

## Introduction

- People with multiple sclerosis (PwMS) experience increased rates of psychiatric disorders (e.g., Jones et al., 2012; Pronchow et al., 2011).
- Recently, emotion regulation and emotion dysregulation have been examined as transdiagnostic factors that capture the affective functioning underlying psychiatric disorders (e.g., Romer, Lee, Salters-Pedneault, Erisman, Orsillo, & Mennin, 2009; Gleen & Klonsky, 2009).
- In comparison to healthy controls, PwMS report greater emotion dysregulation (Phillips et al., 2014). Due to the higher prevalence of psychiatric disorders in PwMS there is need to target emotion dysregulation in PwMS as a mechanism to potentially ameliorate affective functioning.
- Mindfulness, a non-judgmental present moment awareness, has recently been explored as a factor that improves affective functioning. Higher levels of trait mindfulness in PwMS are associated with improvements in affective functioning (e.g., Senders et al., 2014; Pakenhan & Samios, 2013). For instance, initial research suggests higher levels of trait mindfulness are associated with lower levels of emotion dysregulation in PwMS (Schirda et al., 2015).

### Specific Aims

- Aim 1 Replicate the established negative relationship between trait mindfulness and emotion dysregulation in two novel samples of PwMS.
- Aim 2 Extend the identified relationship to a behavioral correlate of emotion regulation strategy use during a worry and rumination induction.

## Procedures

### Participants:

- Study 1: 111 PwMS (16 males; 14.41%)
- Study 2: 61 PwMS (14 males; 22.9%)
- Absence of comorbid neurological or psychiatric disorders
- Score > 23 on the MMSE (Study 2)
- Relapse and corticosteroid free for last 30 days

| Demographic      | Study 1      |          | Study 2       |          |
|------------------|--------------|----------|---------------|----------|
|                  | Mean (SD)    | Range    | Mean (SD)     | Range    |
| Age              | 45.68 (9.52) | 30-59    | 45.74(8.10)   | 31-59    |
| Education        | 16.00 (2.86) | 12 – 24  | 15.99 (2.27)  | 12 – 23  |
| HADS-D           | 6.14 (4.06)  | 0 – 16   | -             | -        |
| BDI              | -            | -        | 12.30 (10.29) | 0 – 46   |
| EDSS             | 4.69 (1.25)  | 1 – 7    | 4.35 (1.30)   | 0 – 7    |
| Disease Duration | 10.14 (8.38) | < 1 – 34 | 10.33 (7.36)  | 0.5 – 30 |

### Measures:

- Five Facet Mindfulness Questionnaire (FFMQ; Baer et al., 2006)
- Difficulties in Emotion Regulation Scale (DERS; Gratz & Roemer, 2004)

#### Study 1

- Hospital Anxiety and Depression Scale (HADS; Zigmond & Snaith, 1983)
- Contextual Emotion Regulation Assessment

#### Study 2

- Beck Depression Inventory-II (Beck et al., 1996)
- ER Strategy Use during Worry and Rumination Induction

## Analyses

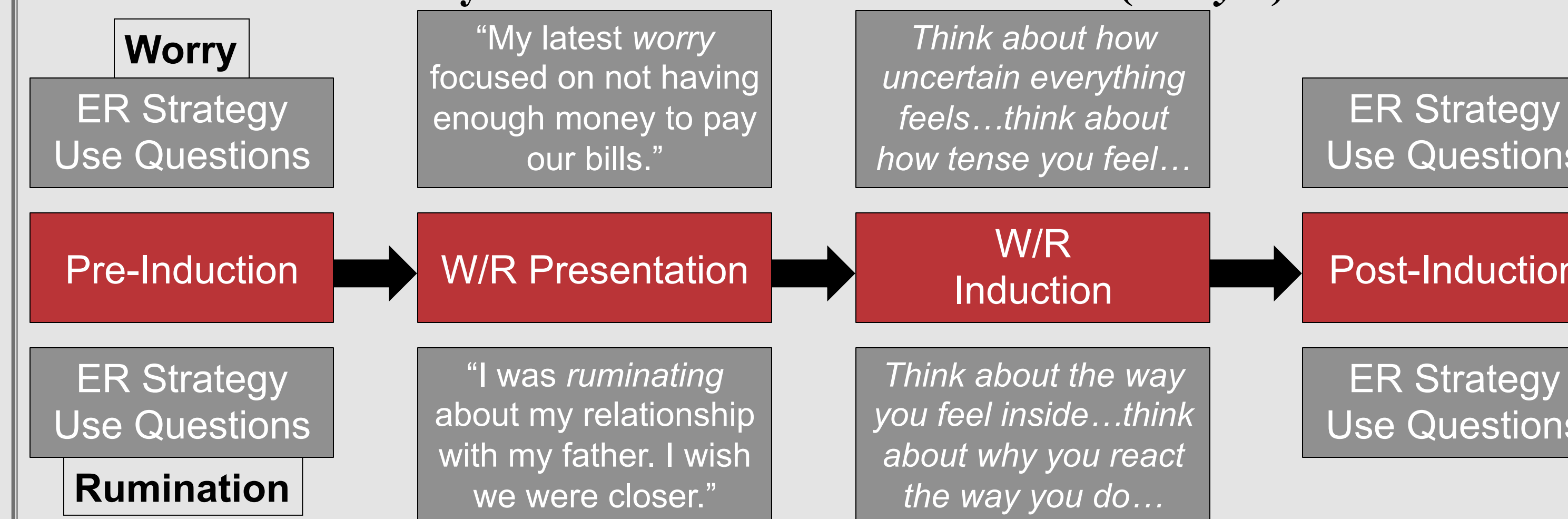
### Study 1 & Study 2:

- A factor analysis was completed to establish maladaptive and adaptive strategy composites. Composite scores were created for FFMQ and DERS.
- Composite variables were outlier corrected and tested for normality. Z scores  $\pm 2.5$  standard deviations from the mean were replaced.
- Bivariate correlations were used to test the relationship between trait mindfulness and measures of emotion dysregulation.
- Exploratory moderations were conducted on significant correlations.

### Contextual Emotion Regulation Assessment (Study 1)

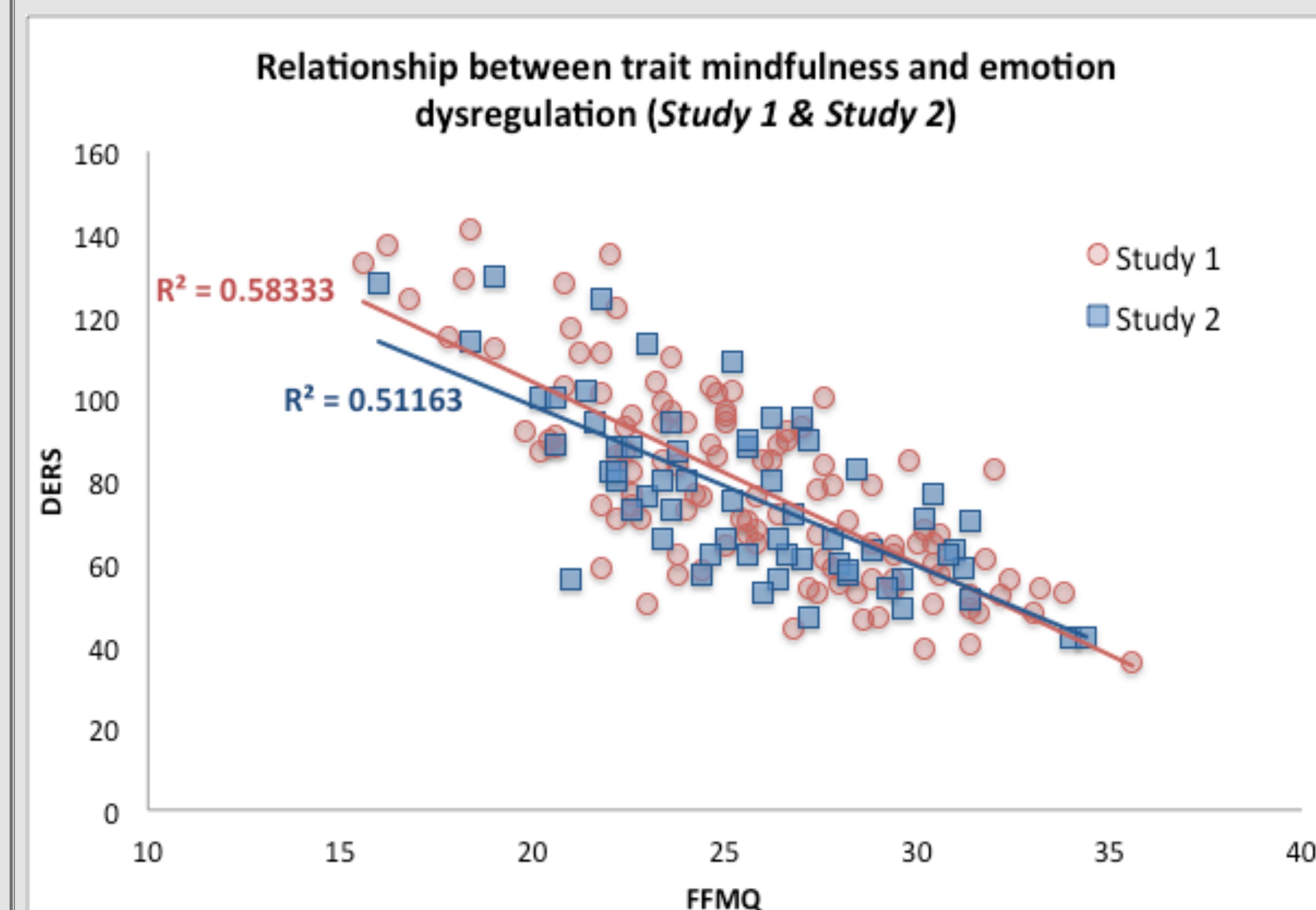
| Part 1:<br>Education on Emotions and Emotion Regulation  | Part 2:<br>Situation Generation  | Part 3:<br>Ratings on Strategy Use and Success of Use   |
|--|--|---|
| <ul style="list-style-type: none"> <li>• Definitions of emotion and emotion regulation in various contexts.</li> <li>• Emotion was divided into subjective experience, physical arousal, and behaviors.</li> </ul> | <ul style="list-style-type: none"> <li>• Participants generated 24 situations across various combinations of three contexts: emotion-elicited (anxiety, anger, sadness, happiness), environment (health, social) and intensity (low, moderate, high).</li> </ul> | <ul style="list-style-type: none"> <li>• Eight semi-randomly selected situations presented back.</li> <li>• Rated strategy use for: acceptance, cognitive reappraisal, problem solving, expressive suppression, self-criticism, thought suppression, and worry/rumination.</li> </ul> |

### Worry and Rumination Induction Task (Study 2)



## Results

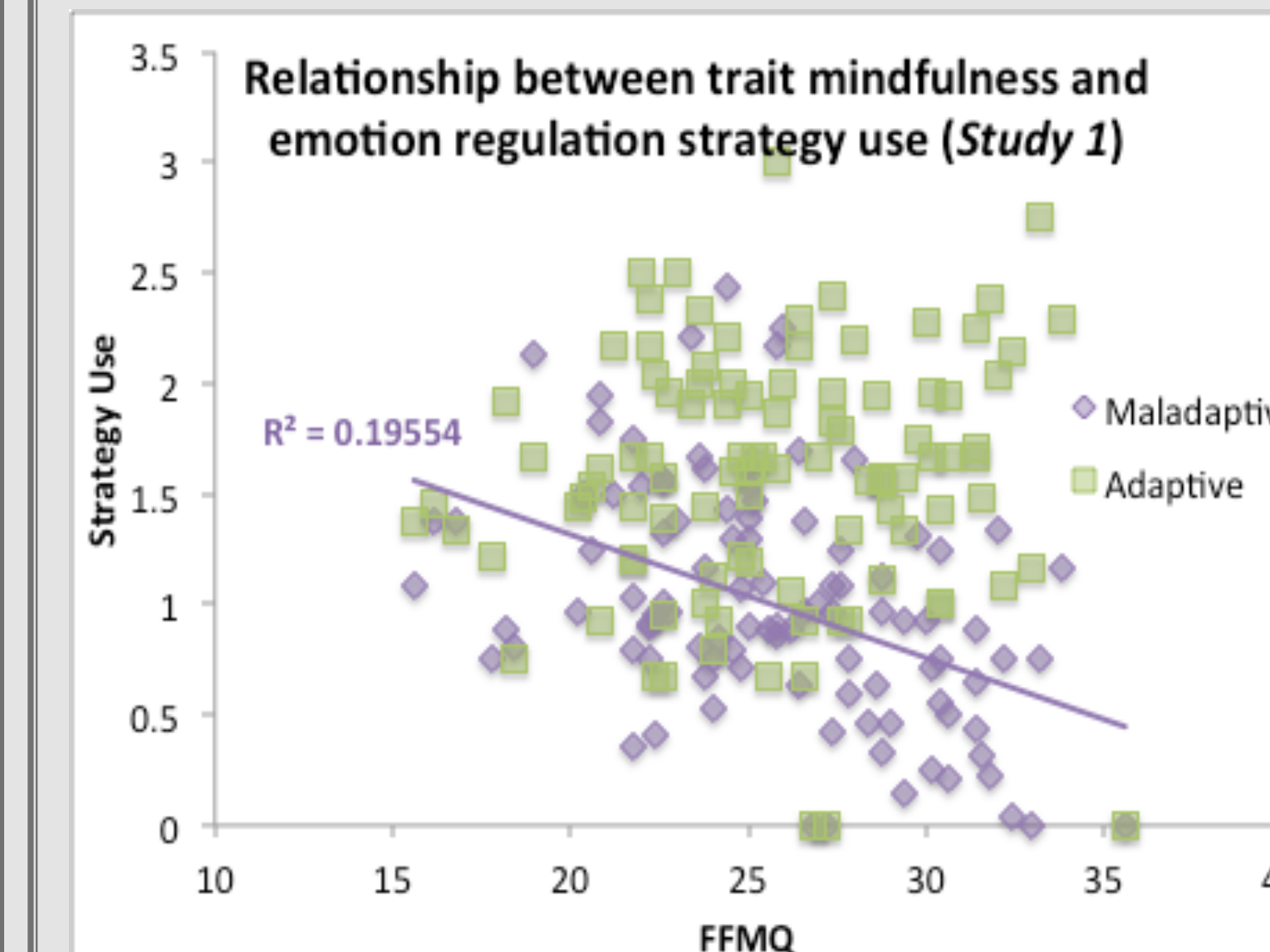
### Trait Mindfulness Negatively Correlates with Emotion Dysregulation



Higher levels of trait mindfulness were associated with lower levels of emotion dysregulation in both Study 1 ( $r = -.74, p < .01$ ) and Study 2 ( $r = -.67, p < .01$ ).

## Results

### Trait Mindfulness and Emotion Regulation Strategy Use



| Measures                  | Study 2 |      |      |     |
|---------------------------|---------|------|------|-----|
|                           | 1       | 2    | 3    | 4   |
| 1. FFMQ                   |         |      |      |     |
| 2. Worry Maladaptive      | -.15    |      |      |     |
| 3. Worry Adaptive         | .32*    | .12  |      |     |
| 4. Rumination Maladaptive | -.09    | .18  | -.18 |     |
| 5. Rumination Adaptive    | .04     | -.00 | .27* | .14 |

#### Study 1

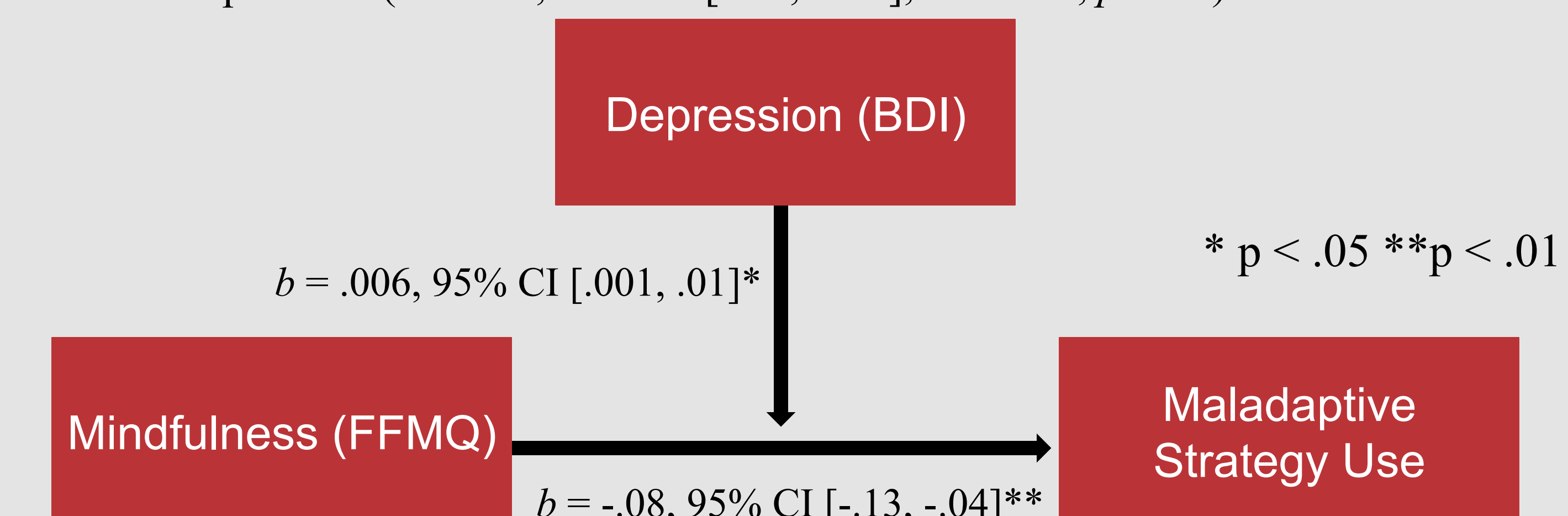
- Trait mindfulness was associated with maladaptive strategy use such that PwMS showing higher levels of mindfulness employed fewer maladaptive strategies ( $r = -.44, p < .01$ ). Trait mindfulness was not significantly associated with adaptive strategy use.

#### Study 2

- Trait mindfulness was associated with adaptive strategy use in the worry condition such that PwMS showing higher levels of mindfulness employed greater adaptive strategies during a worry induction.
- Mindfulness was not associated with adaptive strategy use during the rumination condition or maladaptive strategy use in either condition.

### Depression as a Moderator of Mindfulness and Emotion Dysregulation

- Depression did not moderate the relationship between FFMQ and DERS in either study.
- The significant relationship between FFMQ and adaptive strategy use during a worry induction (Study 2) was not moderated by depression.
- However, the relationship between FFMQ and maladaptive strategy use (Study 1) was moderated by depression, such that the effect was significant in those with lower levels of depression ( $b = -.07, 95\% \text{ CI } [-.11, -.04], t = -4.30$ \*\*) and not in those with higher levels of depression ( $b = -.02, 95\% \text{ CI } [-.05, 0.01], t = -1.55, p = .12$ ).



## Conclusions

- The current research corroborates the strong negative relationship between trait mindfulness and emotion dysregulation in two novel samples of PwMS.
- Findings suggest the role of depression in the identified relationship is still unclear. The current research suggests depression may moderate the relationship between mindfulness and maladaptive ER strategy use. However, additional research employing a larger sample size is needed to corroborate this finding.
- The cross-sectional design prevents claims regarding causality in the relationship between trait mindfulness and emotion dysregulation.
- Future directions should involve a controlled RCT to investigate the causal relationship between trait mindfulness and emotion dysregulation. And further explore potential methods to behaviorally operationalize emotion dysregulation.

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