# Sleep As A Social Justice Issue

Teacher Copy:

The following copy is provided to help provide teachers with an idea of how to model I^2 graph analysis and what to look for in student graph analysis. Student responses to the "Identify" and "Interpret" parts of the analysis will vary based on what observations the students make. Thus, it is not provided as an answer key, but as a guide to help with the analysis.

How Much Sleep We Need Differs by Age
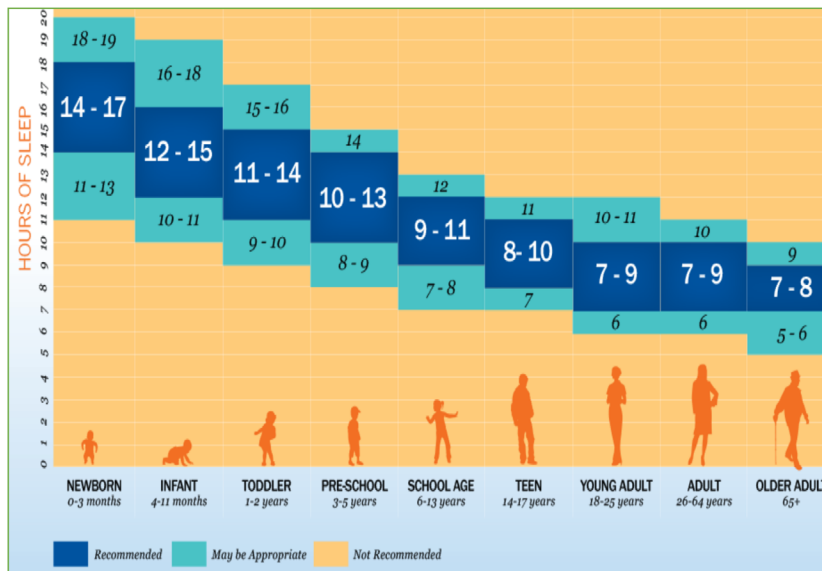
09/23/2020 Alcantara | Zuckerman Brain Insight Lecture Series Source: Hirshkowitz et al., 2015, Sleep Health

I see: There are *orange people on the bottom that get older and bigger from left to right.*
It means: *The x-axis is showing different ages, from newborn on the left to older adults on the right.*

I see: *There are rectangles above each person with blue in the middle and teal above and below. The rectangles go down like a staircase.*
It means: *The blue is the recommended amount of sleep per night for each age. In general, it decreases as a person gets older from 14-17 hours per night as a newborn to 7-8 hours per night as an older adult.*

Caption: *This graph shows sleep requirements by age. Age is on the x-axis and increases from newborn to older adult. The amount of sleep needed decreases across the graph. This means that as we get older, we need fewer and fewer hours of sleep starting at 14-17 hours per day for a newborn and ending at 7-8 hours per day for an older adult.*
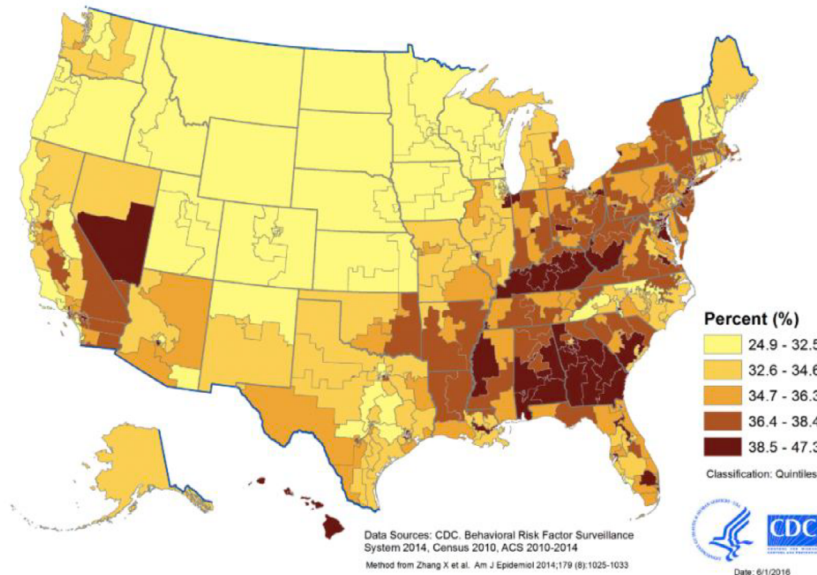
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GROUP #1

1 in 3 US Adults are Sleepless in America

Figure 3. Prevalence of Short Sleep Duration (<7 hours) for Adults Aged ≥ 18 Years, by Congressional District, United States, 2014

Percent (%)
- 24.9 - 32.5
- 32.6 - 34.6
- 34.7 - 36.3
- 36.4 - 38.4
- 38.5 - 47.3

Classification: Quintiles

Data Sources: CDC. Behavioral Risk Factor Surveillance System 2014, Census 2010, ACS 2010-2014
Method from Zhang X et al. Am J Epidemiol 2014;179 (8):1025-1033

Date: 6/1/2016

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I^2 Analysis:

<u>I see</u>: *There are dark brown areas in south (Georgia, Alabama, Mississippi) and in Kentucky/West Virginia.*
<u>It means</u>: *38.5-47.3% of adults in these areas are not getting enough sleep.*

<u>I see</u>: The *Upper Midwest and West are mostly yellow.*
<u>It means</u>: *Fewer people (24.9-32.5% of adults) are not getting enough sleep in those regions.*

<u>I See</u>: The *Eastern Half of the US has darker colors.*
<u>It means</u>: *People in the eastern US get less sleep.*

<u>Caption</u>: *This map shows the percentage of adults who sleep less than 7 hours per night in different areas of the country. The darker colors are found in the Southeastern states and in Nevada and indicate that over 38.5% of adults in those areas do not get enough sleep. The upper midwest and western areas of the country are lighter in color. This means that fewer adults in those areas are sleep deprived.*

Additional Questions

1) Which areas of the country are the most sleepless? *South, Mid-Atlantic.*

2) Which areas of the country are the most rested? *Upper Midwest and West*

3) What are some possible reasons for this pattern? How does this relate to social justice?
The pattern could be related to income and poverty. It could also be related to patterns of population density of racial diversity. It could relate to social justice if sleep deprivation correlates with poverty and/or racial discrimination.

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GROUP #2

Almost 4 in 10 Adults are Sleepless in New York
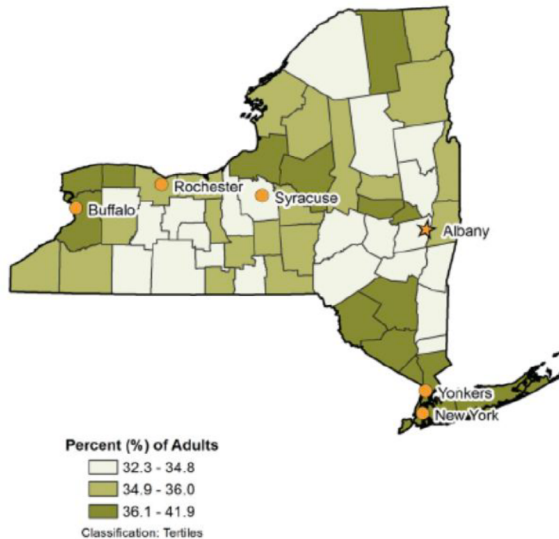
In 2014, 38.1% of New York adults reported sleeping less than 7 hours per night.

Percent (%) of Adults
- 32.3 - 34.8
- 34.9 - 36.0
- 36.1 - 41.9
Classification: Tertiles

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I² Analysis:

I see: *There is a dark area around New York City and just north.*
It means: *People in and around NYC are more likely to sleep less than 7 hours per night.*
I see: *Lighter areas in most of the middle of the state.*
It means: *People in the lighter areas are less likely to sleep less than 7 hours per night.*
I See: *Darker areas around Buffalo and north of Syracuse.*
It means: *Like the NYC area, people in these areas are more likely to sleep fewer hours.*

Caption: *This map shows the percentage of adults who sleep less than 7 hours per night in different areas of New York State. The areas around New York City, the Hudson Valley, and Long Island are darker in color, indicating that over 36.1% of adults do not get enough sleep. This is also true of the areas around Buffalo and north of Syracuse. In other areas of the state, the map is lighter in color meaning that adults in those areas are less likely to be sleep deprived.*

Additional Questions
1) Which areas of New York are the most sleepless? *New York City, Long Island, Hudson Valley, around Buffalo*

2) Which areas of New York are the most rested? *The parts in the middle of the state and not near big cities.*

3) What are some possible reasons for this pattern? How does this relate to social justice?
The pattern could be related to income and poverty. It could also be related to patterns of population density of racial diversity. It could relate to social justice if sleep deprivation correlates with poverty and/or racial discrimination.

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GROUP #3

Racial/Ethnic Differences in Sleep Disturbances
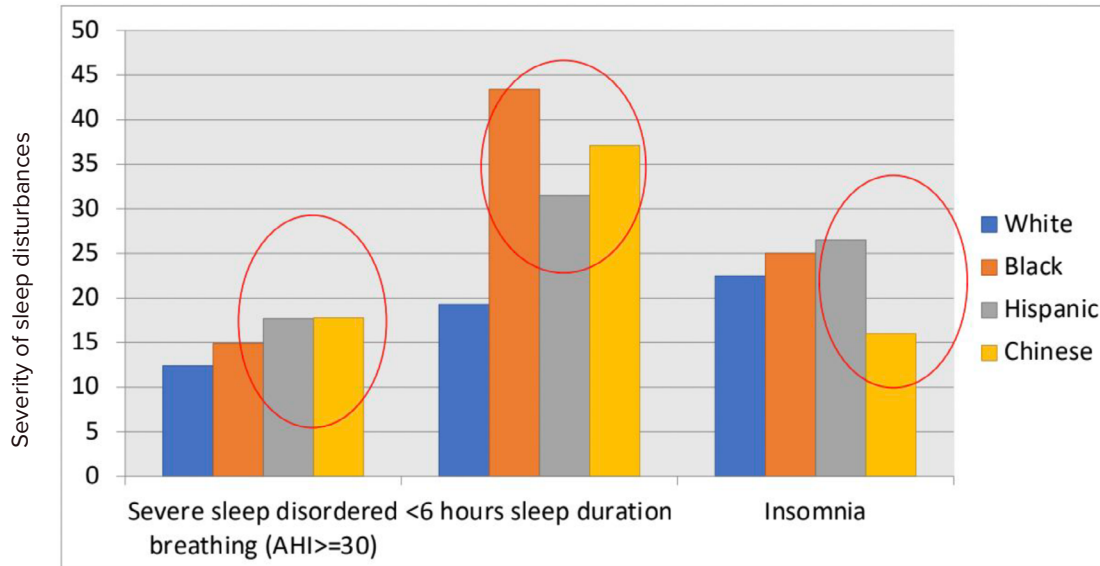
09/23/2020   Alcantara | Zuckerman Brain Insight Lecture Series   Source: Chen et al., 2014, SLEEP
                                                                                 Page 13

I² Analysis:

I see: *The gray and yellow bars are highest and cirlced for the first grouping.*
It means: *Chinese and Hispanic people had higher rates of breathing problems while sleeping.*

I see: *The orange and yellow bars are tallest in the second grouping.*
It means: *Black and Chinese people were more likely to sleep less than 6 hours per night.*

I See: *The gray and orange bars are tallest in the third grouping.*
It means: *Black and Hispanic people had the highest rates of insomnia.*

Caption: *This graph shows racial/ethnic differences in sleep disturbances. For severe breathing disorders, the gray bars and yellow bars are higher and are circled. This shows that severe breathing disorders are more common in Chinese and Hispanic people. For low sleep duration, the orange, gray, and yellow bars are all taller and circled. This means that Black, Hispanic, and Chinese people are all significantly more likely to get insufficient sleep than white people. For Insomnia, the gray bar is taller than the yellow bar and they are both circled. This indicates that Hispanic people are more likely to have insomnia than Chinese people.*

Additional Questions

1) According to the graph, which racial/ethnic groups are the most sleep deprived (<6 hours)?
Black and Chinese

2) According to the graph, which racial/ethic groups have the most problems with sleep disordered breathing and insomnia?
Hispanic and Chinese

3) What are some possible reasons for this pattern? How does this relate to social justice? *Stressors associated with racial discrimination may contribute to or correlate with sleep disturbances.*
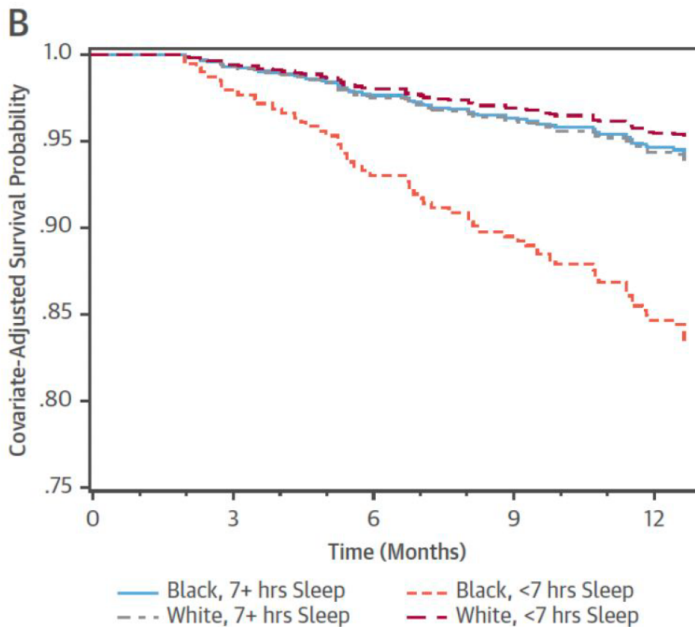
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GROUP #4

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Black patients who slept less than 7 hours had highest risk of MACE (i.e., death, heart attack, unstable angina) compared to all other groups.

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Source: McGlinchey, et al., 2018, *Journal of the American College of Cardiology*

I² Analysis:
I see: *Three of the lines are fairly close together.*
It means: *Survival probability is similar following Acute Coronary Syndrome for Black pateints who sleep more than 7 hours and white patients no matter how much they sleep.*

I see: One of the lines goes down much farther and faster than the others.
It means: Patients who are Black and get less than 7 hours of sleep per night are more likely to die from a heart problem while recovering from Acute Coronary Syndrome.

Caption: *The graph shows the probability of survival in patients following Acute Coronary Syndrome based on race and hours of sleep. Three of the lines are very similiar in slope. This means that there is not a big difference in survival between white patients and Black patients who get 7 or more hours of sleep. The last line drops much faster and farther. This shows that Black patients who are getting less sleep are much more likely to encounter further heart problems.*

Additional Questions
1) In the study, which group had the LOWEST survival probability after 3 months?
Black, less than 7 hours of sleep

2) Which group had the highest survival probability after 12 months?
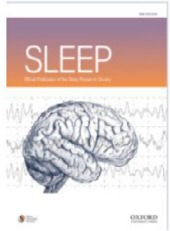*White, less than 7 hours of sleep*

3) What are some possible reasons for this pattern? How does this relate to social justice?
Stress, lack of sleep, and health problems seem to compound each other and can have disproportionate effects on Black patients.
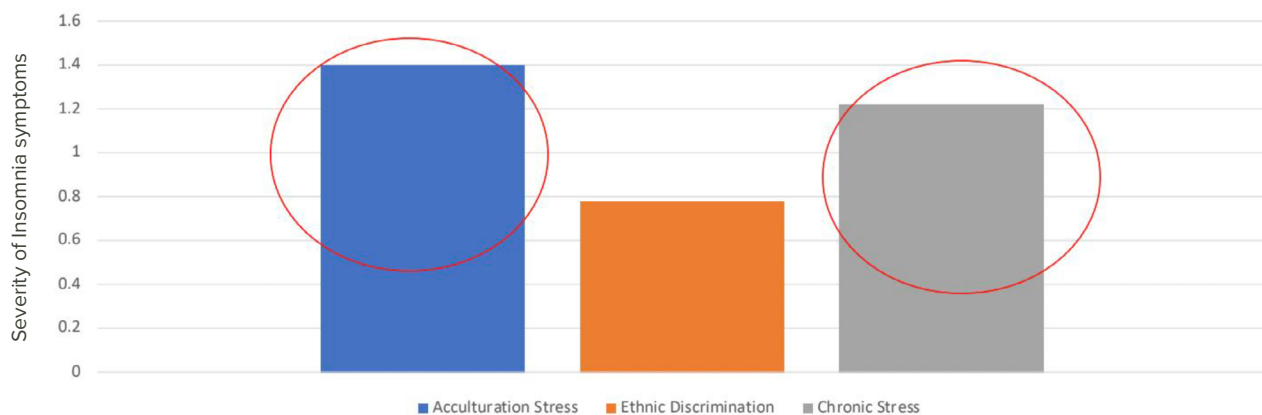
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GROUP #5

Sociocultural and psychosocial stressors and Insomnia Symptoms: HCHS/SOL Sueño & Sociocultural Ancillary Study (N = 1192)

Severity of Insomnia symptoms

■ Acculturation Stress ■ Ethnic Discrimination ■ Chronic Stress

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I² Analysis:
<u>I see</u>: *The blue bar is biggest and is circled.*
<u>It means:</u> *Acculturation stress contributes significantly more to insomnia than discrimination.*

<u>I see:</u> *The gray bar is second biggest and is circled.*
<u>It means:</u> *Chronic stress contributes significantly more to insomnia than discrimination.*

<u>I See:</u> *The orange bar is smallest.*
<u>It Means:</u> *Ethnic discrimination has an effect on insomnia symptoms, but it is not as big as the effects of chronic stress and acculturation stress.*

Caption: *This graph shows the effect of different stressors on insomnia symptoms. The blue and gray bars are larger and are circled. This means that acculturation stress and chronic stress have larger effects on insomnia symptoms than ethnic discrimination.*

Additional Questions
1) Which of the variables studied caused the biggest increase in Insomnia Symptoms?
Acculturation Stress

2) What are some possible reasons for this pattern?
The stressors involved in acculturation may be longer lasting and more pervasive than the stressors associated with ethnic discrimination

3) How does this relate to social justice?
Societal pressures to acculturate can contribute to insomnia symptoms.

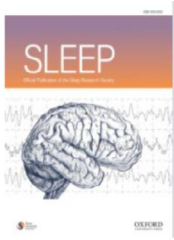# Sleep As A Social Justice Issue

GROUP #6

Figure. Effect of Acculturation Stress on Insomnia Symptom Severity by Employment Status
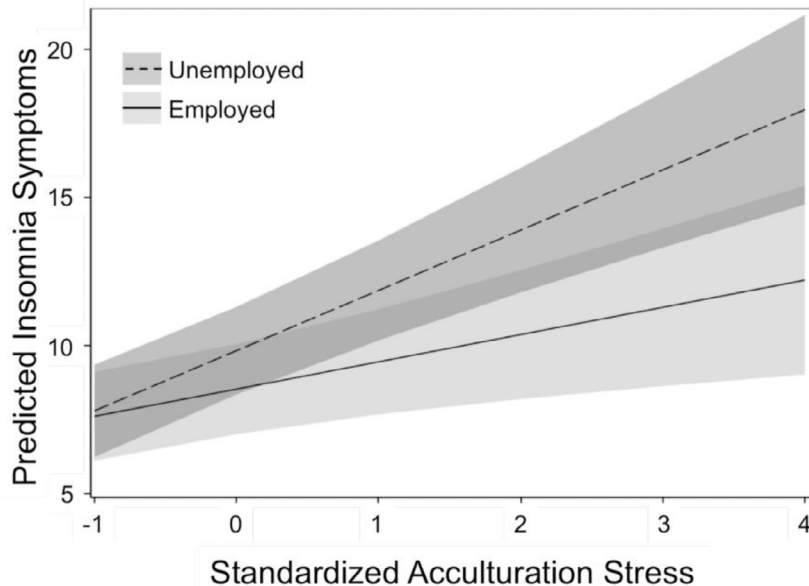

Figure Legend: Effect of acculturation stress (continuous) on ISI (continuous) in analyses weighted for sampling weights and adjusted for age, sex, site and ethnicity with an employment term (dichotomous), an acculturation stress term and an acculturation stress X employment term (interaction).

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I^2 Analysis:
I see: *The dotted line goes up faster and higher than the solid line.*
It Means: *Being unemployed increases the effect of acculturation stress on insomnia.*

I See: *The solid line goes up, but not as fast or as high as the dotted line.*
It means: *Acculturation stress increases insomnia symptoms in people who are employed, but not as much as in people who are unemployed.*

Caption: *This graph shows the effects of acculturation stress on insomnia symptom severity by employment status. The line for employed shows* shows a slight increase as acculturation stress increases. *This means that acculturation stress impacts insomnia symptoms in people who are employed. The line for unemployed starts at a similar level but rises farther and faster than the employed line. This shows that being unemployed magnifies the effect of acculturation stress on insomnia symptoms.*

Additional Questions
1) What happens to Insomnia Symptoms when Acculturation Stress goes up?
Insomnia symptoms increase when acculturation stress goes up.

2) How does employment status affect this pattern?
They increase more when unemployed.

3) What are some possible reasons for this pattern? How does this relate to social justice?
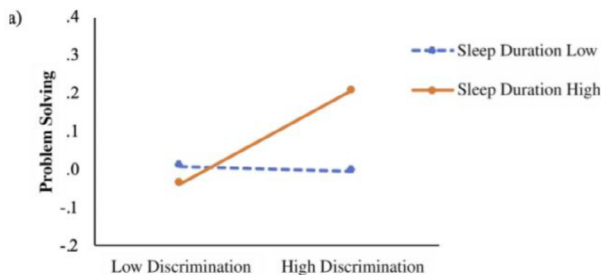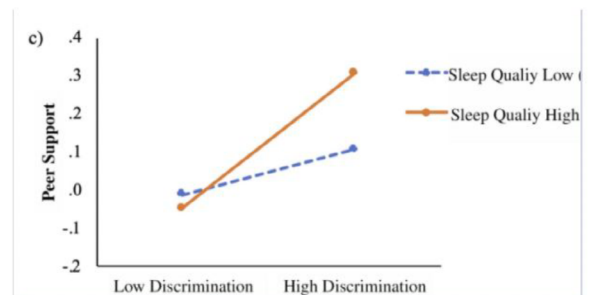*The combination of unemployment and acculturation stress has a bigger effect than acculturation stress alone.*

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GROUP #7

Sleep Promotes Healthy Coping in Face of Stress

Source: Wang & Yip, 2019, *Child Development*

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I² Analysis:
<u>I See:</u> *For "Greater Problem Solving" the orange and blue lines are similar on the left but orange is higher on the right.*
<u>It Means:</u> *Getting enough sleep helps improve problem solving in high discrimination situations.*

<u>I See:</u> *For "Greater Peer Support" the orange and blue lines are similar on the left, but orange is higher on the right.*
<u>It Means:</u> Getting enough sleep leads to increased peer support in high discrimination situtations.

<u>Caption:</u> *These graphs show the effect of getting enough sleep (high duration) on adaptive behaviors like problem solving and peer support in the face of discrimination. In both graphs, the blue line (low sleep quality) is relatively similar in the low and high discrimination conditions. The red line (high sleep quality) goes up significantly for both adaptive behaviors. This demonstrates that quality sleep allows children to better utilize healthy coping skills in the face of discrimination.*

Additional Questions
1) What happens to problem solving skills and peer support in high discrimination situations when children are well rested?
Problem solving skills and peer support increase.

2) What happens to problem solving skills and peer support in high discrimination situations when children are not well rested?
They increase slightly or decrease.

3) What are some possible reasons for these patterns? How do they relate to social justice?
People are better at coping with stress when they are well rested. If coping with stress is improved by quality sleep, then marginalized populations are not only receiving more stress, but are also suffering from reduced abilities to cope with those stressors.