DISPARITIES IN YOUTH SLEEP: LONGITUDINAL AND MULTILEVEL ASSOCIATIONS WITH RACISM

PREVENTION SCIENCE METHODOLOGY GROUP
OCT 18 2022

TIFFANY YIP, PH.D
FORDHAM UNIVERSITY
DEPARTMENT OF PSYCHOLOGY
SLEEP: BIOLOGICAL NECESSITY OR WASTE OF TIME?
MOST* ANIMALS SLEEP
• 2/3s of Americans take something to help them sleep
• In 2021, Americans spent $65b in sleep aids
• By 2025, market projected to be $115b
DESPITE BEING A BIOLOGICAL NECESSITY, SLEEP IS SHAPED BY:

Macro-level sociocultural, environmental and systemic factors

Micro-level physical and social contexts
DISCRIMINATION & RACIAL DISPARITIES IN SLEEP

- Review of discrimination and sleep disturbances, 17/17 studies reported a significant association between discrimination and sleep

Slopen, Lewis & Williams, 2015
ROADMAP

• Race-related disparities in sleep
  • middle childhood through young adulthood
• Race-related discrimination and sleep
  • daily processes
  • reciprocal dynamics
• Macro-systems and sleep
  • C-19 pandemic
  • crime
  • school start times
• Protective functions of sleep
RACE-BASED DISPARITIES IN SLEEP
PATTERNS DURING MIDDLE CHILDHOOD AND YOUNG ADULTHOOD
Racial Sleep Disparities Among Middle Childhood - NYC Child Community Health Survey

- 1389 youth ages 6-12 ($\bar{X} = 9.19$), 2009
- Population-based analysis
- Parent report
- Sleep duration: “typical” bed and wake time on school day ($\bar{X} = 9h 46m$, SD = 50m)

Adjusting for: bedtime, age, SES, media use, asthma, nativity, neighborhood safety, crowding, physical activity.

Yip, Cheon, Wang, Deng & Seligson, 2020
Racial differences in actigraphy

Notes: Asian (35”) & Latinx (36”) > Black
Average sleep duration = 7h 42m
8-10hrs/night recommended

Notes: Black, Latinx > Asian**; Black > Latinx**

Yip, Cheon, Wang, Cham, Tryon & El-Sheikh, 2019
RACIAL SLEEP DISPARITIES AMONG ADOLESCENTS – SELF-REPORT

**PSQI Sleep Disturbance by Race**

- **Asian**: 0.43
- **Black**: 0.52
- **Latinx**: 0.57

**PSQI Daytime Dysfunction by Race**

- **Asian**: 0.2
- **Black**: 0.25
- **Latinx**: 0.3

Latinx > Asian
Adjusting for: gender, weekday/end

Asian > Black, Latinx
Yip, Cheon, Wang, Cham, Tryon & El-Sheikh, 2019
DO 10-20 MINUTE DIFFERENCES IN SLEEP DURATION MATTER?
SLEEP ACROSS HIGH SCHOOL

Sleep Duration by Race

Notes:
9th – 12th: No significant differences among groups;
SLEEP ACROSS HIGH SCHOOL

Sleep Efficiency By Race

Notes:
9th: No significant differences among groups; 10th: Asian*** > Black, Asian** > Latinx; 11th: Asian*** > Black, Latinx** > Black; 12th: Asian* > Black, Latinx* > Black;
SLEEP ACROSS HIGH SCHOOL

**WASO by Race**

<table>
<thead>
<tr>
<th>Race</th>
<th>9th</th>
<th>10th</th>
<th>11th</th>
<th>12th</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asian/Asian American</td>
<td>39.43</td>
<td>20.80</td>
<td>21.27</td>
<td>12.34</td>
</tr>
<tr>
<td>Black/African American</td>
<td>46.42</td>
<td>31.73</td>
<td>37.86</td>
<td>40.60</td>
</tr>
<tr>
<td>Hispanic/Latinx</td>
<td>39.09</td>
<td>28.12</td>
<td>26.10</td>
<td>25.20</td>
</tr>
</tbody>
</table>

**Notes:**
- 9th: No significant differences among groups;
- 10th: Asian*** < Black, Asian** < Latinx;
- 11th: Asian*** < Black, Latinx* < Black;
- 12th: Asian* < Black, Latinx* < Black;
**1ST SEMESTER SLEEP DURATION (ACTIGRAPHY)**

<table>
<thead>
<tr>
<th>Race</th>
<th>Duration</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>White</td>
<td>7h42m</td>
<td>1.8hrs</td>
</tr>
<tr>
<td>ERM</td>
<td>7h27m</td>
<td></td>
</tr>
</tbody>
</table>

**Wake Time**
- White: 9:00 am, SD = 1.67 hrs
- ERM: 8:59 am, SD = 1.67 hrs

**Bed Time**
- White: 1:34 am, SD = 1.20 hrs
- ERM: 1:31 am, SD = 1.20 hrs

**Differences in Duration**
- White: 7h27m
- ERM: 7h20m
1ST SEMESTER SOCIODEMOGRAPHIC DISPARITIES

Differences in Duration
Pell: 7h09m
Non-Pell: 7h29m

Differences in Duration
1st Gen: 7h23m
Continuing Gen: 7h37m

Pell Receipt

College Generation Status

Sleep Time
Wake Time

Sleep Time
Wake Time
1st Semester Sociodemographic Disparities

Differences in Duration*
- Commuter: 7h25m
- Resident: 7h21m
INSOMNIA SEVERITY INDEX

How Worried/Distressed Are You About Your Current Sleep Problem?

ERM: 1.30
White: 1.04

\[ t = -2.10, \text{ df } = 305, p = .036 \]
SLEEP QUALITY DISPARITIES AMONG YOUNG ADULTS (18-25) DURING A PANDEMIC

"during the past month, how much did you have trouble sleeping…”
1 (≠ not at all) to 4 (≠ three or more times a week)** reverse scored

<table>
<thead>
<tr>
<th>Group</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>AIAN</td>
<td>1.74</td>
</tr>
<tr>
<td>Asian</td>
<td>1.98</td>
</tr>
<tr>
<td>Black</td>
<td>1.71</td>
</tr>
<tr>
<td>Latinx</td>
<td>1.59</td>
</tr>
<tr>
<td>White</td>
<td>1.81</td>
</tr>
</tbody>
</table>

Asian > AIAN*, Black**, Latinx**, White**

Data collected April 2020, Yip et al., 2021
Evidence for sleep disparities by race from middle childhood through young adulthood on various indicators of sleep

General patterns support more and better quality sleep for White individuals compared to populations of color

Specific disparities depends upon sleep dimension and measurement
DISCRIMINATION AND SLEEP

Daily-level processes
Daily discrimination was associated with same-night increases in sleep disturbance (Cohen’s $d = .55$)

- 80% reduction by T+1
- Effects were more pronounced for: girls, multiracial youth

Xie, Yip, Cham & El-Sheikh, 2021
Daily discrimination was associated with next-day increases in daytime dysfunction (Cohen’s $d = .51$).

- 50% reduction by T+1
  - Multiracial youth reduced by a greater %
- Effects were more pronounced for: weekday discrimination, multiple reports of discrimination

Xie, Yip, Cham & El-Sheikh, 2021
DAILY-LEVEL SLEEP MEDIATES DAILY-LEVEL DISCRIMINATION AND MENTAL HEALTH OUTCOMES (1-1-1 MODEL)

- Discrimination $\rightarrow$ (same day) nighttime disturbance $\rightarrow$ (next day) negative mood, anxious mood, rumination, somatic symptoms and positive mood

- Similar mediated effects for daytime dysfunction and daytime sleepiness

Yip, Xie, Cham & El-Sheikh, 2022
DAILY-LEVEL SLEEP MEDIATES DAILY-LEVEL DISCRIMINATION AND PERSON-LEVEL MENTAL HEALTH OUTCOMES (1-1-2 MODEL)

- Discrimination -> (same day) nighttime disturbance -> (past 2 weeks) negative mood, anxious mood, rumination and somatic symptoms
- Similar mediated effects for daytime dysfunction and daytime sleepiness

Yip, Xie, Cham & El-Sheikh, 2022
DISCRIMINATION AND SLEEP

Daily-level processes: reciprocal dynamics
RECIPROCAL DYNAMICS BETWEEN DISCRIMINATION AND SLEEP DURATION

Discrimination is a count of 4 items

Last night, how many hours of actual sleep did you get?

Adjusts for age, gender, generational status

Discrimination \(\rightarrow\) Sleep Duration

- Discrimination (today; within) \(b = .31\)
- Discrimination (today; between) \(b = -.19\)
  - Sleep Duration (tonight)

Sleep Duration \(\rightarrow\) Discrimination (Dichotomized)

- Sleep Duration (tonight; within) \(OR = 1.20\)
- Sleep Duration (tonight; between) \(OR = .75\)
  - Discrimination (tomorrow)
**Reciprocal Dynamics Between Discrimination and Sleep Quality**

Discrimination is a count of 4 items.

Last night, how would you rate your sleep quality overall?

Adjusts for age, gender, generational status.

1 unit increase in report of sleep quality was associated with a 74% decreased likelihood of reporting discrimination the next day.

**Discrimination → Sleep Quality**

- Discrimination (today; within) \( b = .37 \) to Sleep Quality (tonight)
- Discrimination (today; between) \( b = -.35 \) to Sleep Quality (tonight)

**Sleep Quality → Discrimination (Dichotomized)**

- Sleep Quality (tonight; within) \( OR = 2.82 \) to Discrimination (tomorrow)
- Sleep Quality (tonight; between) \( OR = .26 \) to Discrimination (tomorrow)
This likelihood increases to 198% for youth who report low levels of ERI commitment.
RECI Procal Dynamics Between Discrimination and Daytime Sleepiness

Discrimination is dichotomized

Today, did you have trouble staying awake while studying, eating meals, or engaging in social activity?

Adjusts for age, gender, generational status

The likelihood of daytime sleepiness being associated with same-day discrimination is 201% for youth who report low levels of ERI commitment.
SLEEP FACILITATES COPING WITH DISCRIMINATION

Wang & Yip, 2019
SUMMARY: DISCRIMINATION AND SLEEP – DAILY PROCESSES

- Evidence for same-night effects of discrimination on sleep disturbance, and next-day effects on daytime dysfunction
- Daily sleep disturbance mediates the association between daily discrimination and daily/longer-term mental health
- Evidence for reciprocal processes, i.e., sleep quality associated with lower likelihood of next-day discrimination
MACRO-SYSTEMS AND SLEEP

Structural processes: pandemics, neighborhoods, and schools
VICARIOUS RACISM AND SLEEP AMONG ASIAN AMERICAN ADULTS

How often do you hear about or see other Asian American people in public being treated unfairly because of their race?¹

- N = 600 AA adults, ages 18-85 (mean = 38.55)
- Data collected May – July 2020, Atlanta, Chicago, Los Angeles, New Orleans, New York
- Vicarious racism was associated with more sleep disturbance (quadratic)²
- Moderated by ERI private regard and centrality

¹ Chae, Yip et al., 2021, 2. Yip, Chung & Chae, in press
How often do you hear about or see other Asian American people in public being treated unfairly because of their race?

Note. Low and high private regard reflect ± 1 standard deviation from the mean. Private regard and vicarious racism are mean-centered. Data collected: May – July 2020. Yip, Chung & Chae, in press
ASIAN AMERICANS AND THE PANDEMIC: CENTRALITY BUFFERS THE ASSOCIATION BETWEEN VICARIOUS RACISM AND SLEEP DURATION

Note. Vicarious racism and centrality are depicted at the mean and ± 1 SD. Vicarious racism was associated with higher probability of short sleep (< 6hrs) and of long sleep (> 9hrs) – compared to average sleep (7-9 hrs). The panels represent the predicted probability for reporting (A) short sleep (≤ 6 hours), (B) mid-range sleep (7-9 hours), and (C) long sleep (> 9 hours). Significant interaction between panels B and C. Data collected: May - July 2020. Yip, Chung & Chae, in press.

Panel C probability of long sleep (> 9 hrs) compared to mid-range sleep: as VR increases, prob of long sleep was 0.12 for low centrality, 0.07 for average, and 0.04 for high centrality. Avg and high centrality n.s.
Neighborhood cohesion and safety are associated with longer sleep duration among adults$^1$ and children$^2$.

Feelings of safety from crime and violence are associated with better sleep US, Mexico, Ghana, S. Africa, India, China and Russia$^3$.

Children have later bedtimes on evenings following a violent crime in their neighborhood$^4$.

### NEIGHBORHOOD CRIME AND SLEEP

<table>
<thead>
<tr>
<th>Crime Label</th>
<th>2015</th>
<th>2016</th>
<th>2017</th>
<th>2018</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Petit Larceny</td>
<td>45349</td>
<td>44923</td>
<td>45653</td>
<td>45761</td>
<td>181986</td>
</tr>
<tr>
<td>Harassment 2</td>
<td>38783</td>
<td>41155</td>
<td>41807</td>
<td>43450</td>
<td>165195</td>
</tr>
<tr>
<td>ASSAULT 3 &amp; RELATED OFFENSES</td>
<td>34399</td>
<td>34383</td>
<td>33885</td>
<td>34627</td>
<td>137294</td>
</tr>
<tr>
<td>Criminal Mischief and Related Offense</td>
<td>30209</td>
<td>30716</td>
<td>31181</td>
<td>29415</td>
<td>121521</td>
</tr>
<tr>
<td>Grand Larceny</td>
<td>22431</td>
<td>22549</td>
<td>21704</td>
<td>20530</td>
<td>87214</td>
</tr>
<tr>
<td>Felony Assault</td>
<td>13940</td>
<td>14285</td>
<td>13673</td>
<td>13821</td>
<td>55719</td>
</tr>
<tr>
<td>Offense Against Public Ordinance Sensibility</td>
<td>13150</td>
<td>14107</td>
<td>13511</td>
<td>12250</td>
<td>53018</td>
</tr>
<tr>
<td>Dangerous Drugs</td>
<td>15536</td>
<td>13577</td>
<td>12692</td>
<td>9203</td>
<td>51008</td>
</tr>
<tr>
<td>Robbery</td>
<td>11423</td>
<td>10449</td>
<td>9411</td>
<td>8434</td>
<td>39717</td>
</tr>
<tr>
<td>Miscellaneous Penal Law</td>
<td>8916</td>
<td>9148</td>
<td>8698</td>
<td>8552</td>
<td>35314</td>
</tr>
<tr>
<td>BURGLARY</td>
<td>9543</td>
<td>8386</td>
<td>7684</td>
<td>7156</td>
<td>32769</td>
</tr>
<tr>
<td>Dangerous Weapons</td>
<td>7105</td>
<td>6881</td>
<td>5633</td>
<td>5080</td>
<td>24699</td>
</tr>
<tr>
<td>Offenses Against Public Admin</td>
<td>5836</td>
<td>5393</td>
<td>4984</td>
<td>4602</td>
<td>20815</td>
</tr>
<tr>
<td>Vehicle and Traffic Laws</td>
<td>4477</td>
<td>4757</td>
<td>4613</td>
<td>4733</td>
<td>18580</td>
</tr>
<tr>
<td>Grand Larceny of Motor Vehicle</td>
<td>5415</td>
<td>4583</td>
<td>4125</td>
<td>3883</td>
<td>17986</td>
</tr>
<tr>
<td>Sex Crimes</td>
<td>3262</td>
<td>3425</td>
<td>3589</td>
<td>3761</td>
<td>14037</td>
</tr>
<tr>
<td>Intoxicated/Impaired Driving</td>
<td>3705</td>
<td>3646</td>
<td>3369</td>
<td>2899</td>
<td>13619</td>
</tr>
<tr>
<td>Forgerly</td>
<td>3345</td>
<td>3906</td>
<td>3119</td>
<td>2971</td>
<td>13341</td>
</tr>
<tr>
<td>Theft - Fraud</td>
<td>2592</td>
<td>2453</td>
<td>2115</td>
<td>1615</td>
<td>8775</td>
</tr>
<tr>
<td>Criminal Trespass</td>
<td>2483</td>
<td>2109</td>
<td>2029</td>
<td>1928</td>
<td>8549</td>
</tr>
<tr>
<td>Frauds</td>
<td>2038</td>
<td>1846</td>
<td>1403</td>
<td>1116</td>
<td>6403</td>
</tr>
<tr>
<td>Unauthorized Use of a Vehicle</td>
<td>1154</td>
<td>1273</td>
<td>1188</td>
<td>1065</td>
<td>4680</td>
</tr>
<tr>
<td>Possession of Stolen Property</td>
<td>1163</td>
<td>953</td>
<td>1225</td>
<td>1057</td>
<td>4398</td>
</tr>
<tr>
<td>Other Offenses Related to Theft</td>
<td>908</td>
<td>1004</td>
<td>878</td>
<td>795</td>
<td>3585</td>
</tr>
<tr>
<td>Rape</td>
<td>905</td>
<td>880</td>
<td>871</td>
<td>849</td>
<td>3485</td>
</tr>
<tr>
<td>Offenses Against the Person</td>
<td>822</td>
<td>773</td>
<td>799</td>
<td>653</td>
<td>3047</td>
</tr>
<tr>
<td>ADMINISTRATIVE CODE</td>
<td>793</td>
<td>724</td>
<td>631</td>
<td>727</td>
<td>2875</td>
</tr>
<tr>
<td>Offenses Involving Fraud</td>
<td>500</td>
<td>550</td>
<td>560</td>
<td>663</td>
<td>2273</td>
</tr>
<tr>
<td>ARSON</td>
<td>696</td>
<td>531</td>
<td>467</td>
<td>459</td>
<td>2153</td>
</tr>
<tr>
<td>NYS Laws - Unclassified Felony</td>
<td>301</td>
<td>254</td>
<td>303</td>
<td>282</td>
<td>1150</td>
</tr>
<tr>
<td>Murder and Non-Negligent Manslaughter</td>
<td>251</td>
<td>235</td>
<td>183</td>
<td>201</td>
<td>870</td>
</tr>
</tbody>
</table>
On days when adolescents were exposed to multiple violent crimes (> 1), they had less efficient sleep compared to days where they were exposed to no violent crimes ($b = -0.68, p < 0.01, 95\% \text{ CI } [-1.27, -0.09])

- there was no association with sleep duration ($b = 3.57, p = 0.58, 95\% \text{ CI } [-9.17, 16.31])

- Adolescents’ sleep efficiency was also lower on days when violent crime was elevated relative to the average violent crime level in their neighborhood ($b = -0.88, p < 0.05, 95\% \text{ CI } [-1.57, -0.19])

- there was no association with sleep duration ($b = -1.87, p = 0.75, 95\% \text{ CI } [-13.57, 9.83])
SCHOOLS AND SLEEP

How are school start times associated with sleep, what are the moderators, and do SSTs contribute to disparities?

- Meta-analyses of 28 studies, 1,774,509 youth
- Later SSTs were associated with better overall developmental outcomes, longer sleep duration, and less negative mood
- The benefits of later SSTs for reducing sleepiness was stronger for high school (vs middle school) youth, and youth in private (vs public) schools
- New SSTs between 8:30-8:59 were associated with better outcomes than new SSTs between 8:00-8:29

Yip, Wang, Xie, Ip, Fowle & Buckhalt, 2022
2 HSs in Seattle implemented a 25-min delay in SST from 7:50 to 8:45am between 2016 and 2017

RHS (red): n.s., 31% economically disadvantaged, 7% ethnic minorities

FHS (blue): improvement in tardies and absences, 88% economically disadvantaged, 68% ethnic minorities

Could delaying SST be a structural lever to reduce disparities?

Dunster et al., 2018
SUMMARY: MACRO-SYSTEMS AND SLEEP DISPARITIES

- Racism during the pandemic contributed to sleep difficulties
- Neighborhood violent crime contributes to adolescent sleep quality at the daily level
- Later SSTs are generally better for young people, but equivocal evidence linking SSTs to disparities
PROTECTIVE FUNCTIONS OF SLEEP

Moderated associations & Longitudinal processes: how are daily-level processes implicated in developmental over time?
DISCRIMINATION AND INTERNALIZING SYMPTOMS: SLEEP EFFICIENCY AND GENDER

![Graphs showing the relationship between racial discrimination and sleep efficiency with anxiety and depression symptoms.](image)

Figure 4. Racial discrimination predicting internalizing symptoms at lower and higher levels of sleep efficiency (+1 SD) for males and females. Significant slopes are indicated. Lower sleep efficiency = 87.8%; higher sleep efficiency = 99.2%. Panel A: Sleep efficiency and sex as moderators of associations between racial discrimination and anxiety symptoms. Panel B: Sleep efficiency and sex as moderators of associations between racial discrimination and depression symptoms.

El-Sheikh, Zeringue, Saini, Fuller-Rowell & Yip, 2021
WHAT ABOUT ADOLESCENT SLEEP/WAKE REGULARITY?

SLEEP REGULARITY INDEX (SRI)

SRI\(^1\) is “the percentage probability of an individual being in the same sleep state (asleep vs awake) at any two timepoints 24 hrs apart, averaged,” across study days

Coded minute by minute

100 = an individual who sleeps and wakes at exactly the same times each day

0 = an individual who sleeps and wakes at random

- SRI ranged from 32 – 96, mean = 76
- Asian adolescents had higher SRIs than Latinx and Black adolescents\(^2\)
- SRI was associated with earlier bedtimes\(^2\)
- SRI was associated with earlier waketimes\(^2\)

<table>
<thead>
<tr>
<th>Correlations Between Actigraphy-derived Sleep Indices</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
<tr>
<td>-----------------</td>
</tr>
<tr>
<td>SRI</td>
</tr>
<tr>
<td>Total Sleep Time (minutes)</td>
</tr>
<tr>
<td>Bedtime</td>
</tr>
<tr>
<td>Waketime</td>
</tr>
</tbody>
</table>

**SLEEP REGULARITY IS POSITIVELY ASSOCIATED WITH GRADES**

<table>
<thead>
<tr>
<th></th>
<th>SRI</th>
<th>Aggregated</th>
<th>Math</th>
<th>Science</th>
<th>English</th>
<th>M</th>
<th>SD</th>
<th>Median</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 SRI</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>75.79</td>
<td>11.46</td>
<td>77.56</td>
</tr>
<tr>
<td>4 Aggregated Grades</td>
<td>0.16*</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
<td>83.53</td>
<td>9.53</td>
<td>85.19</td>
</tr>
<tr>
<td>5 Math Grade</td>
<td>0.15*</td>
<td>0.85**</td>
<td>-</td>
<td></td>
<td></td>
<td>82.15</td>
<td>11.00</td>
<td>83.25</td>
</tr>
<tr>
<td>6 Science Grade</td>
<td>0.15*</td>
<td>0.87**</td>
<td>0.67**</td>
<td>-</td>
<td></td>
<td>82.86</td>
<td>10.48</td>
<td>85</td>
</tr>
<tr>
<td>7 English Grade</td>
<td>0.15*</td>
<td>0.87**</td>
<td>0.60**</td>
<td>0.69**</td>
<td>-</td>
<td>84.77</td>
<td>9.44</td>
<td>86.5</td>
</tr>
<tr>
<td>8 Social Studies Grade</td>
<td>0.12</td>
<td>0.90**</td>
<td>0.67**</td>
<td>0.68**</td>
<td>0.77**</td>
<td>84.38</td>
<td>11.21</td>
<td>87.5</td>
</tr>
</tbody>
</table>

Note. * p < 0.05; ** p < 0.01

Adjusting for gender, age, ethnicity. All grades were provided by the Dept of Ed
PROTECTIVE FUNCTION OF SLEEP REGULARITY

- No direct association between discrimination-frequency and social studies grades
- However, adolescents reporting frequent discrimination and had irregular sleep schedules had lower social studies grades

SRI was categorized: irregular sleepers - bottom 20% (<67.40), moderately regular sleepers – middle 60%, regular sleepers - top 20% (>86.26), Yip et al, invited resubmission
DISCRIMINATION AND INTERNALIZING SYMPTOMS: SLEEP VARIABILITY AND GENDER

Figure 5. Variability in sleep minutes and adolescent sex as moderators of associations between racial discrimination and anxiety symptoms. Interactions depict associations between racial discrimination and anxiety at high and low levels of variability in sleep minutes (±1 SD) for males and females. Significant slopes are indicated. Less variable sleep = 0.08; more variable sleep = 0.24.

El-Sheikh, Zeringue, Saini, Fuller-Rowell & Yip, 2021
DISCRIMINATION AND EXTERNALIZING SYMPTOMS: SLEEP VARIABILITY

Figure 6. Variability in sleep minutes as moderator of associations between racial discrimination and rule-breaking behavior. Interactions depict associations between racial discrimination and rule-breaking at high and low levels of variability in sleep minutes ($\pm$1 SD) for males and females. Significant slopes are indicated. Less variable sleep = 0.08, more variable sleep = 0.24. Rule-breaking behavior is represented in T scores.

El-Sheikh, Zeringue, Saini, Fuller-Rowell & Yip, 2021
DISCRIMINATION AND SLEEP QUALITY ON DEPRESSIVE SYMPTOM TRAJECTORIES

Yip, 2015
The Interaction between Sleep Quality and Discrimination Over Time

- High Discrimination, High Sleep Quality
- High Discrimination, Low Sleep Quality
- Low Discrimination, High Sleep Quality
- Low Discrimination, Low Sleep Quality

Dunbar, Mirpuri & Yip, 2017
Sleep quality and sleep regularity are observed to buffer associations between discrimination and internalizing, externalizing, and academic outcomes.
Disparities in sleep are evident among children and young adults across various indicators.

Sleep serves as a biosocial pathway through which the stress of racism, daily discrimination, and neighborhood conditions across multiple ecological levels impact health, functioning and academics at a daily level and over time.

Reciprocal developmental processes - sleep is impacted by, reduces probability of, and promotes coping with, discrimination stress.

Potential for sleep health/behavior promotion as a biobehavioral lever for interrupting/modifying pathways between racism and health?

A particular focus on sleep quality and regularity.
SLEEP AND HEALTH

“Sleep is the best meditation”
- Dalai Lama

- Sleep is restorative and healing
- Sleep is a modifiable health behavior
- Sleep is a complex and delicate system incorporating biological, social, contextual, environmental, societal, and cultural influences
- It is not the burden of young people to “sleep off” racism
- However, sleep health promotion may be a pathway towards health equity

“Sleep is the best meditation”
- Dalai Lama
THANK YOU!
tyip@fordham.edu

Collaborators:
David Chae, ScD
Yuen Mi Cheon, PhD
Warren Tryon, PhD
Heining Cham, PhD
Ye Feng, MA
Molly Dunbar, BA
Sheena Mirpuri, PhD
Kyle Lorenzo, MA
Kara Chung, MA
Mingjun Xie, PhD
Yijie Wang, PhD
Mona El-Sheikh, PhD
Joseph Buckhalt, PhD
Milou Haskin, BA
Ariel Tseng, BA
Zhen Zhang, PhD
Jinjin Yan, PhD

R21MD011388
BCS1354134
R01MD015715
R01MD014737
R01MD105763