

Emotion Regulation and Cognitive Function

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Regulation of negative emotions

- **Emotion Regulation** – Process by which we influence which emotions we have, and when and how we experience them (Gross, 1998).



Regulation of negative emotions

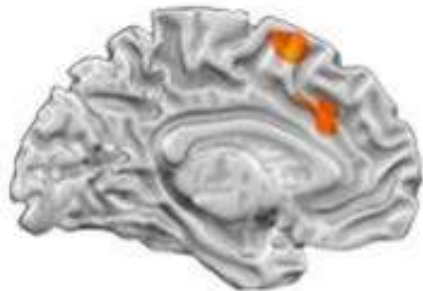
- **Reappraisal**– Reinterpret the meaning of a negative stimulus to change emotional response (Gross, 1998).

Meta-analysis of cognitive reappraisal

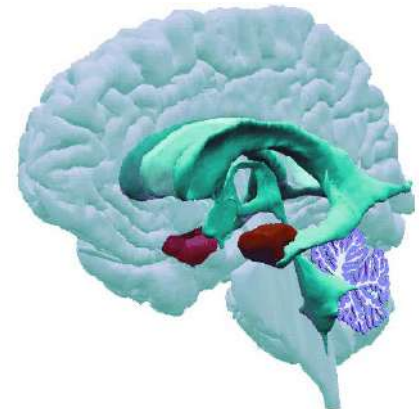
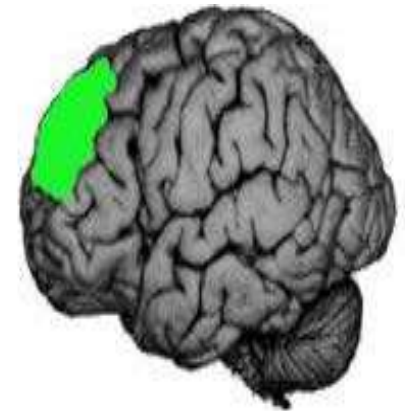
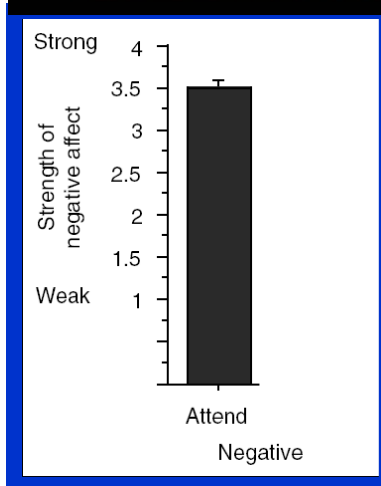
Lateral



Medial



Buhle*, Silvers*, et al., (2014)



Ochsner & Gross, 2005

Regulation of negative emotions

- **Reappraisal**– Reinterpret the meaning of a negative stimulus to change emotional response (Gross, 1998).

e.g., Vrticka et al., 2013



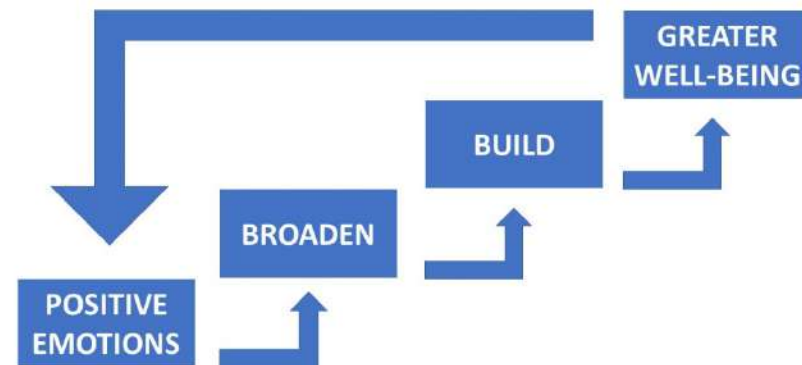
e.g. Holland & Kensinger, 2013



e.g., Delgado et al., 2008

Regulation of negative emotions

- **Emotion regulation strategies such as reappraisal:**
 - Not effective for everyone or in all contexts (Troy et al., 2013).
 - Recruits more effortful cognitive control processes (Strauss et al., 2016).
 - *Difficult due to age-related declines in cognitive control* (Liang et al., 2017; Shiota & Levenson, 2010)
 - Not as effective under stress (Raio et al, 2013).
 - Can lead to increases in peak cortisol reactivity in response to social or physical stressors (Denson et al., 2014).
- **Broaden and build theory of positive emotion** (Catalino & Fredrickson, 2011)
 - Broadens one's cognitive perspective
 - Helps build psychological resources for coping



Remember the good times...

- The retrieval of autobiographical memories can bring back emotions tied to the original experience (Westerman et al., 1996; Rubin, 2007).
- Adaptive role of autobiographical memories
 - Bolster a sense of self-identity (Bluck et al., 2005)
 - Shape future/prospective planning (Schacter & Addis, 2007)
 - Influence an individual's well-being (Young et al., 2013).
- Can the recall of positive memories recruit neural circuits involved in reward and increase subjective well-being?

Positive memory recall paradigm

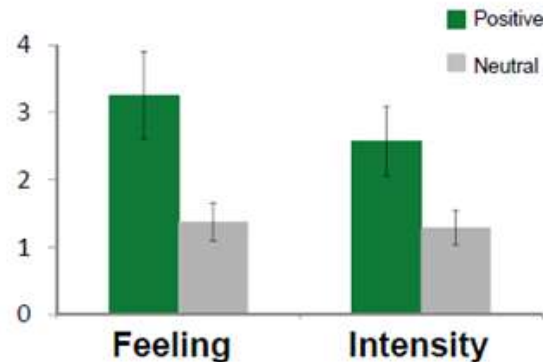


First session – Autobiographical Memory Questionnaire (AMQ)

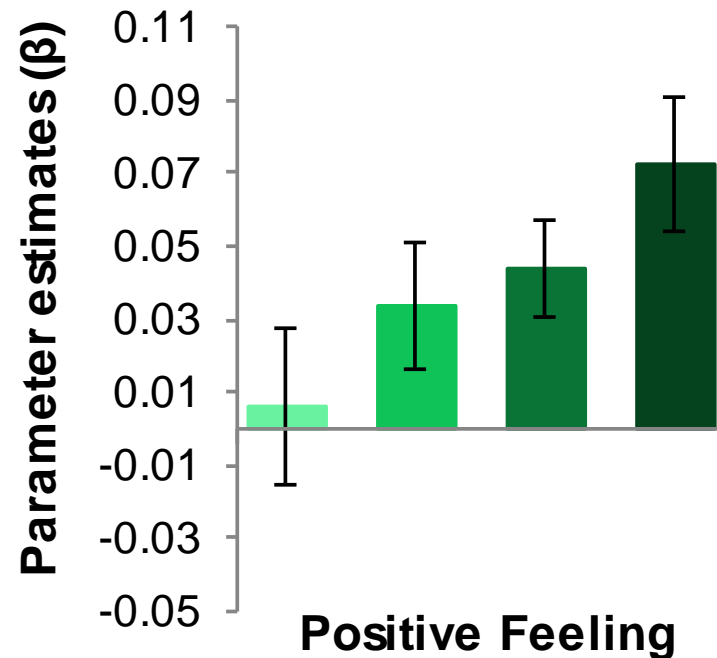
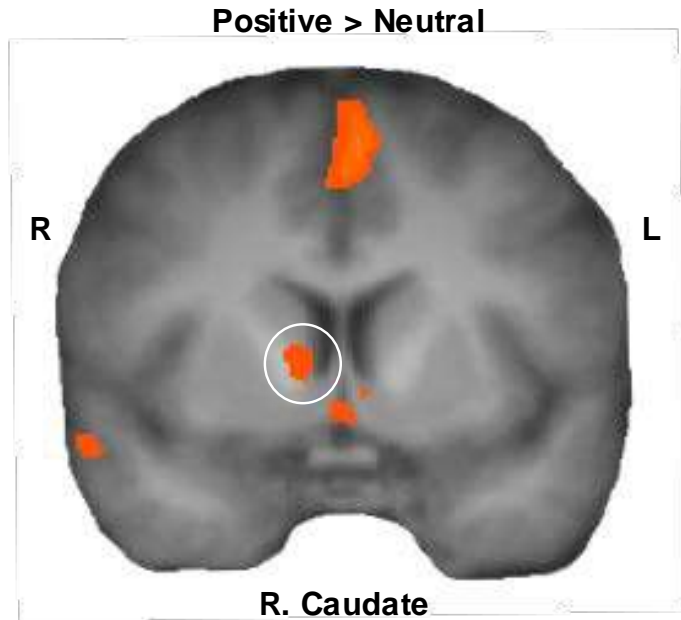
Provide brief description of memory you were personally involved in (cued recall).

Playing in the snow

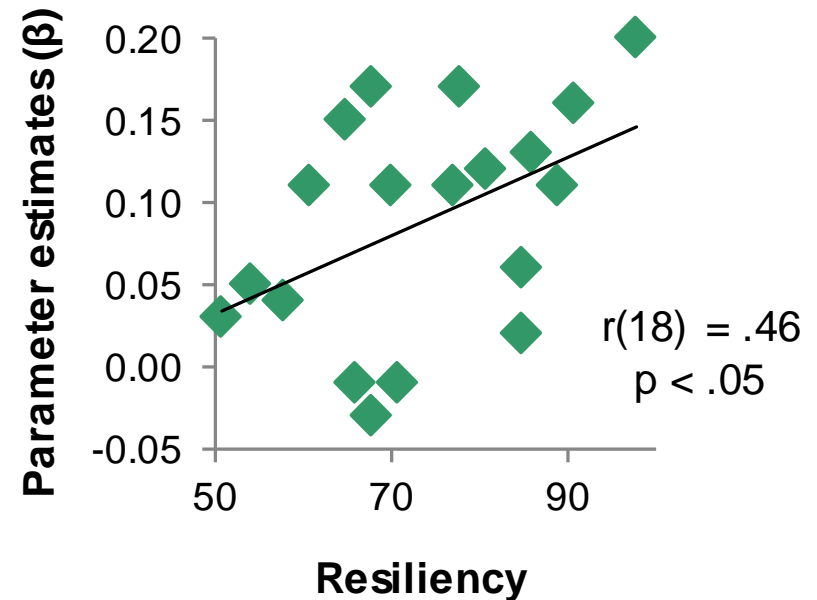
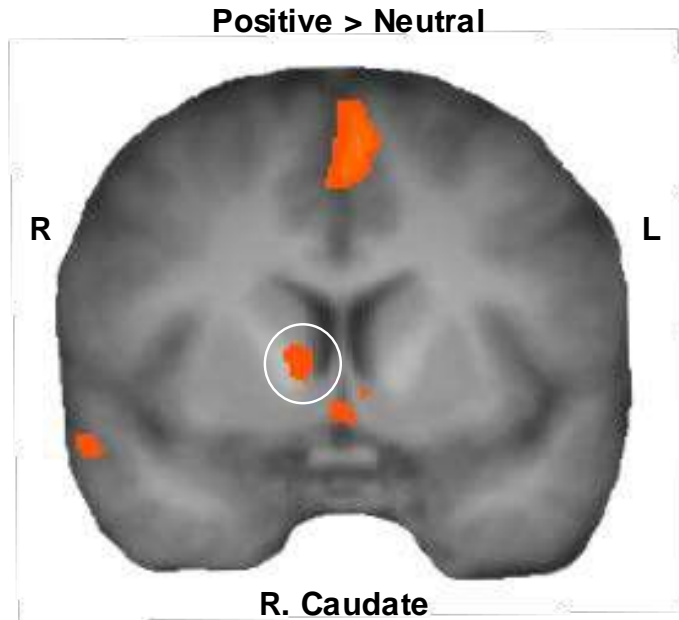
Grocery shopping



Remembering our positive past recruits reward-related regions as a function of positive feeling

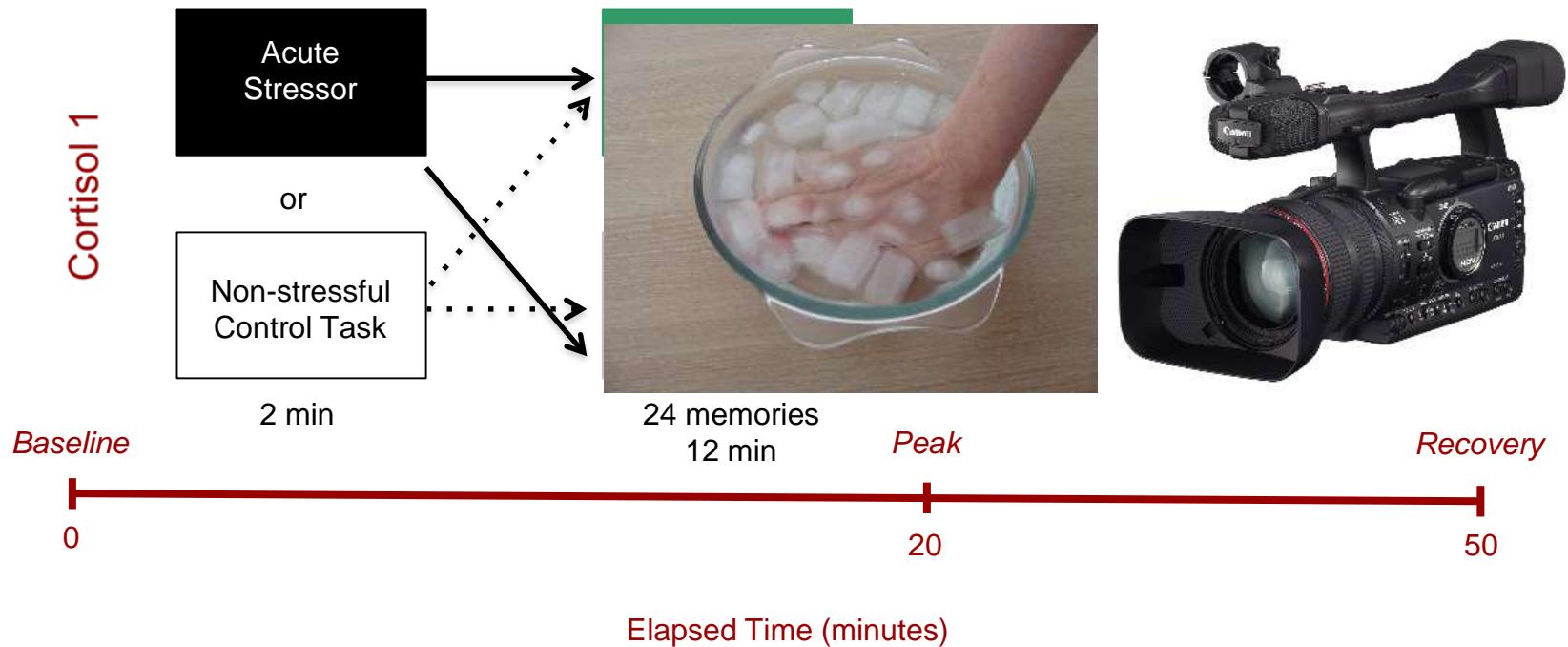


Remembering our positive past correlates with individual differences in resiliency



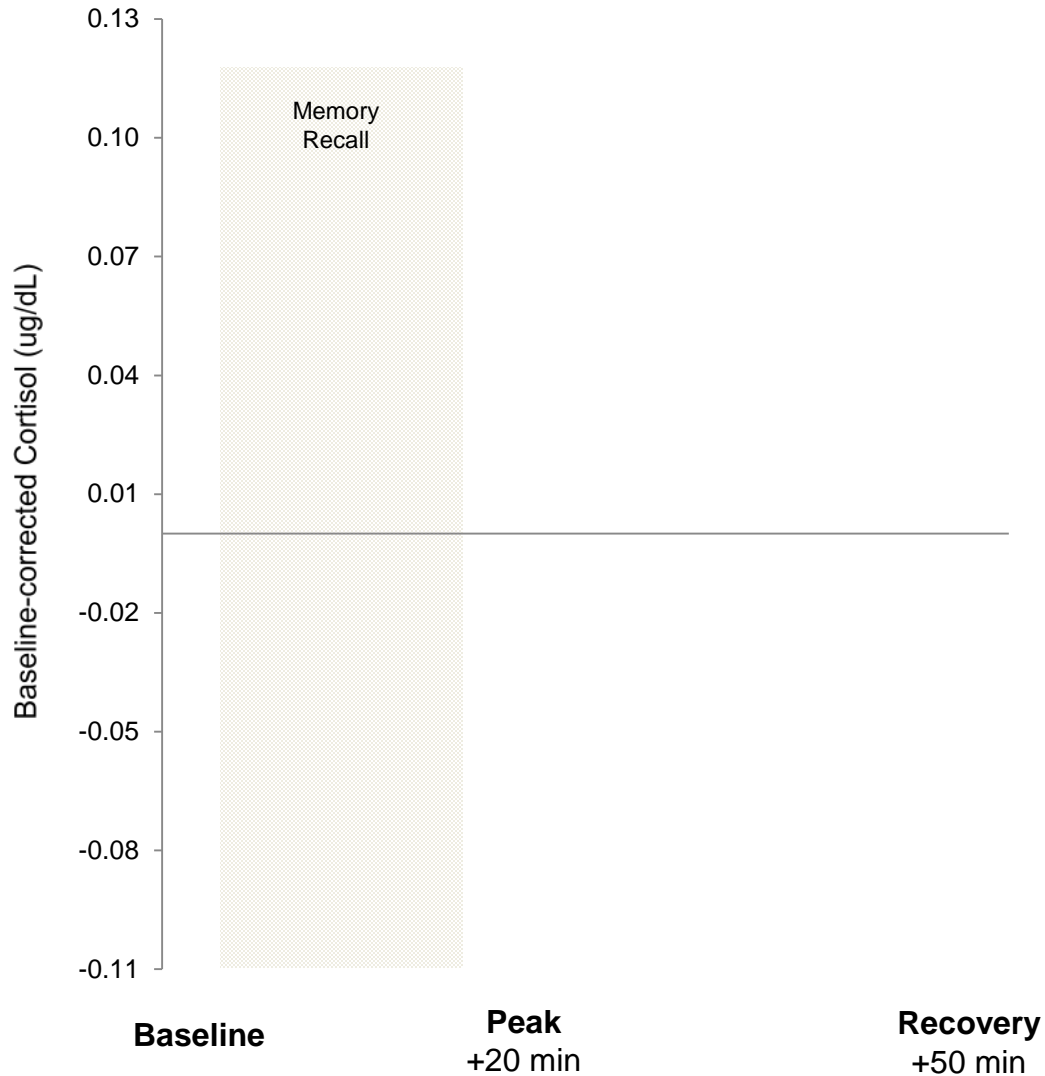
Can positive memory recall serve as an emotion regulation strategy?

Reminiscing about the past while under stress

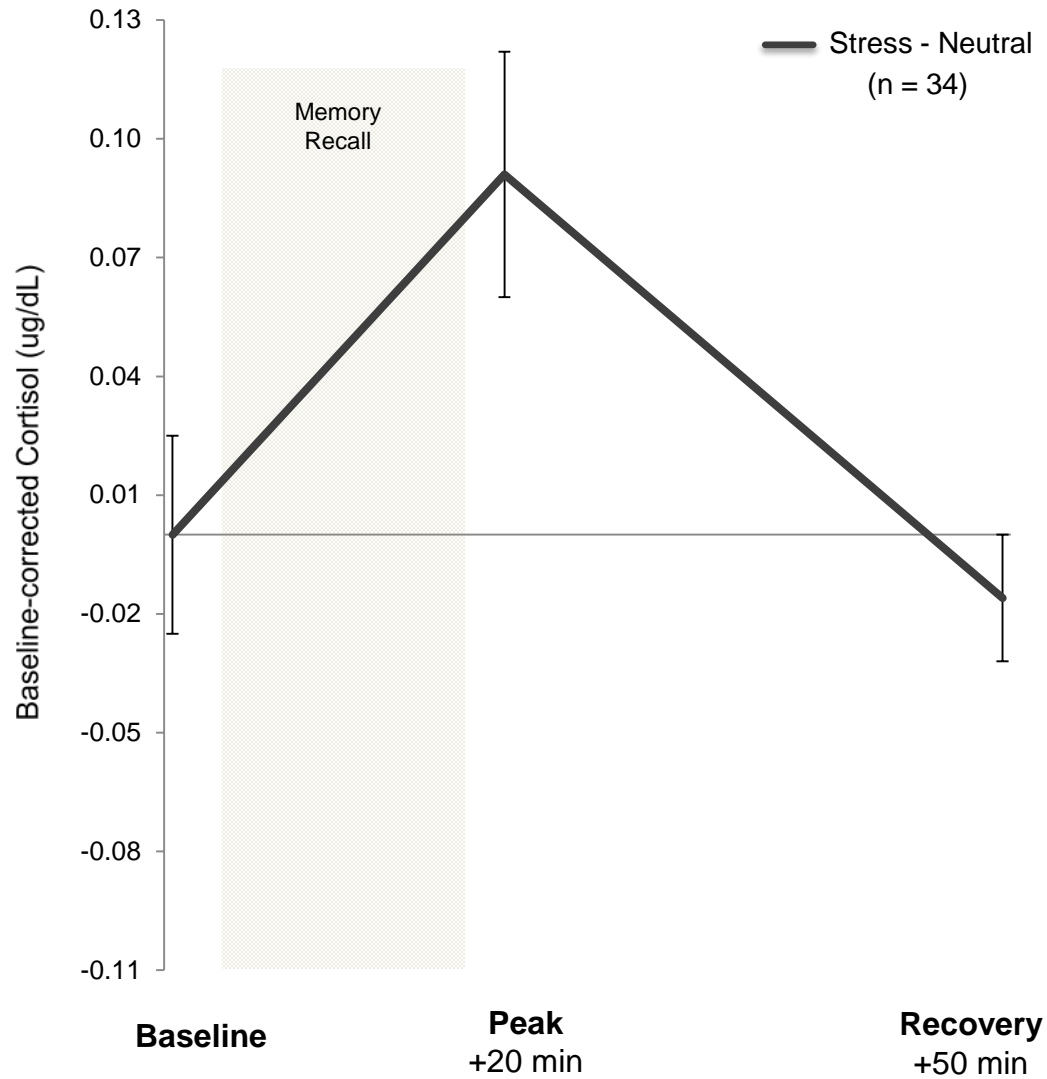


Socially evaluated cold-pressor test (Schwabe et al., 2008)

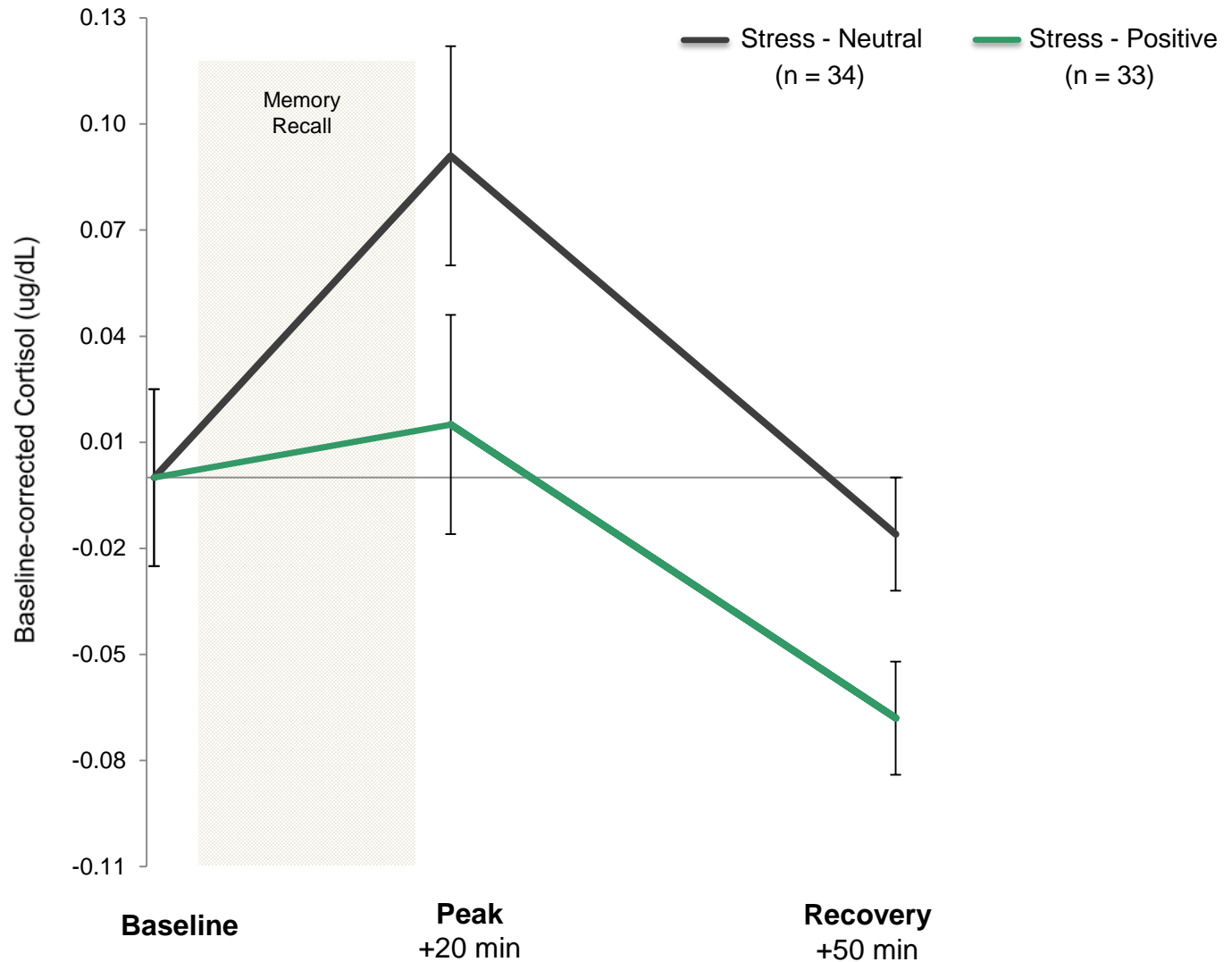
Cortisol Change by Condition and Memory Valence



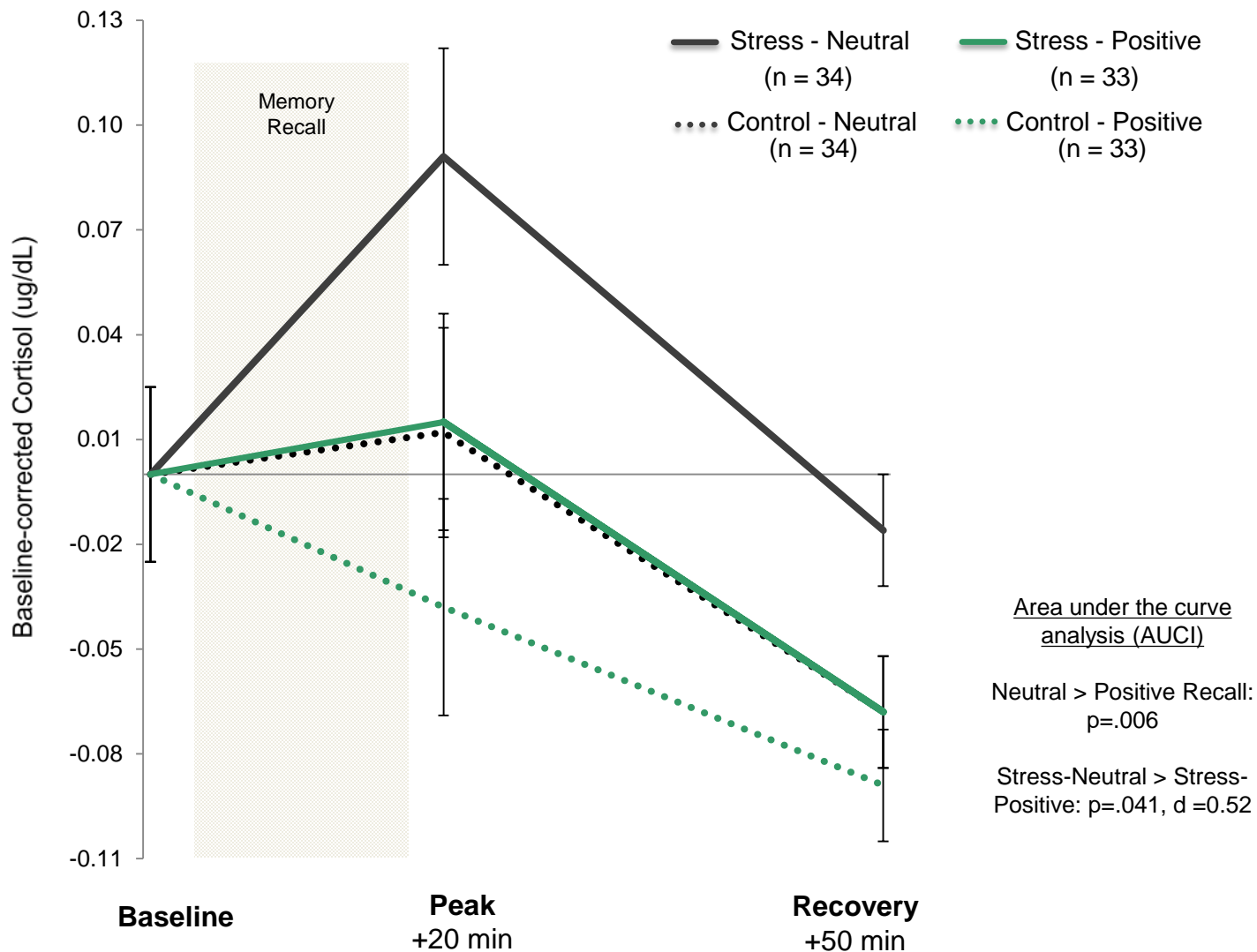
Cortisol Change by Condition and Memory Valence



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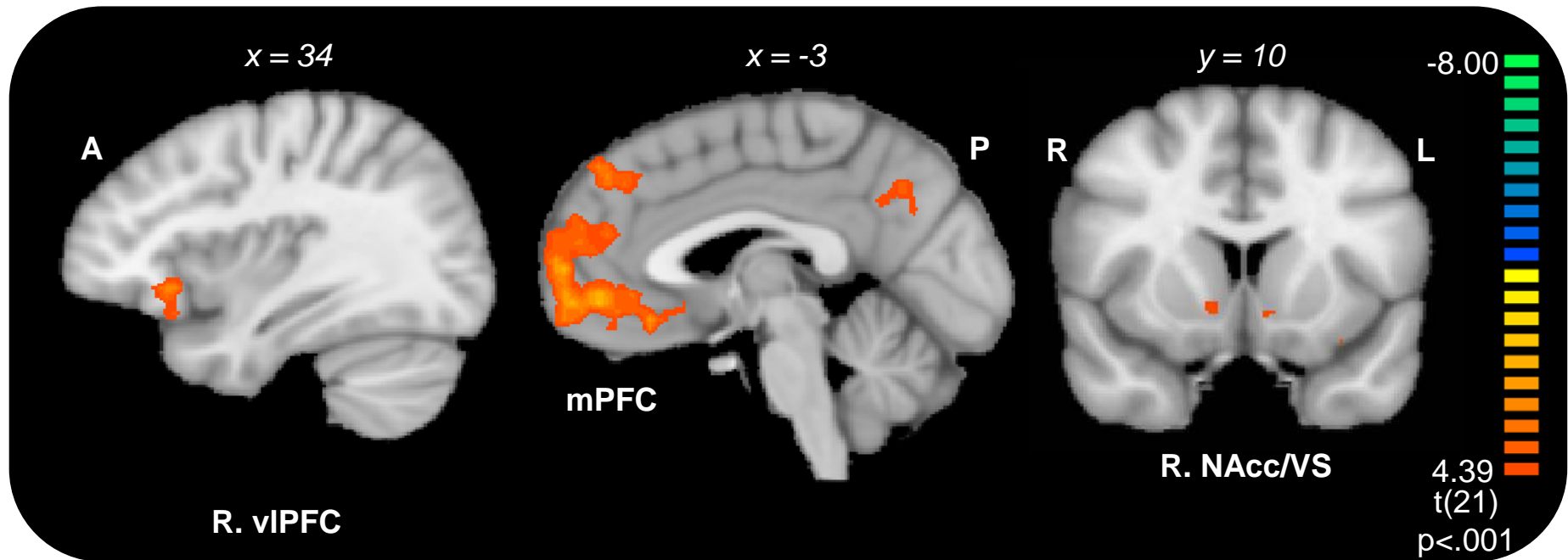


Cortisol Change by Condition and Memory Valence



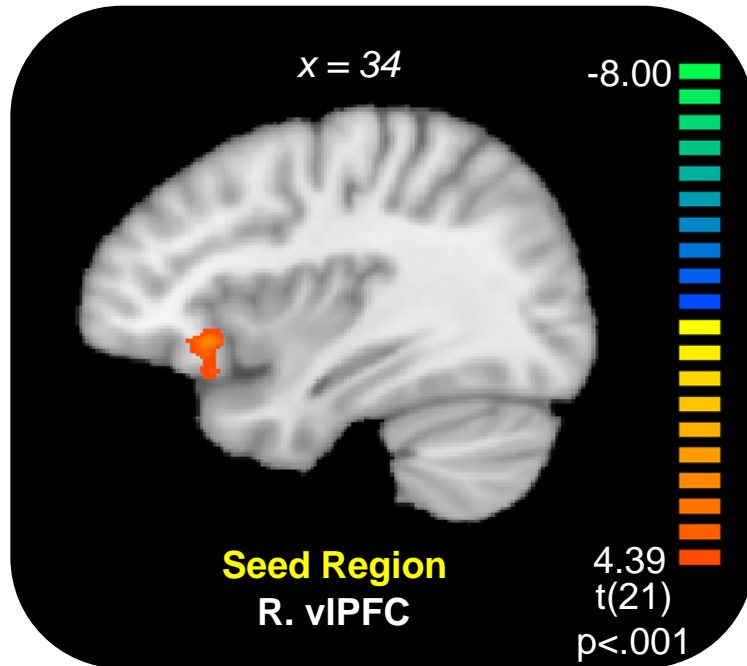
Parametric regression of feeling ratings during memory recall

Stress-Positive Group



Reminiscing about positive memories recruits regions associated with emotion regulation and reward-processing.

Parametric regression of feeling ratings during memory recall

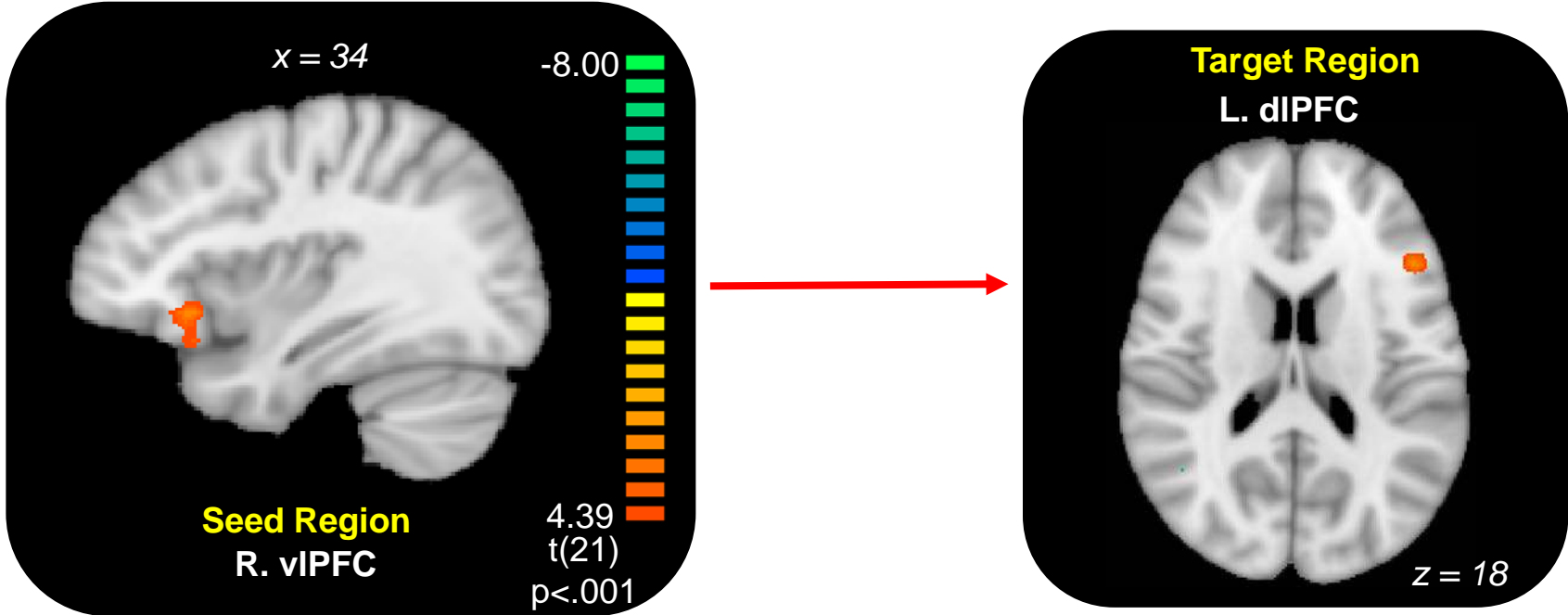


- Emotion regulation
(e.g., Ochsner et al., 2004, Lieberman et al., 2007)
- Reappraisal success
(Wager et al., 2008)
- Response selection and inhibitory function
(e.g., Robbins, 2007)

Psychophysiological Interaction (PPI) Analysis:

Psychological context: Feeling ratings during Memory Recall
Stress-Positive Group

Stronger vIPFC-dIPFC connectivity (emotion regulation circuitry) as a function of increased positive feelings



Psychophysiological Interaction (PPI) Analysis:
Psychological context: Feeling ratings during Memory Recall
Stress-Positive Group

Emotion regulation via positive emotions

- **Recalling positive experiences from the past:**
 - Increases positive emotions & influences mood.
 - Engages reward-related neural circuitry.
- **Positive memories may serve as an alternative form of emotion regulation.**
 - Dampens the physiological response to acute stress.
 - Engages neural circuitry potentially involved in emotion regulatory processes.
- ***Future direction:* Finding positive meaning in the negative past changes how we feel and updates memories.**
 - Positive meaning finding leads to increases in positive emotion at future retrieval, which tracks greater changes in positive memory content.

Implications for Aging

- **Viability of alternative forms of emotion regulation**
 - Age-related declines in cognitive function may make typical regulation strategies more effortful.
 - Similarities in reward-related circuitry (e.g., Samanez-Larkin et al., 2007)
- **Positivity effect: Age related changes in motivation**
 - Meta-analysis supports a positivity effect increase with age (Reed et al., 2014; Carstensen and DeLiema, 2018)
 - Associated with improved health (Kalokerinos et al. 2014) and effective in terms of future interventions (e.g., positive, rather than negative messages; Notthoff & Carstensen, 2014)
- **Neural circuitry of positive emotion regulation in aging?**
 - Recent work suggests shift from more lateral to medial regions in aging during emotion regulation (Van Reekum et al, 2018).

Acknowledgements

Laboratory

Current

Jamil Bhanji
Emily Brudner
Jeff Dennison
Verena Ly
Megan Speer
Sally Wang
Noriya Watanabe

Former

Dominic Fareri
Katie Dickerson
Stephanie Kim
Vicki Lee
Heena Manglani
Mike Niznikiewicz
David Smith

Collaborators

- Luke Chang
- Julie Fiez
- Liz Phelps
- Daniela Schiller



MCKNIGHT FOUNDATION

