



Exploring Executive Function as a Mediator Between Food Insecurity and Depression Over Time Among First-Year College Students

Tran Huynh MPH RD¹, Emma Jane Rose PhD², Meg Bruening PhD MPH RD¹

¹Department of Nutritional Sciences, The Pennsylvania State University

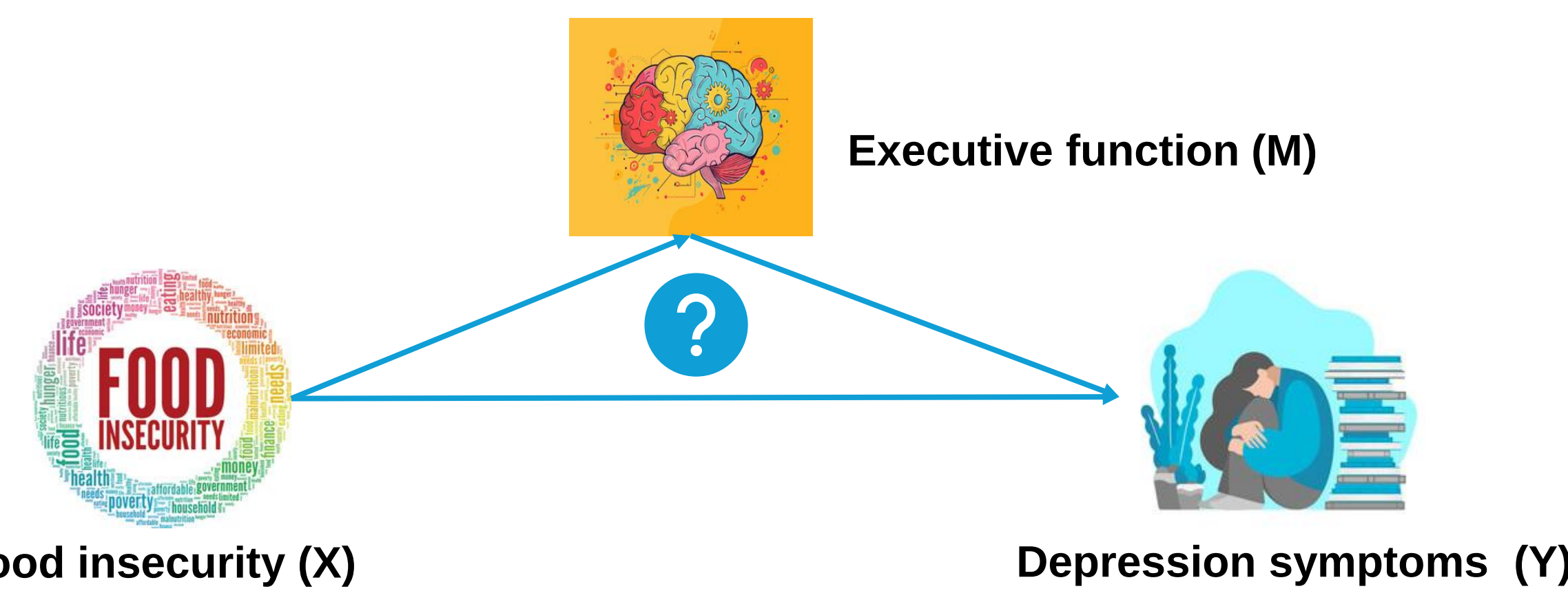
²Department of Psychology, The Pennsylvania State University

Introduction

- **Food insecurity (FI) is emerging among college students**¹
 - FI is the uncertain access to adequate and nutritious food
 - FI prevalence in US college students ranges from 36% - 47% and can begin from the very first year of college
- **Depression is a public health concern among US college students**
 - Nearly 2 in every 5 US college students reported symptoms of depression in 2023 – 2024²
 - FI has been linked to increased odds of depression in college students³
- **FI has been associated with impaired executive function (EF) in children and older adults but underexplored in emerging adults**⁴
 - EF is a set of high-order cognitive skills needed to achieve goals⁵
 - It remains unclear whether EF plays a mediating role between FI and depression

Objectives

- To examine the mediating role of **EF** in the association between **FI** and **depression symptoms** over time among first-year college students



Methods

Population

- Convenience sample of incoming **first-year full-time undergraduate students** in a study about student life at **two time points in Fall 2023 & Fall 2024**
 - T0: Prior to their arrival on campus (June/July)
 - T1: During the first semester on campus (October/November)

Measures

- **FI** over the last 30 days was assessed using the **USDA 10-item Adult Food Security Survey Module (AFSSM)** at T0 and T1
 - Affirmative answers were summed and categorized into food security and food insecurity
 - FI experience was then categorized as “**never**” or “**any FI**”

- **EF** was assessed using the **BRIEF-A survey**
 - Scores were summed up to calculate **Global Executive Composite (GEC)** T-scores. Higher GEC scores indicate worse EF

- **Depression symptoms** in the past 2 weeks were assessed using **DSM-5 Self-Rated Level 1 Cross-Cutting Symptom Measure (CCSM)**

Analysis

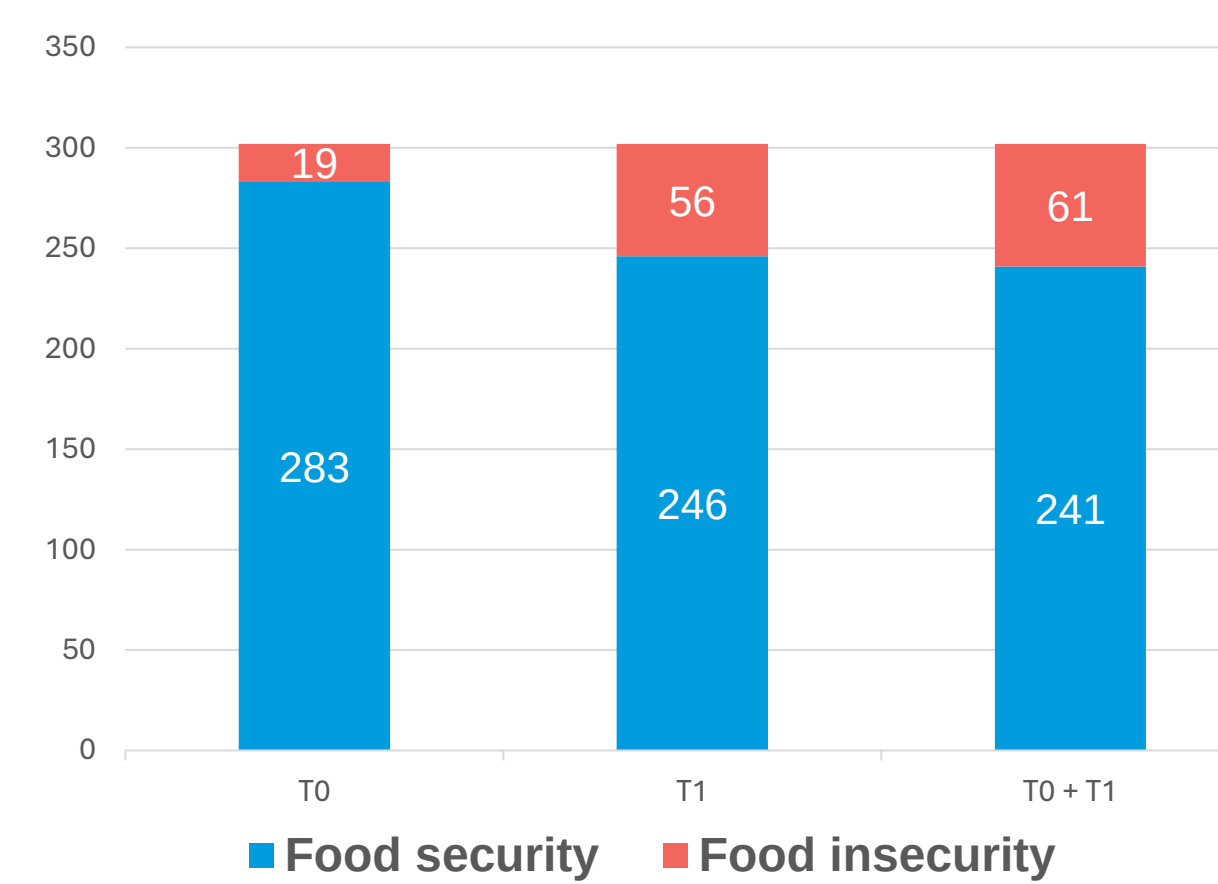
- Mixed linear regression & mediation analysis in R for bootstrapping
- Covariates: sex, race/ethnicity, Pell Grant status, first-generation status, parent's highest education, and parent's employment status.

Results

20% of students reported FI at any time

n = 302 undergraduate students	
Sex	64% female
Race/ethnicity	39% non-White
Pell Grant	28% receivers
First generation	24% students

Figure 1: Food Insecurity Status Over Time



20% of participants reported FI at any time

Figure 2: Executive Function Scores at T1

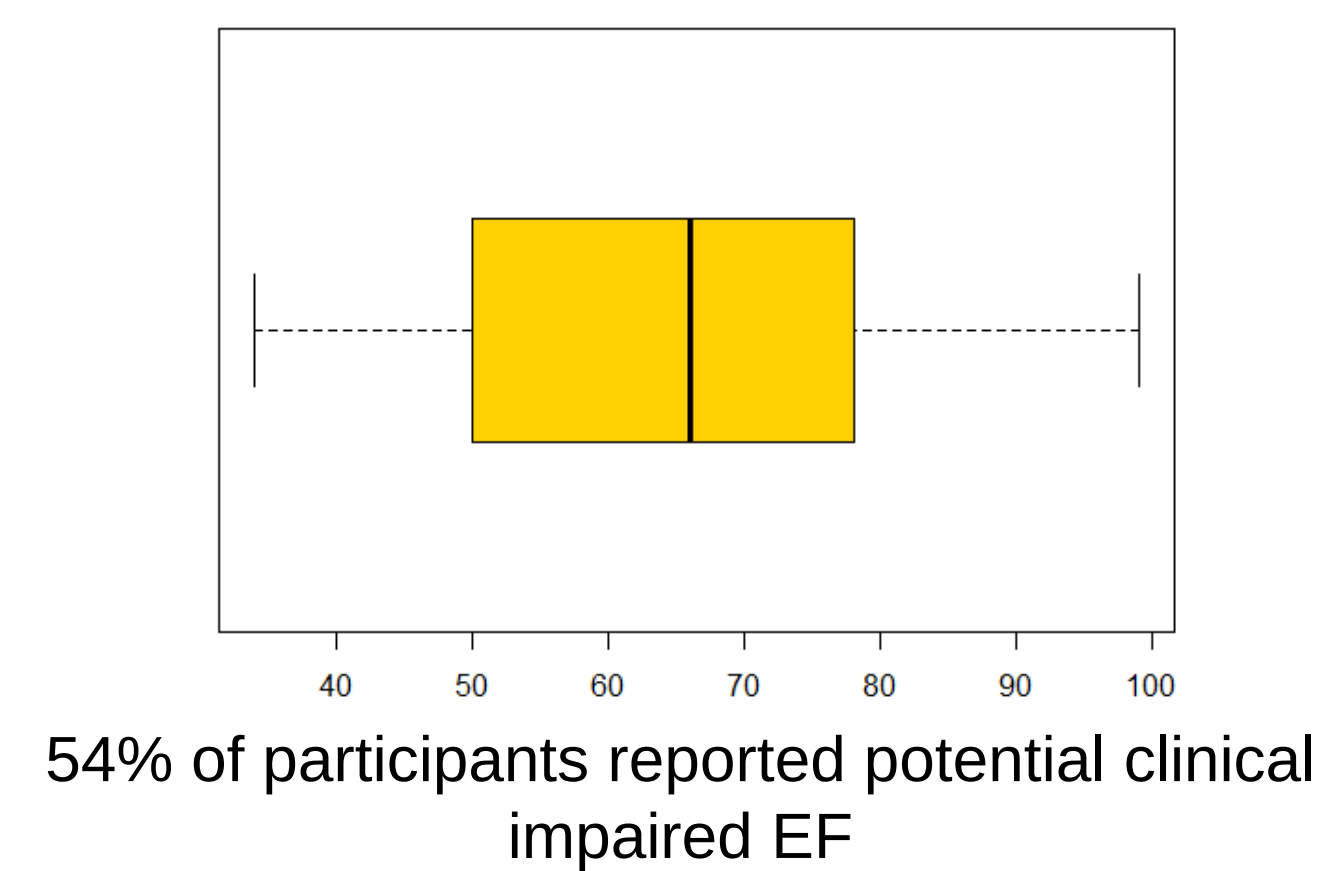
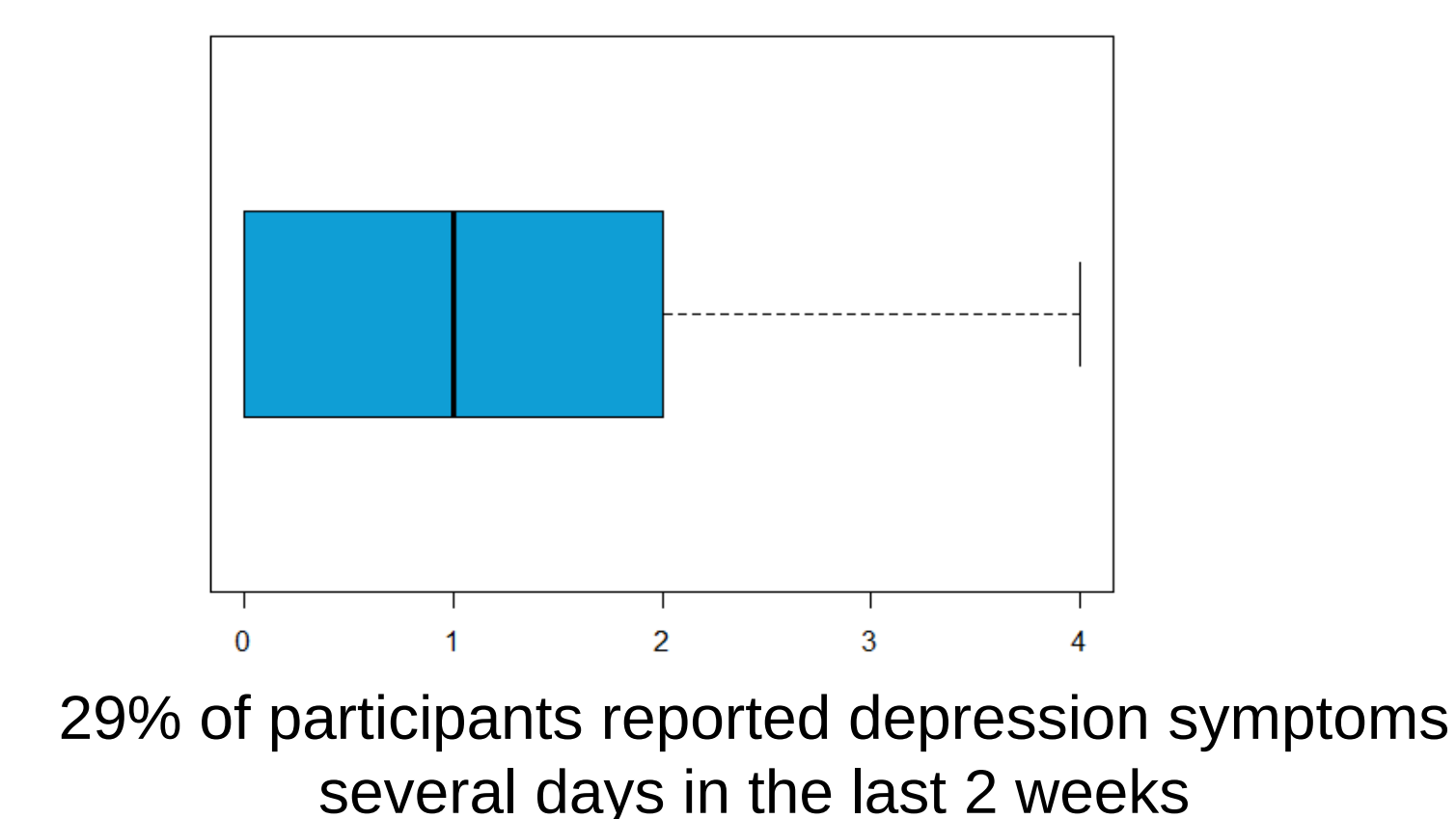


Figure 3: Depression Symptoms at T1



Students who experienced FI had a higher risk of impaired EF and depression symptoms

Figure 4: Executive Function Scores by Food Insecurity Status Over Time

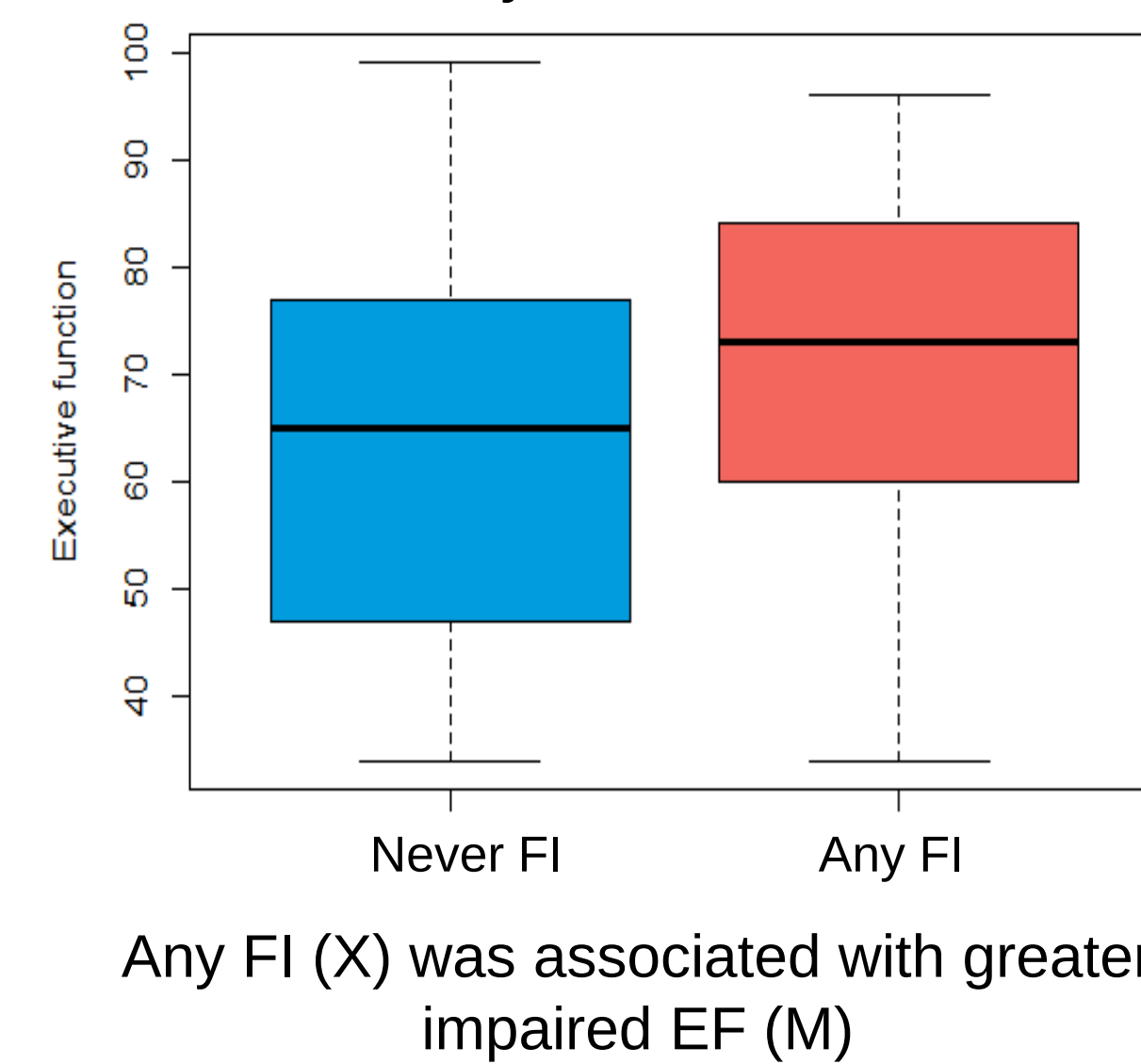
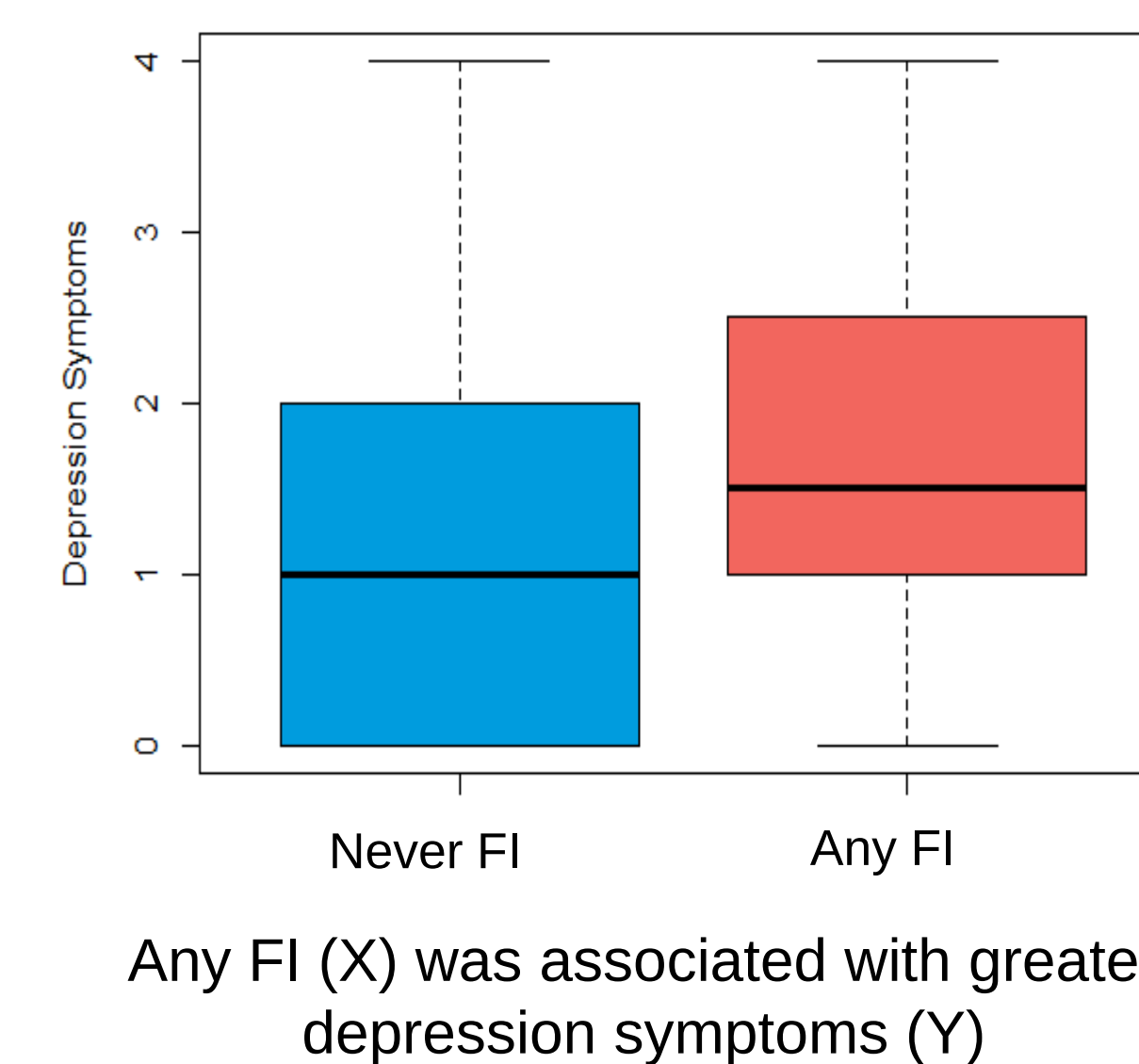


Figure 5: Depression Symptoms by Food Insecurity Status Over Time



EF mediated 23% in the association of FI & Depression

Mediation analysis

- **Step 1: Total effect c between FI and Depression Frequency Over Time**

$$Y = \beta_{Y0,1} + cX + \varepsilon_1$$

	Depression Symptoms (Y)		Executive Function (M)	
	Beta	p	Beta	p
Food Insecurity (X)	0.58 (0.16)	p < .001	7.56 (2.54)	p < .01

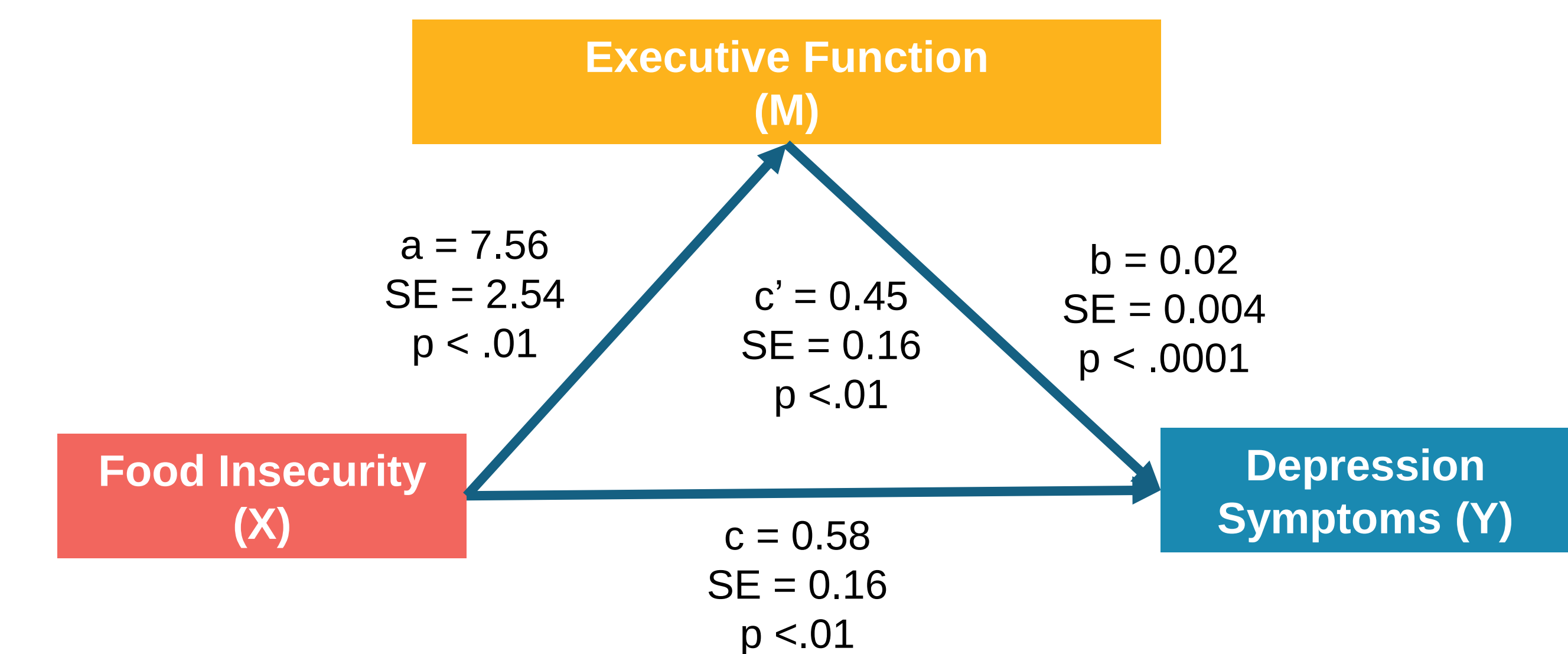
- **Step 2: The direct effect c' between FI and Depression Frequency taking into account the mediation effect of EF**

$$M = \beta_{M0} + aX + \varepsilon_1$$

$$Y = \beta_{Y0,2} + bM + c'X + \varepsilon_2$$

	Depression Symptoms (Y)	
	Beta	p
Food Insecurity (X)	0.45 (0.16)	p < .01
Executive Function (M)	0.02 (0.004)	p < .0001

- **Step 3: Mediation analysis: testing indirect effect using a bootstrap (5000 samples)**



- When EF was included as a mediator, the impact of FI on depression symptoms was reduced ($\beta=0.45$, $SE=0.16$, 95% CI: 0.11 – 0.79, $p<.01$)
- EF partially mediated the association between FI and depression symptoms, accounting for 23.00% (95% CI = 0.08 – 0.59, $p<.01$) of the overall effect

Discussion & Conclusions

- FI was significantly associated with impaired EF and increased depression symptoms among first-year college students
- EF partially mediated the association between FI and depression
- Students experiencing FI at any time in their first semester may demonstrate poor EF due to cognitive and emotional burden by unstable food access, which in turn contributes to greater vulnerability to depression
- Screening and providing practical strategies for FI together with training EF may reduce the risk of depression development in youth transitioning to college

Reference

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