Structural Equation Modeling of Self-Silencing, Depression, Microaggressions, & Inflammation Among Black Women Living with HIV

BreAnne Young
Postdoctoral Research Associate
SHINE Research Program
University of Miami

BreAnne Young, Victoria Petrulla, Rachelle Reid, Peyton R. Willie, & Sannisha K. Dale
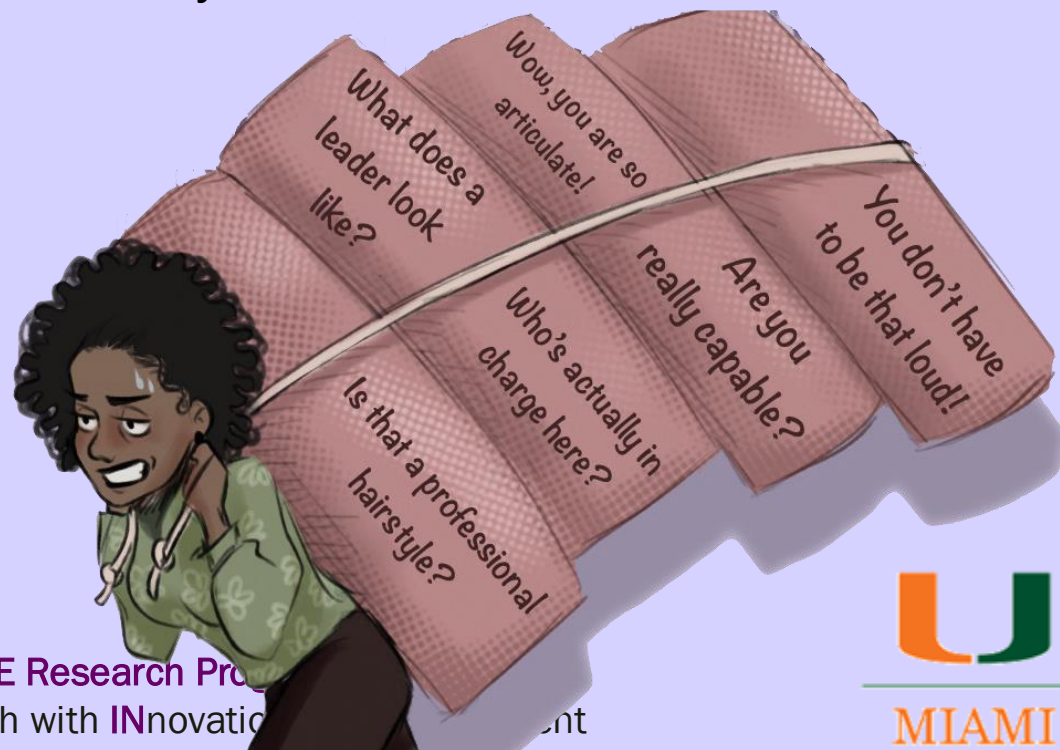
DISCLOSURES

Dr. Sannisha Dale serves as Co-investigator / Miami Site PI on a **Merck & Co.** funded project (PI Ojukutu) on "A Qualitative Study to Explore Biomedical HIV Prevention Preferences, Challenges and Facilitators among Diverse At-Risk Women Living in the United States"

Dr. Sannisha Dale previously served as a workgroup consultant on engaging people living with HIV for **Gilead Sciences, Inc.**

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Background

- Despite marked improvements in antiretroviral treatments, HIV persists as a leading cause of death for Black women in the US

- Evidence suggests **gendered racial microaggressions** are chronic stressors that influence immune system activation

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Gendered Racial Microaggressions

Behaviors or comments directed at an individual based on their race and gender

- assumptions of beauty and sexual objectification

- strong black woman stereotype

- angry black woman stereotype

- silenced and marginalized

Background

- *Despite marked improvements in antiretroviral treatments, HIV persists as a leading cause of death for Black women in the US.*

- *Evidence suggests gendered racial microaggressions are chronic stressors that influence immune system activation*

- Immune system activation can lead to:
  - increased depressive symptoms
  - viral non-suppression

- By way of mental health, immune activation may also impact:
  - treatment adherence and engagement
  - self-silencing behaviors – limiting self-expression to avoid conflict

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Current Study

- Given the dearth of research exploring this mechanism in Black women living with HIV (BWLWH), the current study uses structural equation modeling to examine the associations between self-silencing and GRM on mental health, inflammation, and viral suppression among BWLWH in South Florida.

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Methods

- Intervention: Pilot RCT of **S**triving **T**owards **E**m**P**owerment and Medication **AD**herence Study (addressing mental health and HIV outcomes)

- N = **119** BWLWH completed the baseline visit, which provided data for the current study

- Participants resided in the Miami Metropolitan Area

- Recruitment Timeframe: October 2017 and July 2019

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Methods

Eligible participants were scheduled for an in-person baseline visit and enrolled in the STEP-AD pilot RCT study if they met the following inclusion criteria:

(1) $\geq$ 18 years   (2) Cisgender woman   (3) Black/African American

(4) English-speaking   (5) ART for $\geq$ 2-months (6) History of trauma/abuse

(7) undetectable viral load or missed HIV care visit w/in the past year or history of low ART adherence

- Participants completed a 2-visit baseline, including :
    - (1) Informed consent
    - (2) Self-report surveys using Research Electronic Data Capture (REDCap)
    - (3) A semi-structured clinical interview
    - (4) Blood draw
- Participants received a $50 stipend ($25 for 2-baseline visits)

Methods | Measures

Assessment	Details	Subscales
Gendered Racial Microaggressions Scale for Black Women (GRMS-BW) Lewis JA, Neville HA. Construction and initial validation of the Gendered Racial Microaggressions Scale for Black women. J Couns Psychol. 2015 Apr;62(2):289-302.	26-item scale **Measure of** negative nonverbal, verbal, and behavioral **racial / gender-based slights experienced by Black women**	**Assumptions of Beauty and Sexual Objectification** **Silenced and Marginalized** **Strong Black Woman Stereotype** **Angry Black Woman Stereotype**
Silencing-the-Self Scale (STSS) Jack DC, & Dill D (1992). The Silencing the Self Scale: Schemas of intimacy associated with depression in women. Psychology of Women Quarterly, 16(1), 97–106.	31-item scale **Measure of gender roles:** extent to which women silence their own feelings and needs and prioritize others to maintain harmony in relationships.	**Externalized Self-Perception** **Care as Self-Sacrifice** **Silencing the Self** **Divided Self**
Center for Epidemiological Studies Depression Scale Radloff, L. S. (1977). The CES-D Scale: A self-report depression scale for research in the general population. Applied Psychological Measurement, 1(3), 385–401.	20-item scale **Measure of Mental Health / Depression, incl:** depressed mood, guilt, worthlessness, hopelessness, lack of sleep/appetite, psycho-motor delay, helplessness	
Neutrophil-to-Lymphocyte Ratio (NLR) Buonacera A, Stancanelli B, Colaci M, Malatino L. Neutrophil to Lymphocyte Ratio: An Emerging Marker of the Relationships between the Immune System and Diseases. Int J Mol Sci. 2022 Mar 26;23(7):3636.	**Measure of Inflammation** Ratio between the neutrophil (innate *acute / chronic inflammation*) and lymphocyte (*adaptive immunity*) counts: 1 < NLR < 3	
HIV Viral Load	**Copies HIV / mL blood** Suppressed vs Unsuppressed (<200 mL/mmHg)	

Methods | Statistical Analyses:

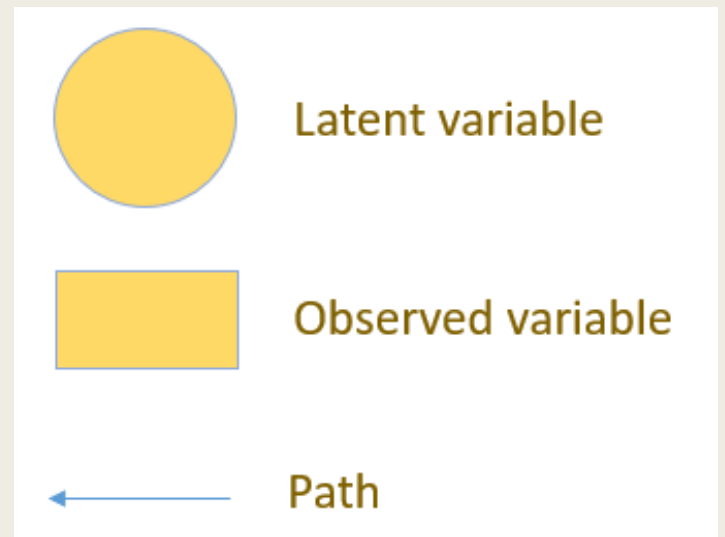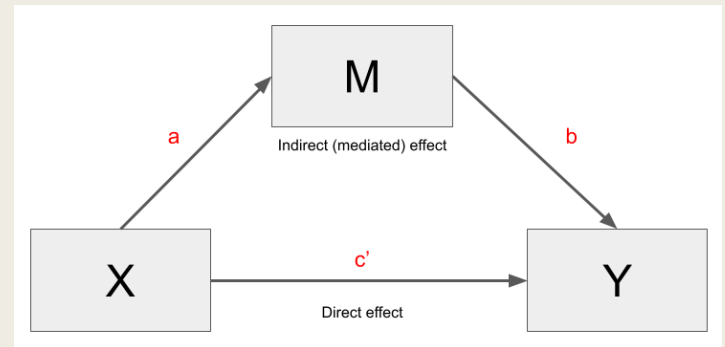## Path Analysis

Path analyses examine relationships between variables

- **direct effects** (X → Y)

- **indirect effects** (X → M → Y)

Structural Equation Modeling =
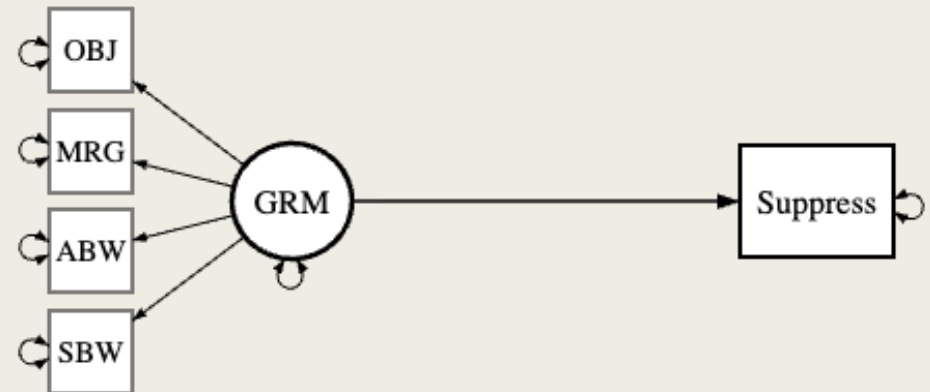**path analysis + latent variables**

- Latent variables: cannot be measured directly

Methods | Statistical Analyses:

Path Analysis

- Structural equation modeling was performed in Mplus

- **Direct Path:**
Microaggression → Viral Suppression

Methods | Statistical Analyses:

Path Analysis
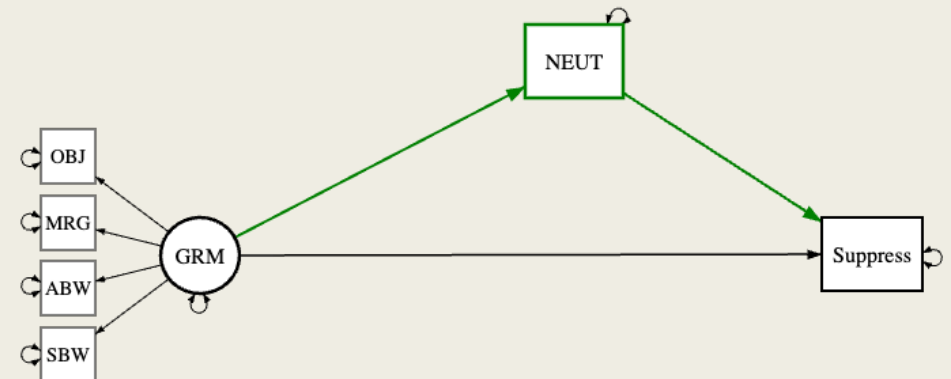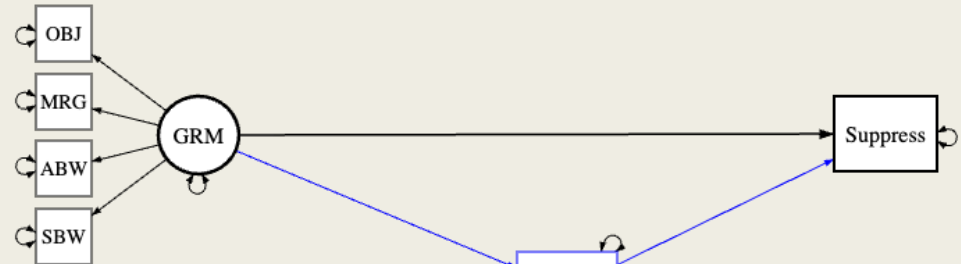
Indirect Paths:
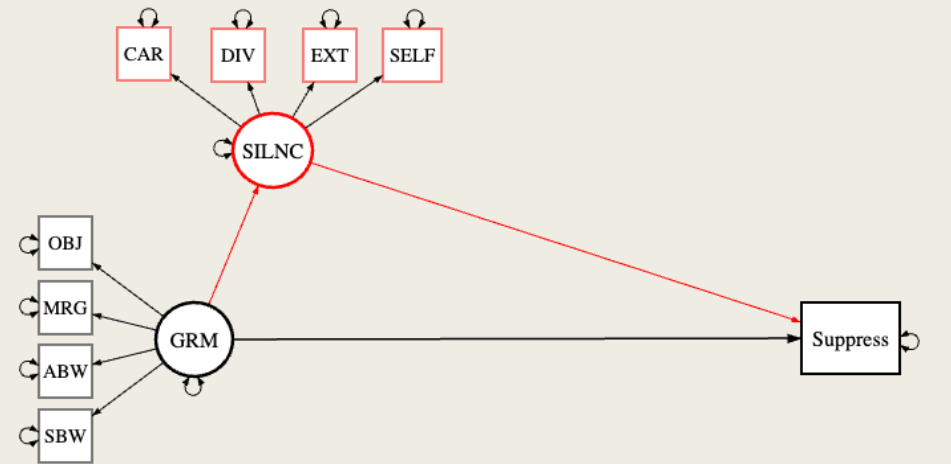
- Silencing the Self:

GRM → SILNC → Suppress

- Depression

GRM → CES-D → Suppress

- Inflammation

GRM → NLR → Suppress

Methods | Statistical Analyses:
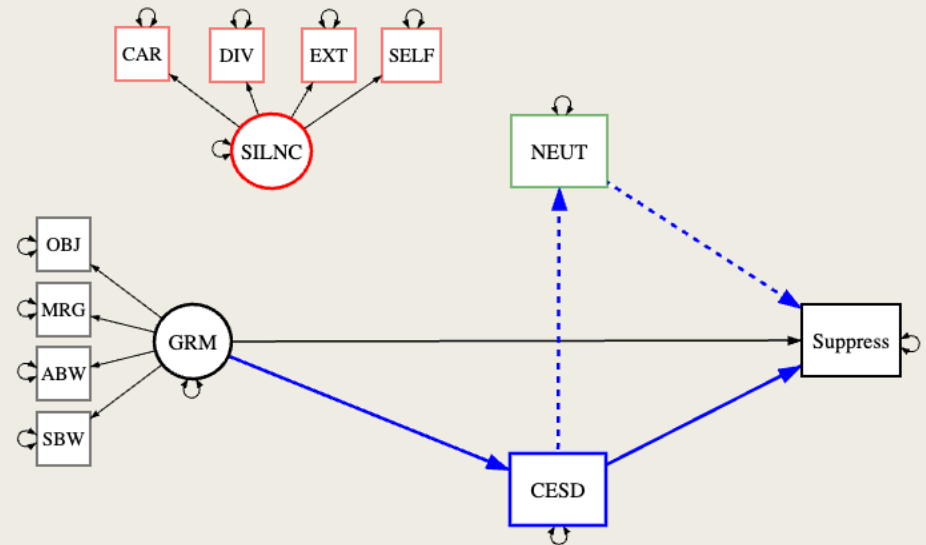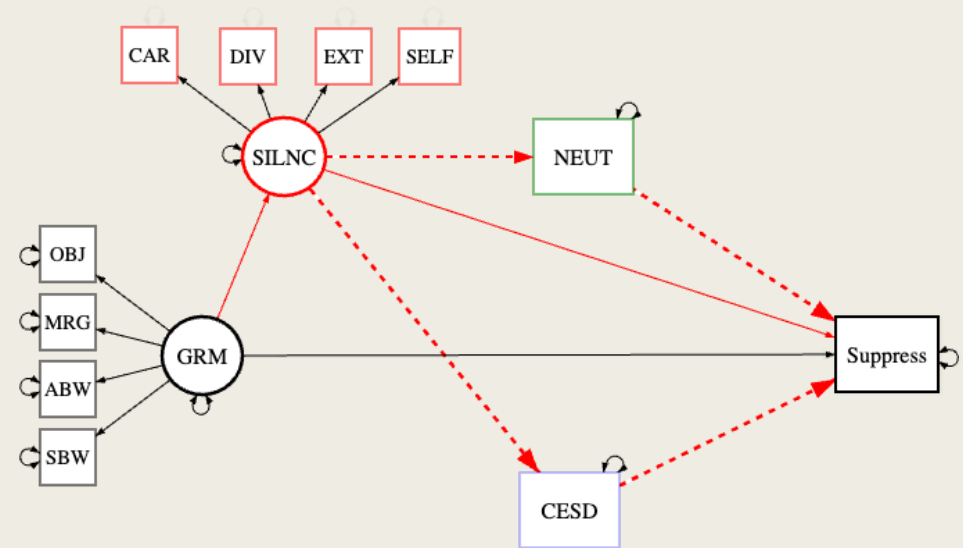
Path Analysis

More Indirect Paths:

- Silencing the Self

GRM → SILNC →NLR → Suppress

GRM → SILNC →CESD → Suppress

- Depression

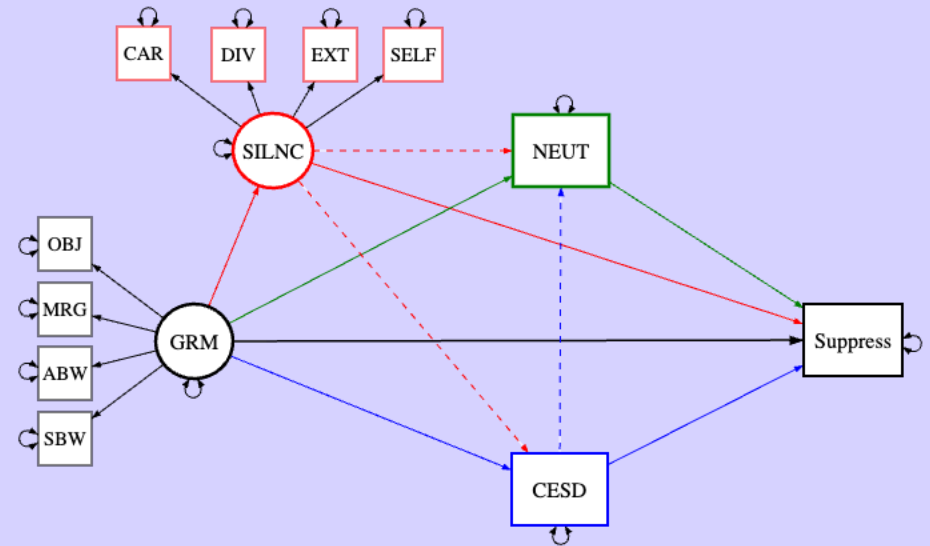GRM → CESD →NLR → Suppress

Results Sociodemographic Characteristics

Ethnicity	
Hispanic	3

Country of Birth	
US-Born	115

Age	
Median	52

Sexual Orientation	
Exclusively Heterosexual (Straight)	91
Bisexual/Some Bisexual Experience	19
Exclusively Homosexual (Gay)	4

HIV Viral Load	
Suppressed (<20 mL/mmHG)	74
Median (IQR)	20 [20, 82.4]
Range	[20, 142,120]

Education	
Some Secondary Education	41
High school graduate or GED	41
Some college	29
College graduate	8

Relationship Status	
Married/In a Relationship	50
Single/No Response	53
Divorced/Separated/Widowed	14

Housing	
Rent/Own	94
Residential Treatment/Subsidized Housing	13
Transitional Housing/Unhoused	10

Income	
Less than $12,000	75
More than $12,000	22
Unsure/No Response	22

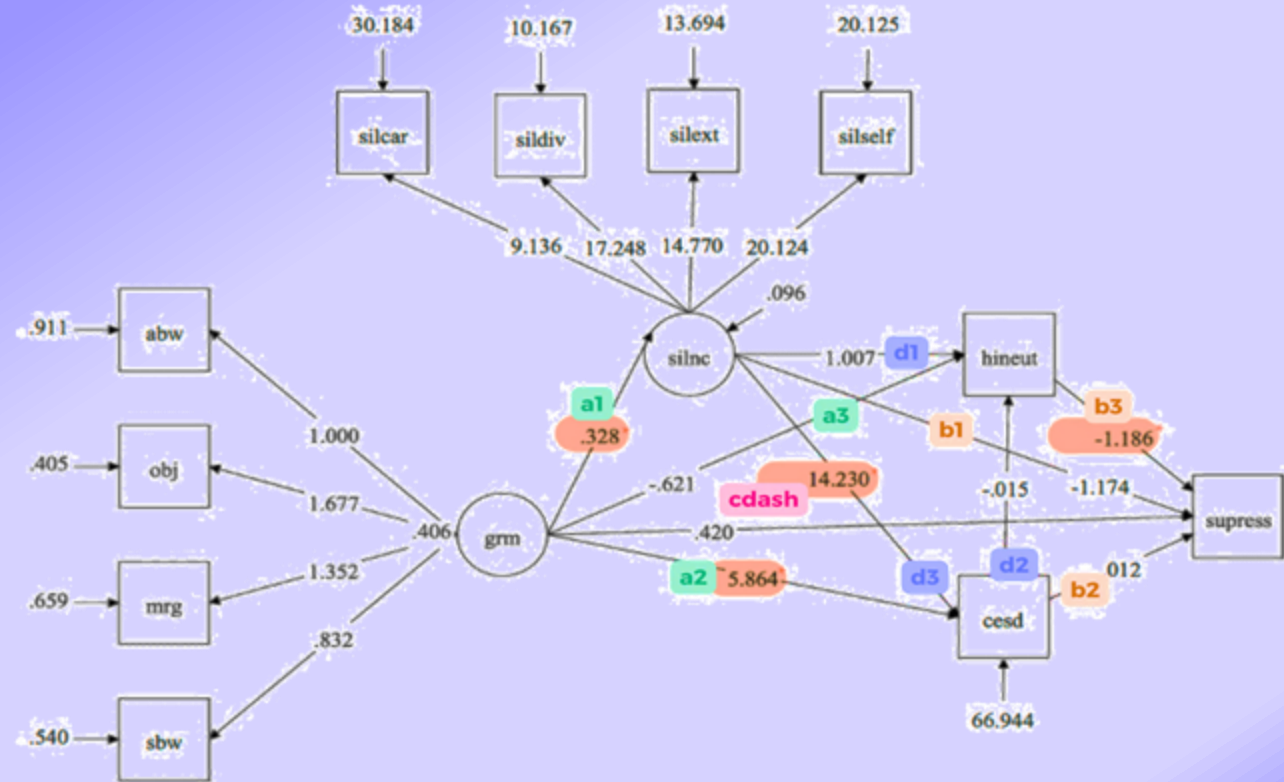# Results

How well does this model fit

        the data collected?

Model Fit Indices	Description	Reference Values	Observed Values
Root Mean Square Error of Approximation	Measures how much the model misses the data	Lower = Better < .05 = good .05–.08 = fair	0.053 CI [0.00, .089]
Comparative Fit Index	Compares model to "null" where variables aren't related	Range: 0 to 1 Highter = Better > 0.95	0.97
Standardized Root Mean Residual	Difference b/w predicted & actual correlations	Lower = Better < .08	0.047
Chi-Square Test (χ^2)	Measures how well the model fits the data	Smaller = better p > .05 = good fit	p = 0.083 x^2 = 49.4, df = 37

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Results

- Significant paths include:
  - microaggressions → self-silencing ($\beta = .328, p = .003$)
  - microaggressions → self-silencing → depression ($\beta = 4.67, p = .002$)
  - inflammation → viral suppression ($\beta = -1.19, p = .038$)

Discussion

- Findings support the need to further examine adversities, self-silencing, mental health, immune activation, and viral suppression together

- Aligns with existing literature on the impact of microaggressions and self-silencing on mental health

- Future studies should examine microaggressions and VL using a larger sample size and additional markers of inflammation

THANK YOU

- ✧ Participants
- ✧ Community Stakeholders and Consultants
- ✧ Colleagues and collaborators
- ✧ Funders
  - ✧ NIMH K23MH108439 (PI: Dale)

Contact Information:
305-243-6714
skd52@miami.edu
shineresearch@miami.edu
https://shine.psy.miami.edu

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