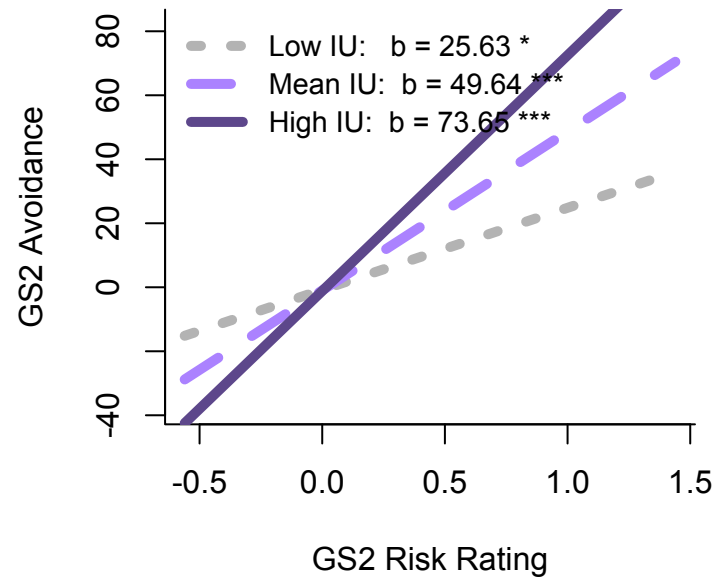


Increasing US disgust
↓
Greater IU-related decrease in Pavlovian-instrumental covariation

Shock Condition, US Pain \leq 5
n=43

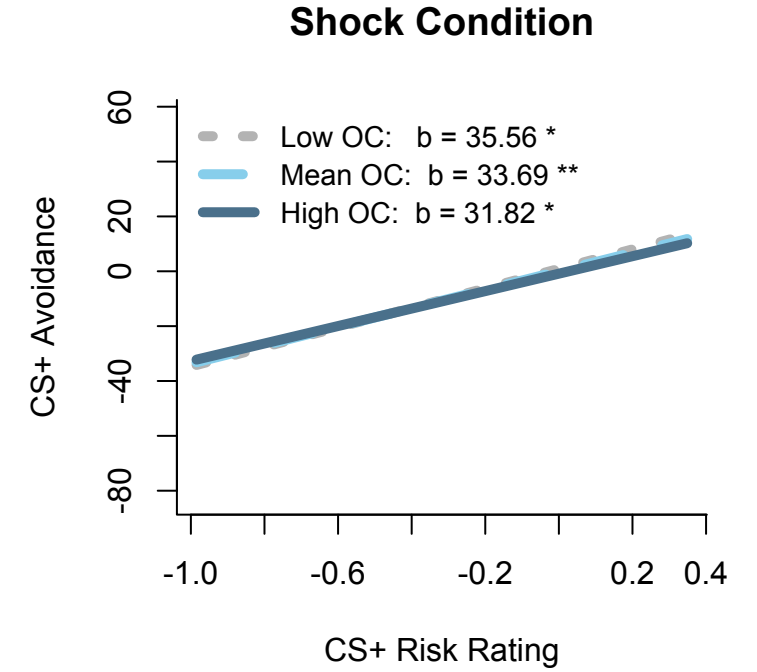
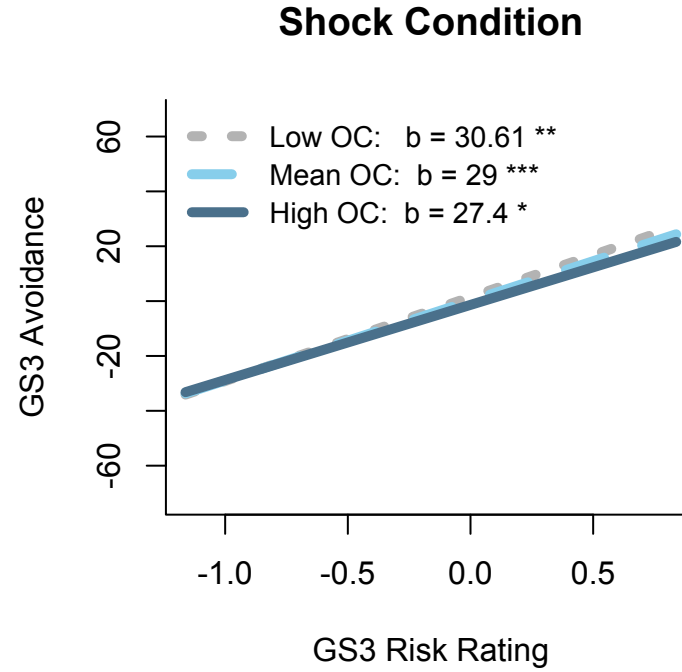
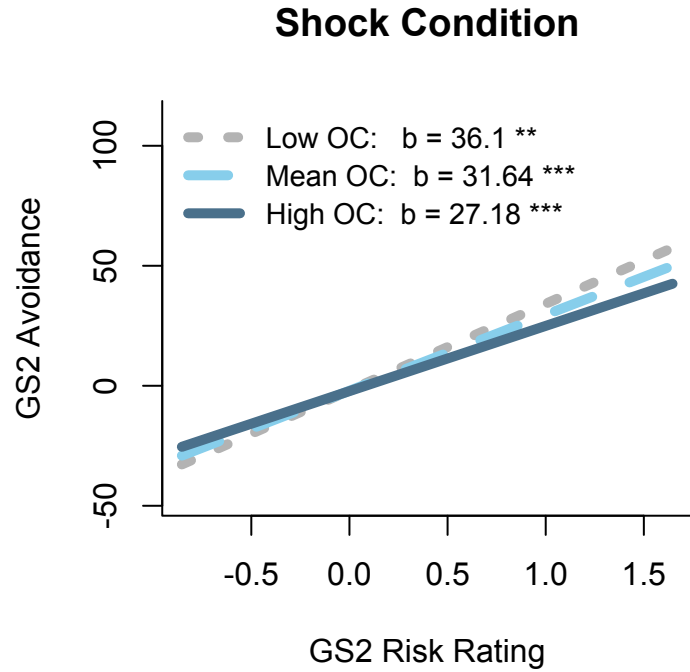


Shock Condition, US Pain $>$ 5
n=22



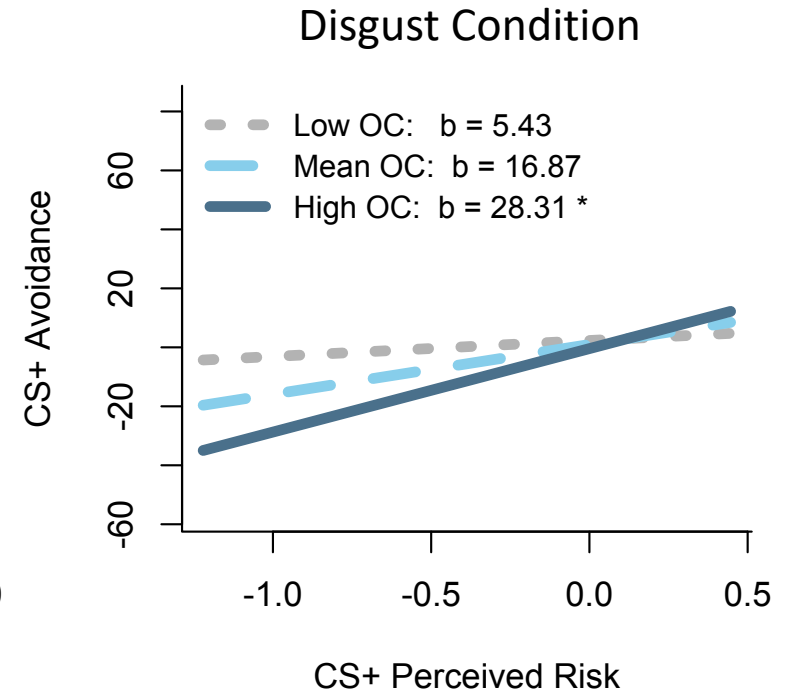
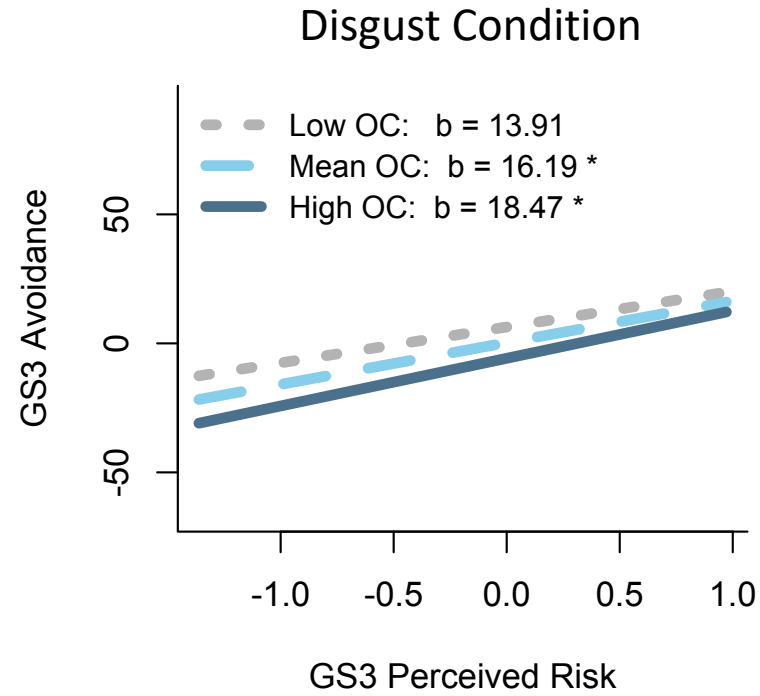
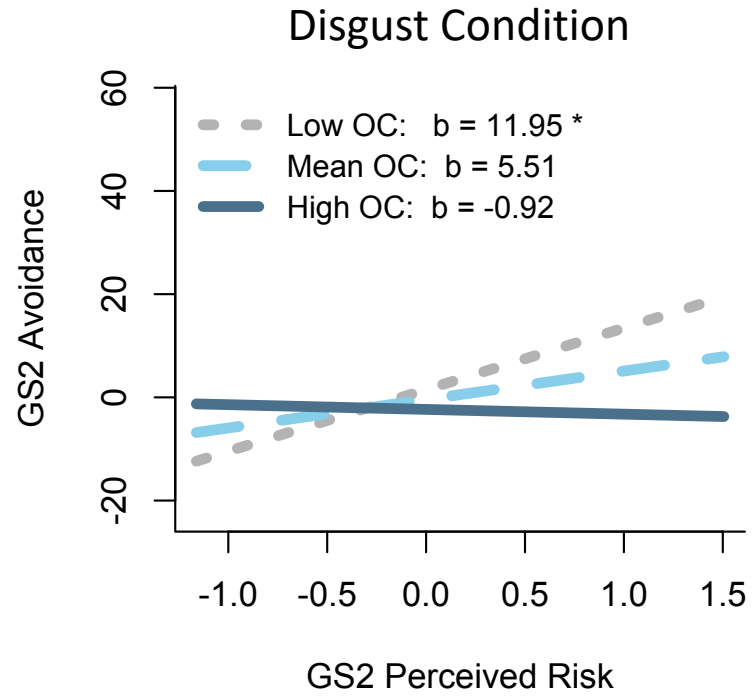
Increasing US pain
↓
Greater IU-related increase in Pavlovian-instrumental covariation

Obsessive-Compulsive Symptoms



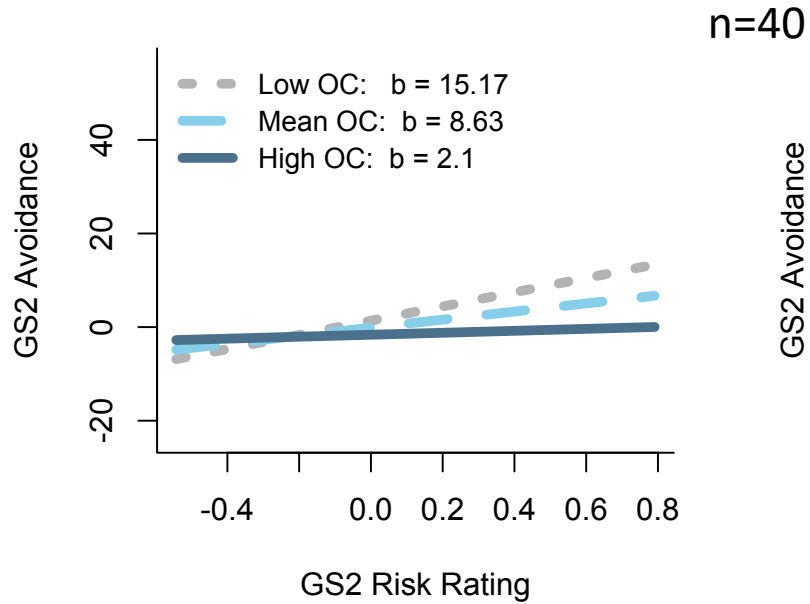
| | | | |
|---------|--|--|---|
| Stim. |  GS2 |  GS3 |  CS+ |
| DP x RR | n. s. | n. s. | n.s. |

Obsessive-Compulsive Symptoms

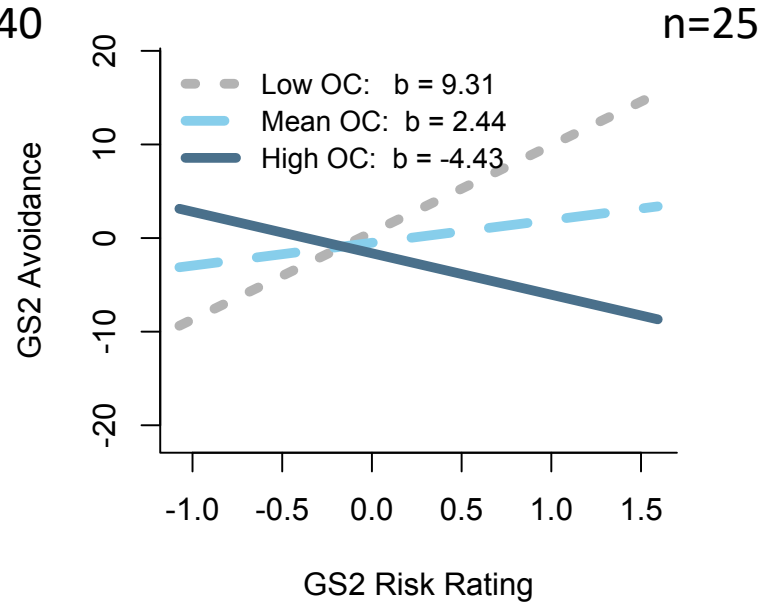


| | | | |
|---------|--|----------|----------|
| Stim. | <div style="border: 2px solid red; padding: 5px; display: inline-block;">○ GS2</div> | ○ GS3 | ○ CS+ |
| OC x RR | $\beta = -.40^*$ | n. s. | n. s. |

Disgust Condition, US Disgust \leq 5

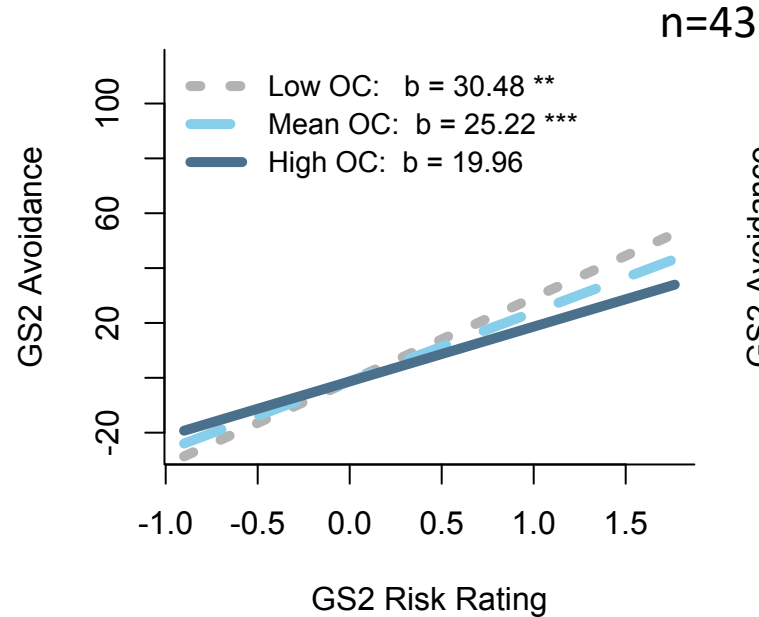


Disgust Condition, US Disgust $>$ 5

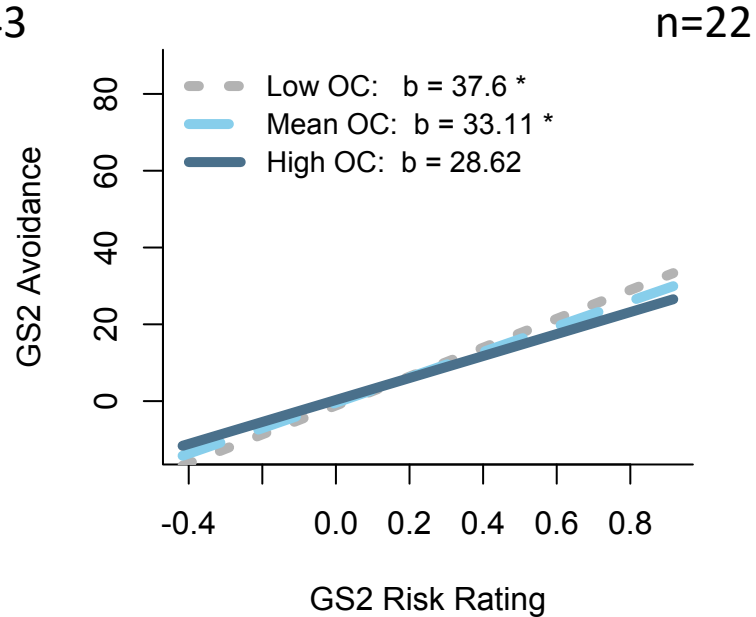


Increasing US disgust
 ↓
 OC symptoms *decrease*
 Pavlovian-instrumental
 covariation

Shock Condition, US Pain \leq 5



Shock Condition, US Pain $>$ 5



Increasing US pain
 ↓
 No effect of OC
 symptoms on Pavlovian-
 instrumental covariation

Conclusions

- Fear promotes rapid selection of a defensive behavior.
- Disgust, by contrast, may promote *careful deliberation* of potential actions.
- Intolerance of uncertainty and OC symptoms may exacerbate this effect



Fearful

Run away fast!



Disgusted

Back away carefully...

Conclusions

- Fear promotes rapid selection of a defensive behavior.
- Disgust, by contrast, may promote *careful deliberation* of potential actions.
- Intolerance of uncertainty and OC symptoms may exacerbate this effect
- This was adaptive in this task, but is likely maladaptive in the context of other goals.



Fearful

Run away fast!



Disgusted

Back away carefully...

Therapeutic aims:

Reduce
avoidance of
disgust cues?

OR

Disengage from
potential disgust
cues?

Future Directions

- Test responding to other forms of generalization stimuli following conditioned disgust, e.g. contextual or spatial similarity to the threat cue
- Test other forms of disgust-motivated avoidance, i.e. passive avoidance, behavioral inhibition
- Investigate disgust-related generalization and avoidance in OCD patients and other clinical populations prone to excessive disgust

Thank you!

- ANGST Lab
- Chris Hunt
- Sam Cooper
- Bunmi Olatunji
- Shmuel Lissek

