# Data Wrangling Project Proposal

**Introduction**

Sleep is a fundamental necessity of life. Sleep loss impairs task performance, cognitive performance, and mood [1]. The Centers for Disease Control and Prevention (CDC) declared that insufficient sleep is a public health epidemic [2]. Self-reported short sleep duration in the United States varies by industry and occupation, and has increased over the past two decades [3]. According to several studies, more than half of healthcare professionals report symptoms of burnout, insomnia, depression, anxiety, and mental health illnesses [4,5]. Some studies have shown race and ethnic disparities in sleep patterns in the United States [6]. Sleep duration varies across the human lifespan and the ideal amount of sleep recommended each night may vary due to genetic factors [7]. Some studies have shown an inverse relationship between sleep with age and insufficient sleep has become widespread, especially among adolescents [7,8]. Our study will investigate the association between sleep and other covariates, and will highlight the consequences of sleep insomnia on mental health.

**Data Description**

The selected dataset consists of three csv files: 1) “insomnia\_data.csv”; 2) “insomnia\_data\_dictionary.csv”; 3) “insomnia\_item\_level\_data.csv”. The main dataset (“insomnia\_data.csv”) features 95 records, each with 95 fields capturing questionnaire composite scores and z-scored values. Variables includes but not limiting to: ‘Sex’, ‘Age’, ‘White’, ‘Black’, ‘Asian’, ‘ISI\_total’ (Insomnia severity index), ‘ASHS\_SleepEnvirnmont’, ‘ASHS\_DaytimeSleep’, ‘ASHS\_substances’, ‘ASHS\_sleepStability’, ‘GCTI\_anxiety’, ‘GCTI\_worries’, ‘NEO\_openness’’, ‘asq\_home’ (Stress of Home Life), ‘asq\_school’, ‘asq\_finance’, ‘asq\_peer’, ‘cope\_disengage\_mental’, and etcetera. The “insomnia\_data\_dictionary.csv” clarifies variables with 95 rows detailing variable short-names. The “insomnia\_item\_level\_data.csv” supplements psychosocial factors and questionnaires responses related to insomnia. Both serve as a vital resource for understanding the intricate relationship between sleep patterns and psychological factors in adolescent insomnia.

**Aim 1:** **Visualization of insomnia symptomatology in adolescents by subgroups**

1.1. Visually identify distinct subgroups among adolescents based on demographic variables (e.g., Age, Race) and their distribution on the GCTI, ASHS, ASQ battery tests.

1.2. Utilize data visualization techniques (e.g., heatmap analysis) to depict the relationship between identified subgroups and psychological factors. Provide an intuitive representation of how diverse psychosocial factors contribute to varied sleep patterns in adolescents.

**Aim 2:** **Statistical Analysis of Sleep Quality and Habits in Adolescents**

2.1. Use sleep quality to predict mental health and habits among adolescents with regression analyses.

2.2. Investigate if the interaction effect of significant predictor factor(s) above and the race factor is statistically significant.

**Concluding Remarks**

This project aims to analyze a dataset gathered from self-reports and standardized questionnaires, focusing on exploring insomnia-related factors in adolescents. Our approach involves utilizing a combination of Excel, R, and potentially Python for data wrangling, analysis, and visualization. The objective is to discover patterns, trends, and distinctive clinical features of adolescent insomnia, aiming to visualize the severity and complexity of insomnia symptomatology across various behavioral and psychosocial factors.

**References**

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