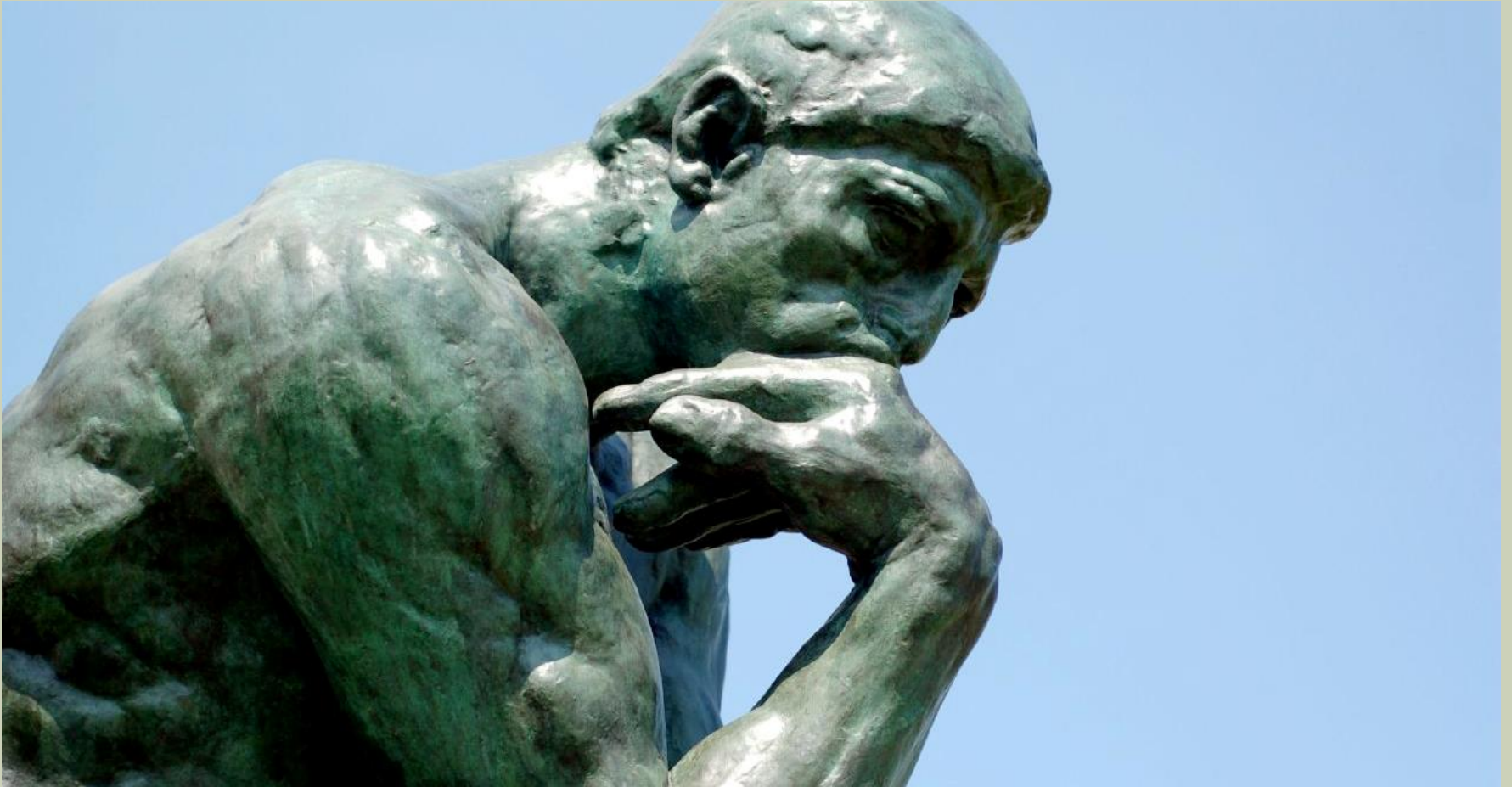# APRIL FOOLS!

# RUMINATION AND HEALTH BEHAVIORS: A DAILY DIARY STUDY

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# RUMINATION

# HEALTH BEHAVIORS

- Poor health behaviors epidemic

- Better college student health -> better US public health

- Need for exploration of additional factors hb engagement college students remains

# RUMINATION -> HEALTH BEHAVIORS

- Acting impulsively

- Not acting at all

# METHOD: DAILY DIARY

- **Accuracy: Error retrospection**
  - Memory reconstruction
  - Availability heuristic
  - State congruent recall

- **Health behaviors frequent**
  - Multiple times per day or week
  - Temporality
  - Precision

# METHOD: STUDY

- 285 college students
- 11 day online daily diary study
- Outcomes:
  - Fruit
  - Vegetable
  - Exercise
  - Alcohol
  - Sexual risk taking
  - Cigarette smoking

# RESULTS

- **Multilevel modeling MPLUS**
  - Normality and missingness
  - Level 1: within person, within days
  - Level 2: between person, across days
  - *Always include time
  - *Bolger & Laurenceau, 2013
- **Rumination -> HBs**
  - ICCs > .10 (Rum .61-.69, Meds .18-.66, HBs .44-.82)

# RESULTS

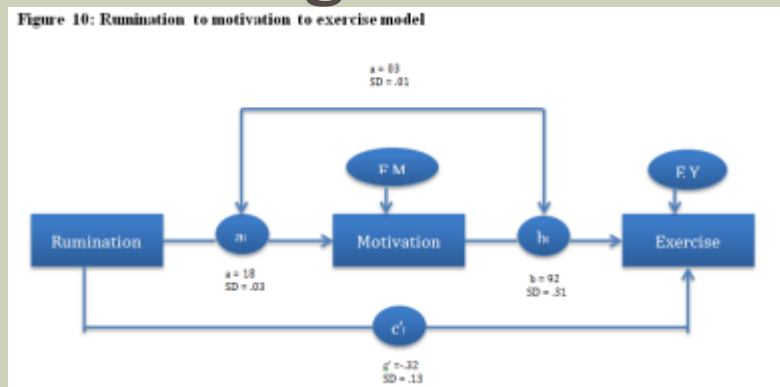**Table 5: Multilevel model of daily rumination to daily health behavior outcomes over time**

| | Estimate | (SE) | $t^a$ | $p^b$ | $CI_{95}$ Lower | $CI_{95}$ Upper |
|---|---|---|---|---|---|---|
| **Within Level** | | | | | | |
| Fruit Intake on | | | | | | |
|   Rumination (within) | -.085 | .051 | 1.673 | .084† | -.015 | .185 |
|   Time | .003 | .006 | .454 | .650 | -.009 | .015 |
| Vegetable Intake on | | | | | | |
|   Rumination (within) | -.060 | .039 | 1.546 | .092† | -.040 | .136 |
|   Time | -.015 | .005 | -3.010 | .003** | -.026 | -.005 |
| Exercise on | | | | | | |
|   Rumination (within) | -.379 | 1.540 | -.246 | .806 | -3.398 | 2.640 |
|   Time | -.494 | .164 | -3.014 | .003** | -.816 | -.173 |
| Alcohol on | | | | | | |
|   Rumination (within) | .252 | .140 | 1.796 | .062† | -.225 | .527 |
|   Time | .003 | .015 | .214 | .830 | -.073 | .032 |
| Sexual Risk on | | | | | | |
|   Rumination (within) | .181 | .207 | .874 | .382 | -.255 | .588 |
|   Time | -.008 | .025 | -.315 | .753 | -.057 | .042 |
| **Between Level** | | | | | | |
| Fruit Intake on | | | | | | |
|   Rumination (between) | -.182 | .062 | 2.342 | .053† | -.015 | .185 |
| Vegetable Intake on | | | | | | |
|   Rumination (between) | -.092 | .041 | 2.146 | .047* | -.040 | .136 |
| Exercise on | | | | | | |
|   Rumination (between) | -.339 | 1.540 | -.246 | .112 | -.498 | 1.640 |
| Alcohol on | | | | | | |
|   Rumination (between) | .252 | .140 | 1.796 | .041* | -.125 | .927 |
| Sexual Risk on | | | | | | |
|   Rumination (between) | .122 | .97 | 1.3744 | .092† | -.127 | .238 |
| **Intercept (within)** | | | | | | |
|   Fruit | 1.171 | .057 | 20.475 | <.001 | -.015 | .121 |
|   Vegetable | .830 | .043 | 19.474 | <.001 | -.016 | .136 |
|   Exercise | 25.629 | 1.603 | 15.992 | <.001 | -3.398 | 2.640 |
|   Alcohol | 1.543 | .221 | 13.782 | <.001 | -.023 | .527 |
|   Sexual Risk | 2.682 | .177 | 15.149 | <.001 | -.225 | .588 |

# RESULTS

- ## Mediation L1:

  - ### Impulsivity significant for all HBs

    

    Figure 7: Rumination to impulsivity to exercise model
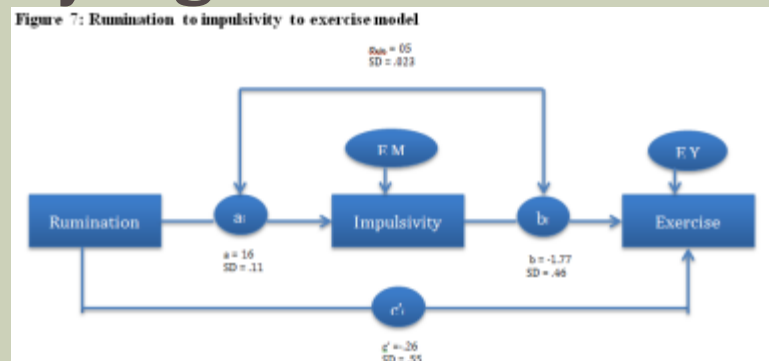
  - ### Inability to act significant for exercise

    

    Figure 10: Rumination to motivation to exercise model

# IMPLICATIONS

- Another predictor of maladaptive health behaviors, common in college students
  - Rumination!
  - Subclinical = Prevention

- Identified mechanisms of action for intervention

# LIMITATIONS

- **Directionality**

- **Recall**

- Not representative

# TAKEAWAYS

- Rumination may be important to study in the context of health behaviors

- Use daily diary studies for health behaviors

- Studying mechanisms is important

- You can do multilevel mediation! Promise!
  - Bolger & Laurenceau, 2013

# THANK YOU

- Select References:
    - Smith & Alloy, 2009
    - Raudenbush & Bryk, 2002
    - Shiffman, Stone, Hufford, 2008
    - Bolger & Laurenceau, 2013

- Riley.Kristen.E@gmail.com

# EXTRA SLIDES

Moderated mediation - level 2 predictor and a level 2 mediator

```
WITHIN = day0 wrumbxcw dinextdw ruminexw;
BETWEEN = MABSmot drumbxcb dinextdb ruminexb Motinexb;
CLUSTER = partic;
missing = all (-99);
DEFINE: ruminexw=dinextdw*wrumbxcw;
DEFINE: ruminexb=dinextdb*drumbxcb; Motinexb=MABSmot*dinextdb;
ANALYSIS: TYPE = twolevel random;
Algorithm = Integration;
Integration = Montecarlo;
MODEL:
%WITHIN%
Dexstmd ON wrumbxcw;
Dexstmd ON dinextdw ruminexw;
Dexstmd ON day0;

%BETWEEN%
Dexstmd ON drumbxcb;
MABSmot ON drumbxcb; MABSmot ON dinextdb ruminexb;
Dexstmd ON MABSmot; Dexstmd ON dinextdb Motinexb;

OUTPUT: sampstat cinterval;
```

# EXTRA SLIDES



**Three Types of HLM-Based Multilevel Mediation Models**
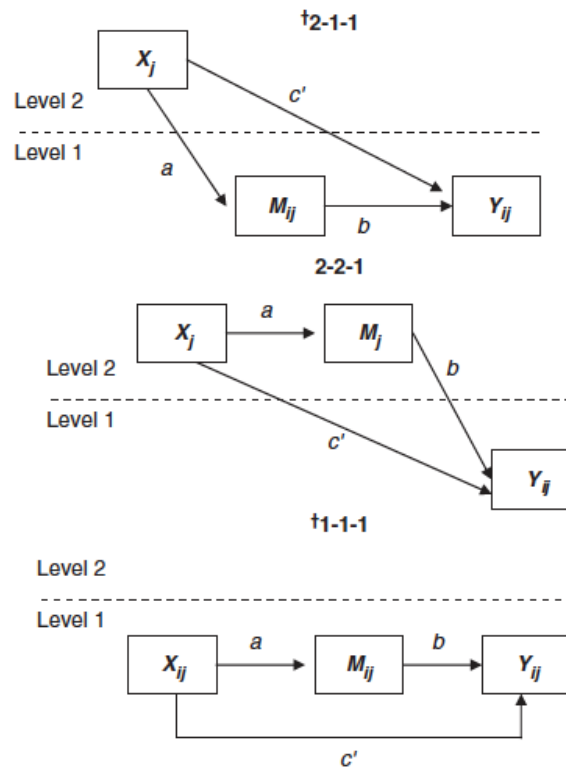
Note: †indicates that grand-mean centered HLM models can produce confounded estimates of the mediation effects. HLM = hierarchical linear modeling.

# EXTRA SLIDES

- Missing data :
  - MCAR
  - 9.72 of 11 daily diary days, or 88.3% of the days, an amount that is typical for daily diary completion (e.g., Losavio et al., 2011)

# EXTRA SLIDES

- Plotting multilevel moderation effects: http://www.quantpsy.org/interact/hlm2.htm