

# Stress and Academic Disparities: Biological Pathways

Emma K. Adam

School of Education and Social Policy and

Institute for Policy Research

Northwestern University

[ek-adam@northwestern.edu](mailto:ek-adam@northwestern.edu)

[@emmakadam](#)

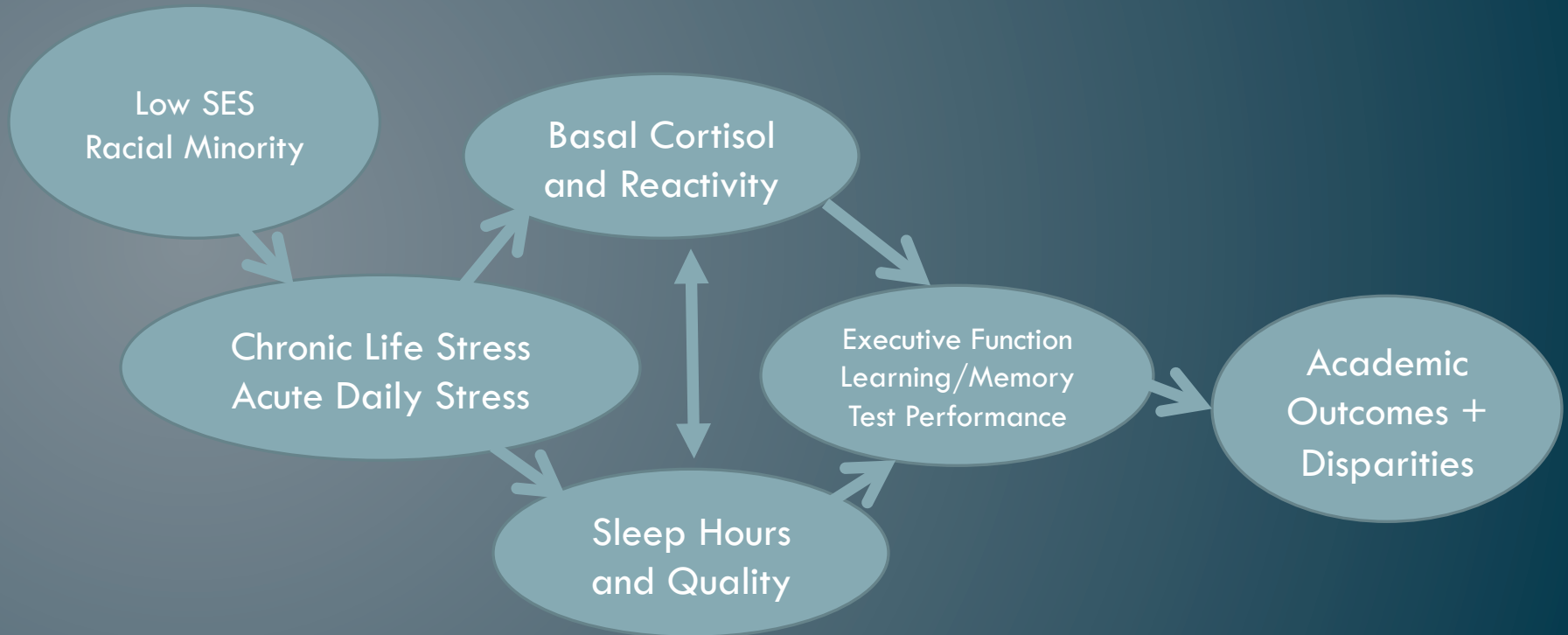
# Background

- **Lower socioeconomic status (SES) and minority race/ethnicity are associated with:**
  - **Greater morbidity for a wide variety of illnesses**
  - **Lower academic performance and attainment**
  
- **Growing body of theory & research suggests role for:**
  - **Psychosocial stress**
  - **Activity of stress-sensitive biological systems**

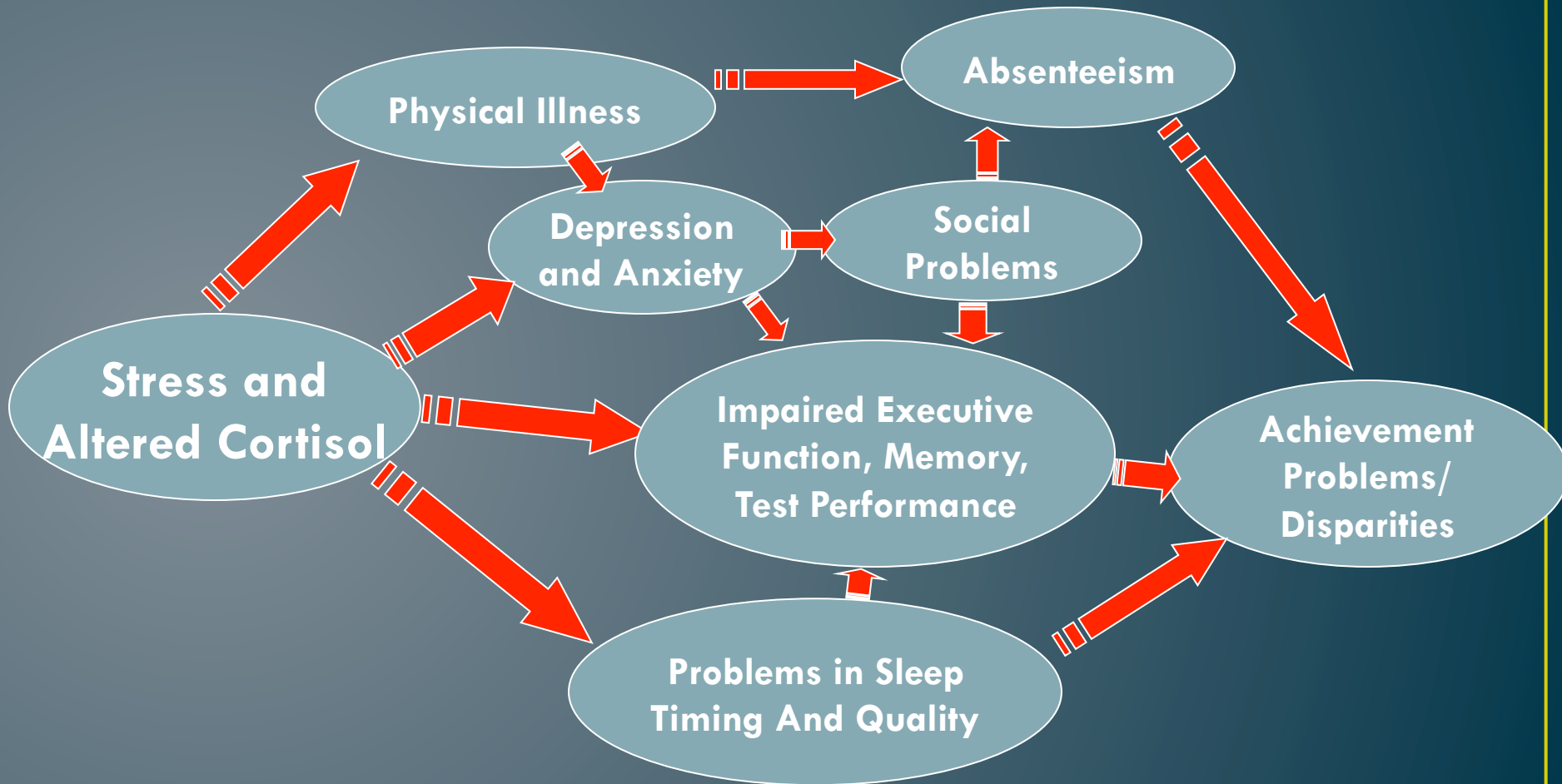
# Two stress sensitive biological systems of key interest in my research

- Hypothalamic Pituitary Adrenal Axis
  - HPA axis, cortisol
  - Sensitive to stress
  - Shows disparities by SES and race/ethnicity
  - Lower morning levels, less decline across the day predict worse cognitive functioning
- Sleep
  - Sleep hours, sleep quality
  - Sensitive to stress
  - Shows disparities by SES and race/ethnicity
  - Shorter sleep hours, lower sleep quality predicts worse cognitive functioning

# SES, Race, Stress, and Academic Disparities

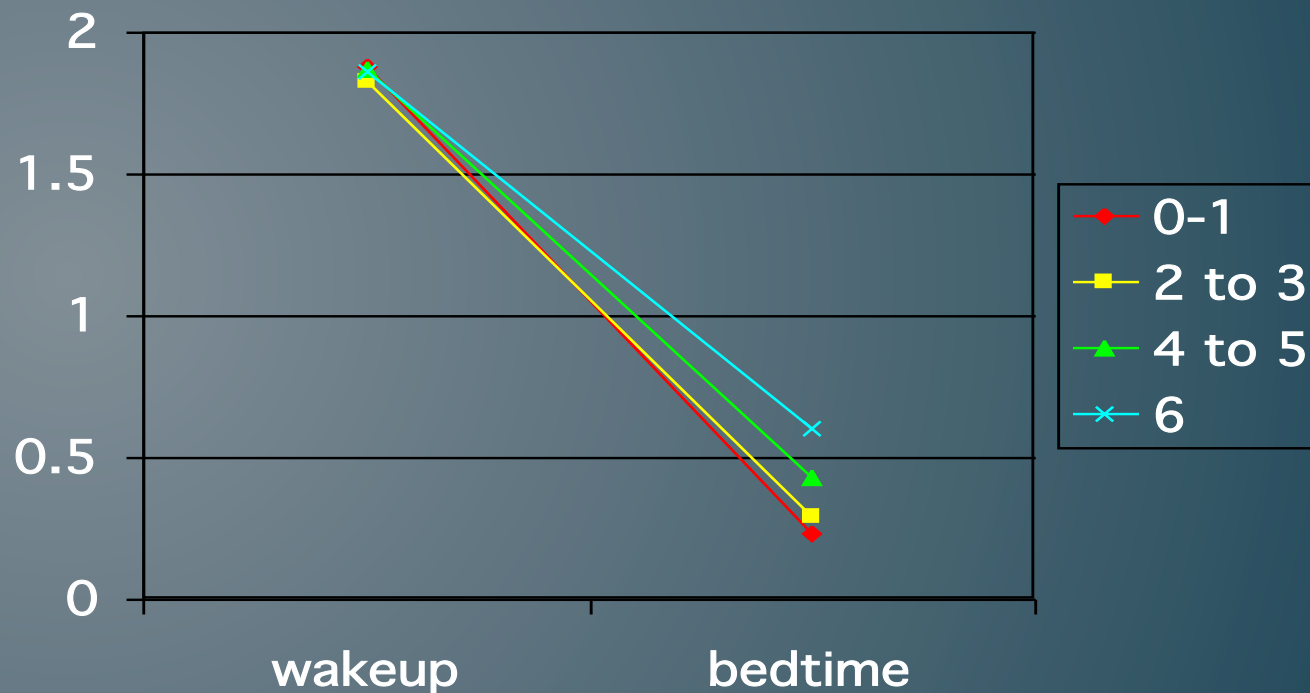


# S.A.D. Model: Stress and Academic Disparities



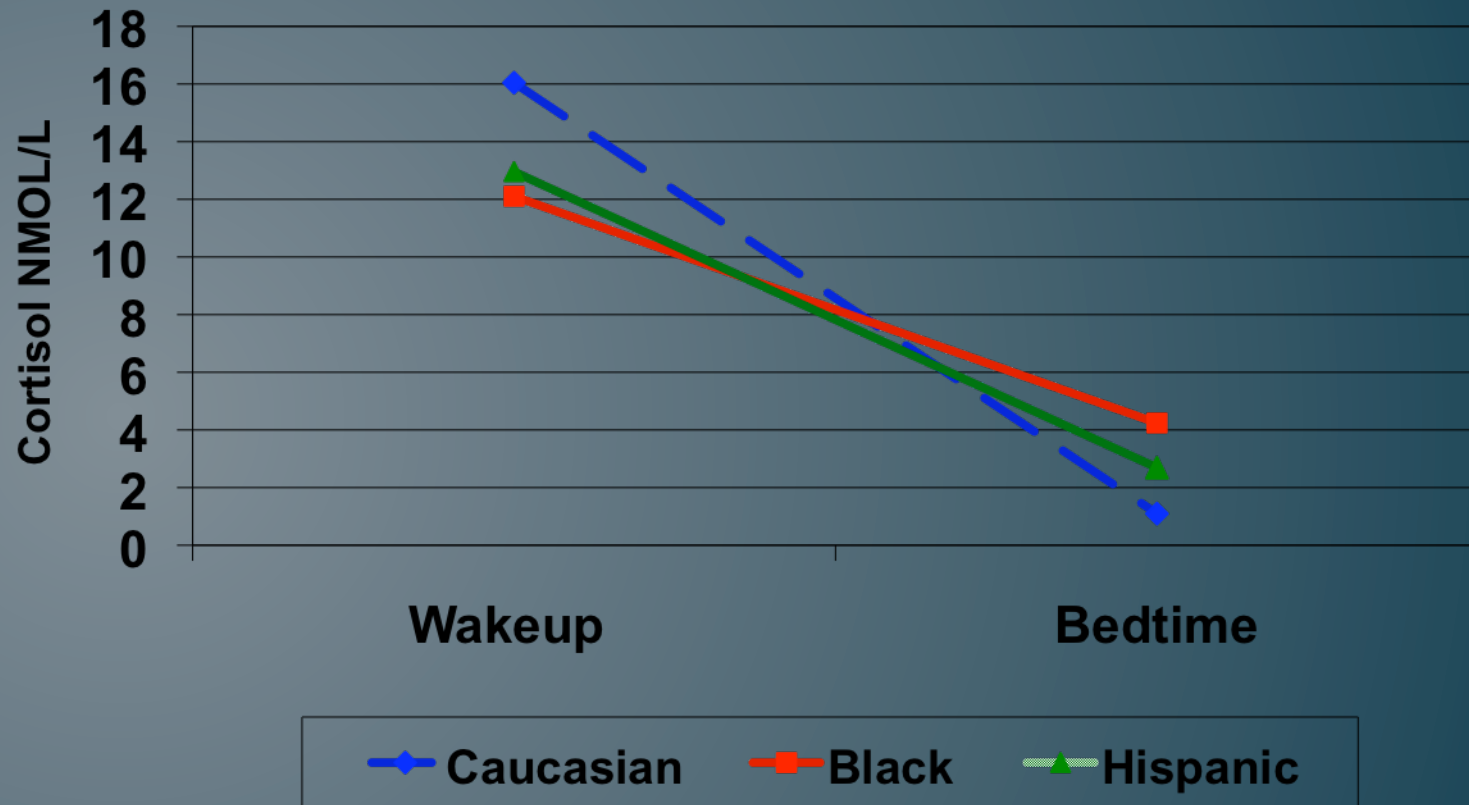
Adam, E.K., Klimes-Dougan, B., Gunnar, M.R., 2007. Social regulation of the adrenocortical response to stress in infants, children and adolescents: Implications for psychopathology and education. in: Coch, D., Dawson, G., Fischer, K. (Eds.), *Human Behavior, Learning, and the Developing Brain: Atypical Development*. Guilford Press, pp. 264-304.

# Poverty and Cortisol: More Time Periods Low SES from Prenatal-Adulthood Predict Flatter Cortisol Rhythms



Desantis, A.S., Kuzawa, C.W., Adam, E.K., 2015. Developmental origins of flatter cortisol rhythms: socioeconomic status and adult cortisol activity. *American Journal of Human Biology* 27, 458-467.

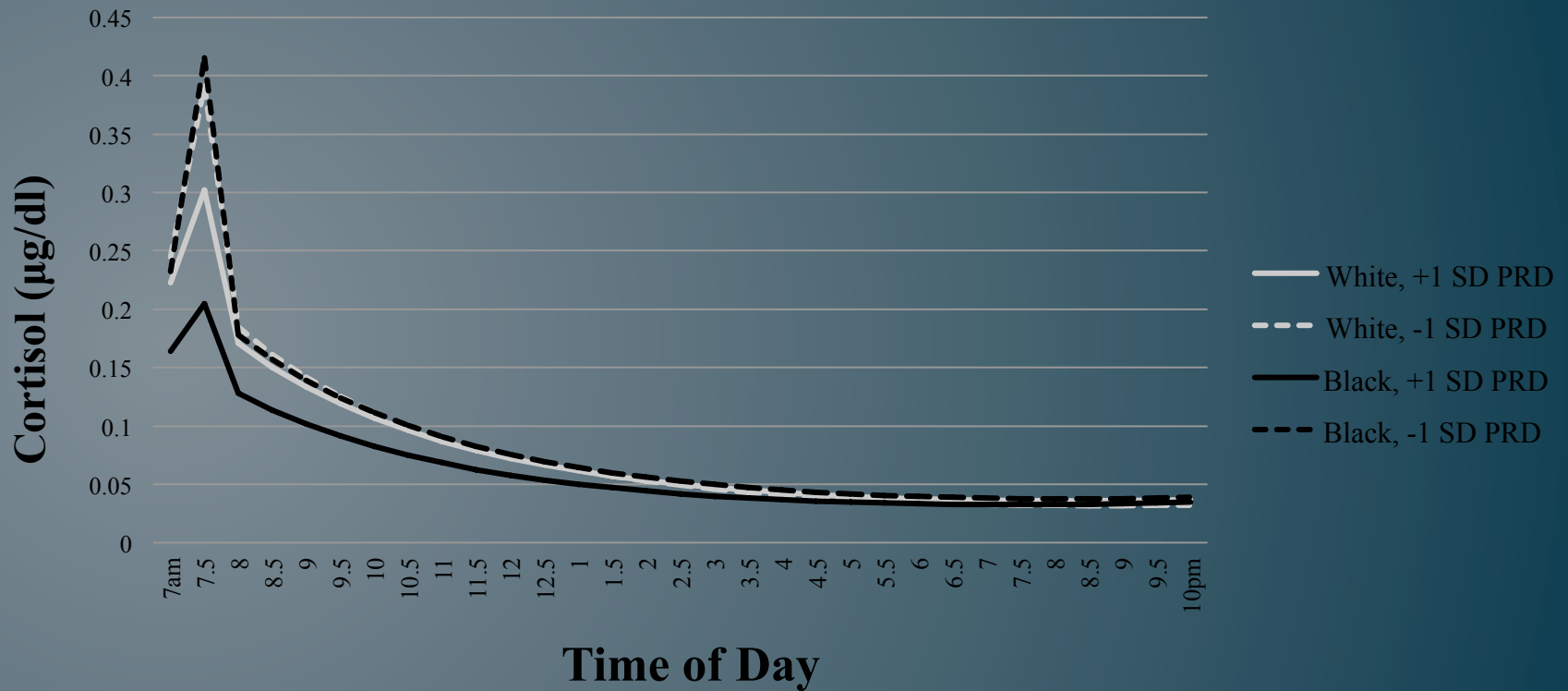
# Racial/ethnic Differences in Cortisol Rhythms



DeSantis, A.S., Adam, E.K., Hawkley, L.C., Kudielka, B.M., Cacioppo, J.T., 2015. Racial and ethnic differences in diurnal cortisol rhythms: Are they consistent over time? *Psychosomatic Medicine* 77, 6-15.



# Adolescent Perceived Racial Discrimination and Early Adult Cortisol



Adam, E.K., Heissel, J.A., Zeiders, K.H., Richeson, J.A., Ross, E.C., Ehrlich, K.B., Levy, D.J., Kemeny, M., Brodish, A.B., Malanchuk, O., Peck, S.C., Fuller-Rowell, T.E., Eccles, J.S., 2015. Developmental histories of perceived racial discrimination and diurnal cortisol profiles in adulthood: A 20-year prospective study. *Psychoneuroendocrinology* 62, 279-291.



# Cortisol and Cognition

- Flatter diurnal cortisol slopes have been associated with worse executive functioning/cognitive performance in children and adults

Maldonado, E., Fernandez, F., Trianes, M., Wesnes, K., Petrini, O., Zangara, A., Enguix, A., Ambrosetti, L., 2008. Cognitive Performance and Morning Levels of Salivary Cortisol and alpha-Amylase in Children Reporting High vs. Low Daily Stress Perception. *Spanish journal of psychology* 11, 3.

Evans, P.D., Fredhoy, C., Loveday, C., Hucklebridge, F., Aitchison, E., Forte, D., Clow, A., 2011. The diurnal cortisol cycle and cognitive performance in the healthy old. *International Journal of Psychophysiology* 79, 371-377.

# Questions?

- Contact information:

Emma Adam

[ek-adam@northwestern.edu](mailto:ek-adam@northwestern.edu)

@emmakadam

<http://adamlab.sesp.northwestern.edu/index.html>