

# Racial discrimination, sleep, and pain in Black adolescent-caregiver dyads in the US: An application of the Actor-Partner Interdependence Mediation Model

Cecelia Valrie<sup>1</sup>, Ph.D. Jelaina Shipman<sup>1</sup>, M.A., Angela Pascale<sup>1</sup>, B.A.,Tiffany Green<sup>2</sup>, Ph.D., Faye Belgrave<sup>1</sup>

Ph.D., Heather Jones<sup>1</sup>, Ph.D., & Nao Hagiwara<sup>1</sup>, Ph.D.

<sup>1</sup>Virginia Commonwealth University, <sup>2</sup>University of Wisconsin-Madison



VCU

## Background

- Black Americans report more frequent and severe chronic pain and more pain related disability than their white counterparts.<sup>1,2</sup>
- Racial discrimination has been linked to more pain,<sup>3-5</sup> greater pain intensity,<sup>6,7</sup> and greater pain interference.<sup>7</sup>
- Poor sleep has also been linked with greater experiences of pain.<sup>8</sup> Given the association of discrimination with poor sleep,<sup>9</sup> sleep may be an underlying mechanism through which racial discrimination is associated with pain outcomes.
- The family, more specifically the parent-child relationship, provides an important context for understanding the impact of discrimination on the pain experiences of Black individuals. Consistent with Interdependence theory<sup>10</sup>, adolescents' and caregivers' experiences of discrimination may influence each other's pain experiences.

## Present Study

The current study aimed to:

- (1) Examine the relations between the experience of racial discrimination and pain among Black adolescents and their caregivers

*Hypothesis 1: High racial discrimination experienced by Black adolescents and their caregivers will be associated with both higher pain intensity and interference among adolescents and caregivers (e.g., actor and partner effects).*

- (2) Investigate whether sleep factors act as mediators of the association between the experience of racial discrimination and pain in these dyadic pairs.

*Hypothesis 2: Sleep disturbance and fatigue will mediate the relationships between racial discrimination and pain symptoms experienced by both Black adolescents and their caregivers.*

## Methods

- We conducted a secondary data analysis of dyadic survey data on 194 Black adolescents aged 12-17 years and their caregivers from a larger study exploring risk and protective factors and well-being in Black youth and their caregivers from communities in Central Virginia.
- We used the Actor-Partner Interdependence Mediation Model (APIMeM) to test the associations of racial discrimination, sleep factors (sleep disturbance, fatigue), and pain (interference and intensity).
- The APIMeM was calculated using MEDYAD<sup>7</sup> for SPSS. We controlled for adolescent and caregiver gender and chronic disease status as well as household income and caregiver education level.
- Primary Measures**
  - Racial Discrimination Scale<sup>8</sup> – Perceived Personal-level Discrimination
  - PROMIS<sup>®</sup> 25-Pediatric Youth and PROMIS<sup>®</sup> 29-Adult Profiles<sup>9</sup> - Sleep Disturbance, Fatigue, Pain Interference, and Pain Intensity

Table 1. Sample Demographics

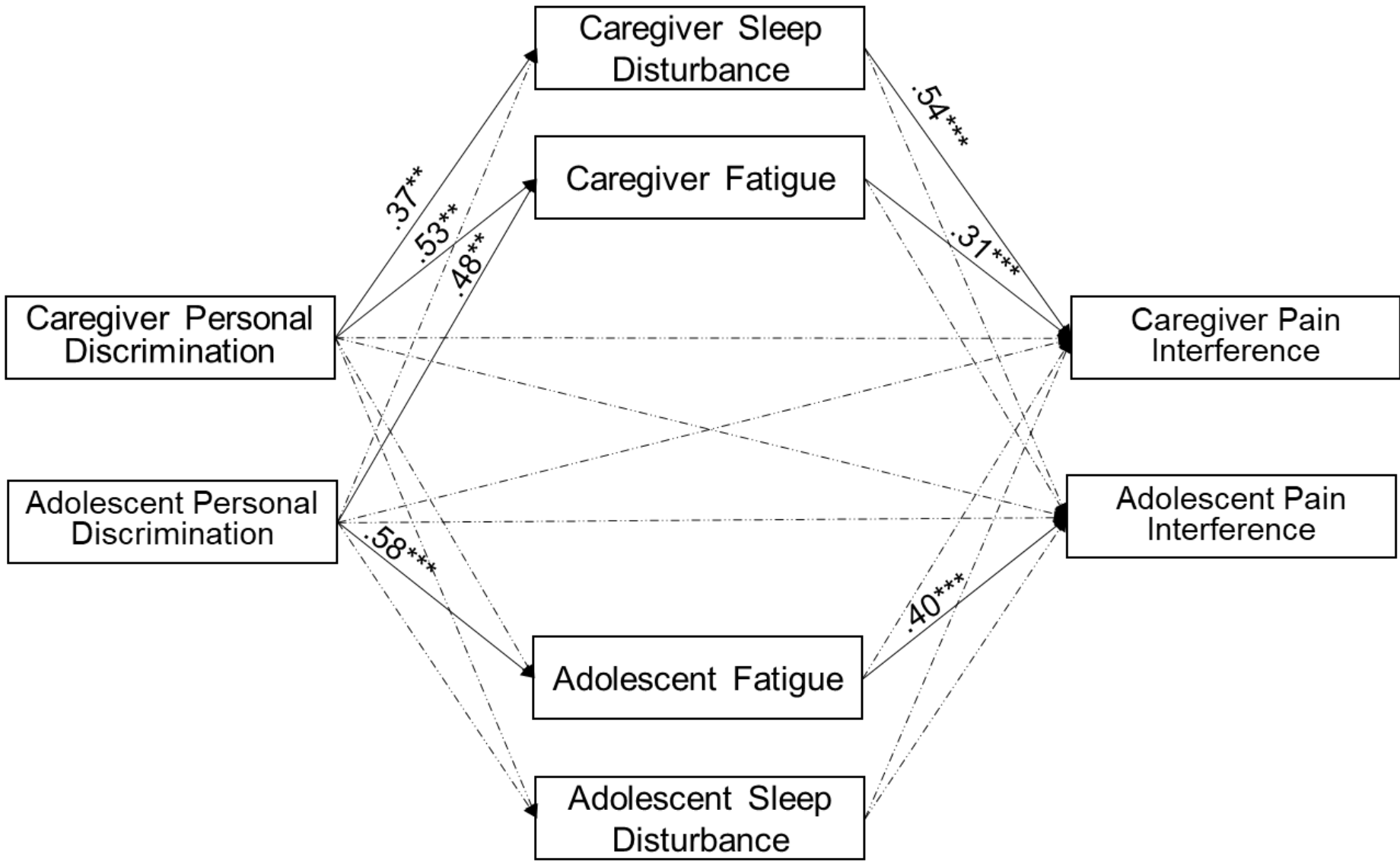
|                 | Adolescents  |             | Caregivers    |             |
|-----------------|--------------|-------------|---------------|-------------|
|                 | M (SD)       | N (%)       | M (SD)        | N (%)       |
| Age             | 14.36 (1.70) |             | 39.25 (11.09) |             |
| Gender          |              |             |               |             |
| Male            |              | 90 (46.4%)  |               | 39 (20.4%)  |
| Female          |              | 96 (49.5%)  |               | 145 (75.9%) |
| Chronic Disease |              |             |               |             |
| Yes             |              | 33 (16.9%)  |               | 41 (21.4%)  |
| No              |              | 153 (78.9%) |               | 142 (74.3%) |

### Additional Caregiver Demographics

- 61.8% Reported being employed
- 61.2% Endorsed an annual household income of \$50,000 or less
- 31.4% Reported GED/High School diploma as their highest level of education completed

## Results

APIMeM with Caregiver and Adolescent Pain Interference as Outcome Variables



### Significant Actor Effects:

Adolescent Discrimination → Adolescent Pain Interference:  $\beta = .68$  [.32, 1.05],  $p < .001$

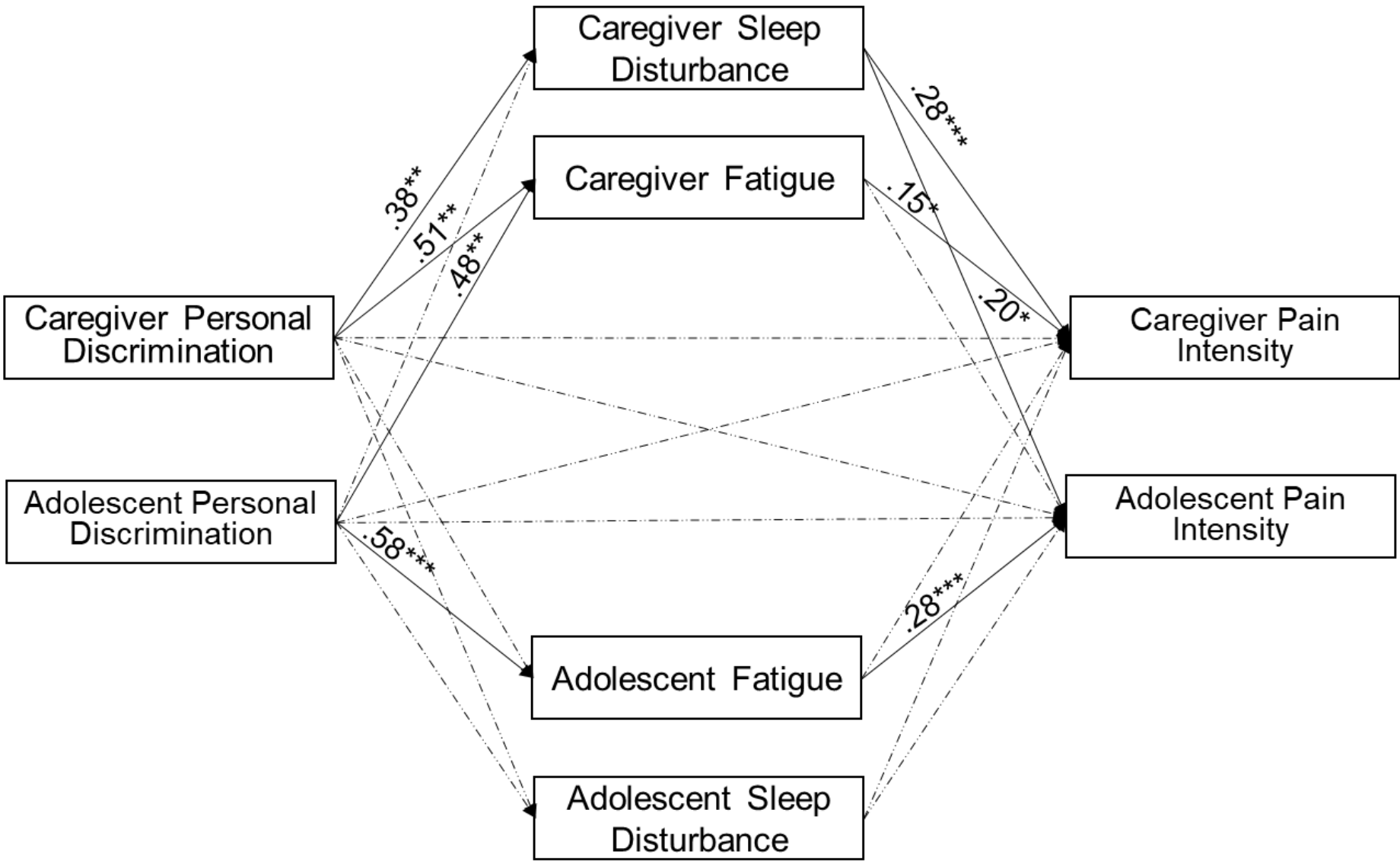
Adolescent Discrimination → Adolescent Fatigue → Adolescent Pain Interference:  $\beta = .23$  [.08, .44]

There were no significant actor effects for caregiver discrimination and caregiver pain interference.

### Significant Partner Effects:

Adolescent Discrimination → Caregiver Fatigue → Adolescent Pain Interference:  $\beta = .08$  [.002, .21]

APIMeM with Caregiver and Adolescent Pain Intensity as Outcome Variables



### Significant Actor Effects:

Caregiver Discrimination → Caregiver Pain Intensity:  $\beta = .25$  [.001, .49],  $p < .05$

Caregiver Discrimination → Caregiver Sleep Disturbance → Caregiver Pain Intensity:  $\beta = .11$  [.02, .20]

Caregiver Discrimination → Caregiver Fatigue → Caregiver Pain Intensity:  $\beta = .08$  [.01, .18]

There were no significant actor effects for adolescent discrimination and adolescent pain intensity.

### Significant Partner effects:

There were no significant partner effects

## Discussion

*While caregiver discrimination experiences are related to their disrupted sleep, fatigue, and subsequent increased pain intensity, their discrimination experiences are not related to their adolescents' sleep and pain outcomes.*

- Caregivers may not disclose their experience of discrimination to their adolescents; thus, not affecting adolescents' sleep and pain experiences.

*In contrast, when Black adolescents experience discrimination, it is related to adolescent and caregiver fatigue, and subsequent adolescent pain interference.*

- When Black adolescents experience racial discrimination, they may tell their caregivers, which leads to higher caregivers' fatigue. High caregiver fatigue may, in turn, reduce caregivers' capacity to provide support for their adolescents when they experience pain, or it may signal to Black adolescents that they cannot use their caregivers for support during pain experiences.

- It may also be that when Black families live in places with more racial discrimination, that leads to both more experiences of discrimination and fatigue for Black adolescents and their caregivers.

### Implications/Future Directions

- Future research should examine how family conversations about racial discrimination may explain these relationships, but also may be important targets for interventions to reduce the effects of discrimination.
- In addition, these findings also support the need for access to high quality pain services for Black adolescents and their caregivers that address their experiences of racial discrimination and its possible effects, with a focus on family-focused interventions.
- This study supports sleep disturbance and fatigue as possible mechanisms, and therefore, intervention target for reducing the impact of racial discrimination on pain among Black adolescents and their caregivers.
- Longitudinal research is needed to determine the temporal relationships between discrimination, sleep and fatigue problems, and pain in Black individuals and families.

## References

- Meints, S. M., Cortes, A., Morais, C. A., & Edwards, R. R. (2019). Racial and ethnic differences in the experience and treatment of noncancer pain. *Pain management*, 9(3), 317–334. <https://doi-org.proxy.library.vcu.edu/10.2217/pmt-2018-0030>
- Aroke, E. N., Joseph, P. V., Roy, A., Overstreet, D. S., Tollefsbol, T. O., Vance, D. E., & Goodin, B. R. (2019). Could epigenetics help explain racial disparities in chronic pain? *Journal of pain research*, 12, 701–710. <https://doi-org.proxy.library.vcu.edu/10.2147/JPR.S191848>
- Dugan, S. A., Lewis, T. T., Everson-Rose, S. A., Jacobs, E. A., Harlow, S. D., & Janssen, I. (2017). Chronic discrimination and bodily pain in a multi-ethnic cohort of midlife women in the Study of Women's Health Across the Nation. *Pain*, 158(9), 1656.
- Burgess, D. J., Grill, J., Noorbaloochi, S., Griffin, J. M., Richards, J., Van Ryn, M., & Partin, M. R. (2009). The effect of perceived racial discrimination on bodily pain among older African American men. *Pain Medicine*, 10(8), 1341-1352.
- Edwards, R. R. (2008). The association of perceived discrimination with low back pain. *Journal of Behavioral Medicine*, 31(5), 379-389.
- Taylor, J. L. W., Campbell, C. M., Thorpe Jr, R. J., Whitfield, K. E., Nkimbeng, M., & Szanton, S. L. (2018). Pain, racial discrimination, and depressive symptoms among African American women. *Pain Management Nursing*, 19(1), 79-87.
- Merriwether, E. N., Wittleder, S., Cho, G., Bogan, E., Thomas, R., Bostwick, N., Wang, B., Ravenell, J., & Jay, M. (2021). Racial and weight discrimination associations with pain intensity and pain interference in an ethnically diverse sample of adults with obesity: a baseline analysis of the clustered randomized-controlled clinical trial the goals for eating and moving (GEM) study. *BMC public health*, 21(1), 2201. <https://doi-org.proxy.library.vcu.edu/10.1186/s12889-021-12199-1>
- Finan, P. H., Goodin, B. R., & Smith, M. T. (2013). The association of sleep and pain: an update and a path forward. *The journal of pain*, 14(12), 1539–1552. <https://doi-org.proxy.library.vcu.edu/10.1016/j.jpain.2013.08.007>
- Slopen, N., Lewis, T. T., & Williams, D. R. (2016). Discrimination and sleep: A systematic review. *Sleep Medicine*, 18, 88–95.
- Rusbult, C. E., & Van Lange, P. A. (2008). Why we need interdependence theory. *Social and Personality Psychology Compass*, 2(5), 2049-2070.
- Coutts, J. J., Hayes, A. F., & Jiang, T. (2019). Easy statistical mediation analysis with distinguishable dyadic data. *Journal of Communication*, 69(6), 1-38.
- Hagiwara, N., Alderson, C. J., & Mezuk, B. (2016). Differential effects of personal-level vs group-level racial discrimination on health among Black Americans. *Ethnicity & disease*, 26(3), 453.
- Ader, Deborah N. (2007) Developing the Patient-Reported Outcomes Measurement Information System (PROMIS). *Medical Care*, 45(5, Suppl. 15)