

Sleep Strategies and Their Effectiveness in Improving Dreams and Mental Health

Shannon J. Cavanaugh, Allegría M. Sandino, & Julianna E. Zwart

Flintridge Sacred Heart Academy

Psychology Research 2022-2023

Mrs. Murphy

- I. ABSTRACT
- II. INTRODUCTION
- III. LITERATURE REVIEW
- IV. PROJECT DESCRIPTION
- V. METHODS AND TOOLS
- VI. RESULTS
- VII. DISCUSSION
- VIII. ACKNOWLEDGEMENTS
- IX. REFERENCES
- X. APPENDICES

## **I. Abstract**

84% of college students experience stress dreams in connection to school, suggesting that students in college-preparatory high schools may have a similar rate of stressful dreaming. As the rigor and competitiveness of education continue to increase, the levels of anxiety and sleep deprivation for students will continue to drastically increase as well. A survey was administered to a college-preparatory, independent high school community that included questions about their sleep schedule, dreams, nighttime routines, and school involvement. Subsequently, volunteers participated in a two-week sleep study that tested three sleep strategies to see their effects on the participants' dreams and mental health: staying off of technology for an hour before going to bed, doing a ten-minute yoga routine before bed, or adding an hour of sleep to their regular sleep schedule. For the survey, the research team discovered that, on average, students at Flintridge Sacred Heart tend to get 6-7 hours of sleep. As for the sleep study, the team did not get as much participation as hoped, so there are no definite results. However, they noticed one trend where, for the staying off of technology strategy, on the nights the participant remembered to follow through with the strategy, she would not remember her dreams or have positive dreams, but, on the nights that she forgot to do the strategy, she would have negative dreams.

## **II & III. Introduction and Literature Review**

You are in the midst of finals week, and you are extremely stressed over the five finals you have to take over the next three days. After staying up until 1:00 AM studying your heart out for your first finals that are taking place the next day, you finally decide to try to get some sleep. You keep going over the material you just crammed into your head while you drift off to sleep. Then,

BAM, you wake up in a cold sweat, panting, emerging from an intense and vivid nightmare. This dream adds to your already-existing anxiety, lingering with you throughout the entire next day.

This is just one instance displaying how ineffective sleep strategies can affect mental health and dreams. And the research team knows that this one instance has happened to 84% of college students, according to a study done in 2017 by Debut (Taylor). Stress and sleep deprivation are also prevalent problems in the team's own school community. One of the researchers, Allegría Sandino, has experienced this firsthand, having a recurring nightmare about her own death over the course of a stress-filled week which led to her feeling paranoid throughout the rest of the week, making her scared to fall asleep in fear of the nightmare returning. For another researcher, Julianna Zwart, her interest in this topic began a little differently. After hearing for some time about her mom's weird dreams due to the consumption of cough syrup, Zwart decided to start researching the effect of drugs on dreams. However, as Zwart further researched, she stumbled upon sleep deprivation and its effect on dreams as well which led her to want to pursue this topic. Finally, the last researcher, Shannon Cavanaugh, has also experienced stress nightmares, specifically on the nights before tests. The research team hopes to discover the most effective sleep strategies that will help improve dreams and decrease or eliminate stress dreams, resulting in overall better mental health.

The team first wanted to research how a decrease in sleep can change dreams. In an article by Christie Nicholson, published on the Scientific American website in 2007, it stated that Mark Mahowald, a neurologist from the University of Minnesota, found that "when someone is sleep deprived, we see greater sleep intensity, meaning greater brain activity during sleep; dreaming is definitely increased and likely more vivid" (Nicholson). This is known as "REM Rebound," meaning if a person loses time in REM sleep one night, they will gain more the next

night. One study done in 2005 concluded that, when deprived of just 30 minutes of REM sleep one night, this can result in a 35% increase in REM sleep the next night. This study also found that dream intensity increased along with this REM deprivation. Nicholson also specifically addressed the stages of sleep, which are composed of REM sleep (the stage where most dreaming occurs) along with four stages of non-REM sleep. Another study was mentioned in which people are denied REM sleep to the point where, when they fall back asleep, they immediately go back to REM sleep and skip the non-REM sleep stage altogether. The conclusions of this article are that “dream intensity increases with REM deprivation” (Nicholson).

The team then went on to research more about sleep itself and more effects of sleep deprivation on the body. The journal article “Sleep, Drugs, and Dreams” from *The American Journal of Nursing*, written by Grace Fass, first began by talking about the different stages of sleep, going into detail about the differences between REM and non-REM sleep, how long they generally last, and different bodily functions that occur during these stages of sleep. Then, the journal article continued to describe the effects of sleep deprivation on the body. In one study, after five to seven nights of sleep deprivation due to awakening during REM 1 sleep, people have been found to have more anxiety, difficulty concentrating, and irritability. Fass then described sleep deprivation in Stage IV sleep as well as the side effects of total sleep deprivation. When one is deprived of sleep, when they are able to sleep, there is a pressure to reestablish equilibrium, resulting in more deep sleep (non-REM), which can ultimately lead to personality changes possibly due to the lack of dreaming. This study contradicted the team’s first source, as the article from the Scientific American website stated that sleep deprivation results in more

REM sleep the next night, making the team's intrigue and fascination in this topic even stronger as the researchers now may be able to find out which study is more accurate.

After these findings, the research team then wanted to move away from looking at sleep deprivation and instead focus on the correlation between negative dreams and mood and health factors. In an article created by psychologists who study this topic: Mozhgan Saeidi, Ali Soroush, Parvin Golafrrozi, Ali Zakiei, Behrooz Faridmarandi, and Saeid Komasi, they primarily focused on patients between the ages of 20-80 in Cardiac Rehabilitation Centers and how an adverse mood or hypertension could lead to an increase in emotionally negative dreams. The authors' conveyed this connection and explained the methods/tests by which they supported their claim. They found that "the increasing rates of anxiety and anger and history of hypertension are related to increasing dreams with negative and annoying emotional load in patients with cardiovascular problems. Although negative dreams may be effective in patients' emotional regulation after establishing cardiac disease, control and early treatment of psychiatric disorders and cardiac risk factors, especially hypertension, are concerned as necessities of secondary prevention" (Saeidi). So, their dreams were affected by their moods and vice versa while hypertension also played a role. If their dreams were more positive, then their feelings of anger and anxiety might decrease and certain diagnoses are impacted by these, such as hypertension. Overall, this article related to their initial inquiries about the effects of stress on sleep and how these negative effects could then affect the patient's overall mental health.

Then, the team proceeded to research how fragmented sleep could result in dissociative symptoms, wanting to look into how a disrupted sleep schedule can cause dissociation during the day as well as how other mental disorders may play a role in this, so they read the article "Fragmented Sleep, Fragmented Mind: The Role of Sleep in Dissociative Symptoms,"

written/compiled by Dalena van der Kloet, Harald Merckelbach, and Timo Giesbrecht (all from Maastricht University) as well as Steven Jay Lynn (from Binghamton University) in *Perspectives on Psychological Science*. The authors discussed how dissociative symptoms are related to the sleep-wake cycle and how disturbances in this cycle can result in dreamlike states while awake as well as memory failure. They first stated the definition of dissociation according to the DSM IV as “a disruption in the usually integrated function of consciousness, memory, identity, or perception of the environment” (van der Kloet). Later on in the research article, they dove into dissociation and sleep, noting that, especially with patients with mood disorders, anxiety disorders, borderline personality disorder, or schizophrenia, sleep abnormalities are present due to these disorders, resulting in dissociation throughout the day. They also referenced the *Iowa Sleep Experience Survey*, which assessed the link between dissociative symptoms and vivid dreams, nightmares, and waking dreams as well as the lucid dreaming subscale. The research from this survey proved that sleep and dissociation are connected, specifically through nightmares and waking dreams, but lucid dreaming is only weakly connected to dissociative symptoms. Finally, the authors discussed the relationship between sleep and memory, claiming that sleep disturbances foster commission errors, backed up by Blagrove and Akehurst’s *Gudjonsson Suggestibility Scale* which studied vulnerability to misleading information in sleep-deprived participants. This study proved that sleep-deprived individuals were more likely to succumb to false information and pseudo-memories when compared to the control group. Sleep disturbances have also been associated with memory fragmentation issues as well. Overall, sleep disturbances can be linked to dissociation, including memory issues, but, according to this article, it may not be the singular cause of dissociative pathology.

Finally, wanting to bridge the gap between sleep deprivation and dreams, the team read the article “How Do Dreams Affect Sleep Quality?” written by Danielle Pacheco for the Sleep Foundation, intended for those interested in looking at what dreams could say about the quality of your sleep. Pacheco explained how dreams are a normal and healthy part of the sleep cycle, but, when one experiences nightmares at a frequent rate, they should consider talking to a doctor. The author explained how dreams have been considered contributors to good sleep as they promote “better cognitive function and emotional health” (Pacheco). However, when one experiences disruptive nightmares often, this could be a sign of a nightmare disorder. Pacheco concluded with ways to improve sleeping habits, such as giving ourselves time to relax before going to bed, preventing bad dreams and, therefore, leaving you feeling refreshed and calm throughout the next day. This article suggested methods that the team was interested in having a group of people experiment in the sleep study.

#### **IV. PROJECT DESCRIPTION**

First, the research team hypothesized that overall, for the school-wide community, students would generally get around 6-7 hours of sleep instead of the recommended 8-10 hours for teens. This can be due to many factors, including extracurriculars (such as a job or sports), workload, home life, or lack of time management skills. Additionally, the researchers hypothesized that students who increased the amount of sleep they got would be the most effective strategy in improving their dreams and mental health. The team’s driving research questions led them to search for effective sleep strategies to improve sleep and mental health. The process began by exploring existing methods, recommended by therapists and other health/sleep professionals. Using this data, the research team created a survey, in Google form format, with questions to




help gather data on the Flintridge Sacred Heart community's existing sleep habits (sleep schedules, napping habits, wind-down routines, etc.) and demographics. The survey ended by asking for volunteers to participate in a two-week study to test some existing methods to improve sleep found by the research team, wanting to discover which one was the most effective. The survey contains an explanation of why the researchers were collecting the data and what the two-week study would entail. Then, the team separated the self-selected participants into four groups: three sleep strategies and one control group. The sleep strategies were: adding an extra hour of sleep somewhere into their existing routine, doing a fifteen-minute yoga routine (selected by the research team) before bedtime, and staying off phones, and all general electronics, for an hour before bed. The research team created packets that allowed each participant to document their mood, if they performed their strategy, dreams that they remembered, and stress factors. These packets were collected and analyzed by the research team. The team then generated graphs to see correlations between the overall school-wide data and some of the results of the study.

## **V. METHODS AND TOOLS**

When first researching, the team noticed that past research had focused on how stress and sleep deprivation affects dreaming and how those dreams can affect mental health throughout the day, but it had mainly left out how to try to fix this problem. Consequently, the team began by sending out a school-wide survey which 216 students answered (Figure 1). The survey asked baseline questions such as "How old are you?", "What time do you go to sleep on school nights?", and "How many APs/Honors do you take?" These questions helped the research team find out general information about the students at Flintridge Sacred Heart and the factors that can contribute to their sleep habits. They then took these questions and turned them into bar graphs in

order to find trends between questions. Following the survey, the team created a sleep study in which they gave forty self-selected participants a choice to choose between three sleep strategies: following a ten-minute yoga video, adding one extra hour of sleep to their nightly routine, or staying off of technology for an hour before bed. Along with a chosen sleep strategy, participants were given a packet with questions to answer when they woke up in the morning after having performed the sleep strategy (Figure 2). Some of the questions included were “Did you do your sleep strategy last night?”, “Describe your dreams in 1-2 sentences (if you remember)”, “How are you feeling this morning?”, and “List any stress factors that are currently affecting you (such as exams).” This sleep study helped the research team explore the effectiveness of these sleep strategies. They also could gauge whether or not it was difficult for students to follow a sleep strategy before bed to see if the participants were following through with the study and not skewing their results.



### Sleepy Time Study!

Hi! Want to improve your sleep schedule and (hopefully) your mental health? Volunteer to participate in our experiment for our research project!

We are studying how dreams affect mental health, and, specifically, how certain sleep strategies can improve dreams and therefore improve mental health. We will be conducting an experiment over the course of two weeks where we will ask participants to try certain strategies or routines and see if it improves their dreams and subsequently their mental health.

First, we need to collect overall data about FSHA students' sleeping habits, so please fill out the following questions to the best of your ability. **Filling out these questions does not mean that you will have to participate in our study.** This is just for data collection. Then, the second page will ask demographic questions to see how these demographics could affect your sleeping habits.

Finally, at the end of that page, you will be asked if you want to participate in our study. If you click yes, then there are just a few more simple questions that we need you to fill out to determine if you are the right fit to volunteer. If you click no (which is totally understandable), then you will be prompted to just submit the form. Thank you so much for your participation! (:

Sign up today. If you snooze, you lose! zzz

-Julianna Zwart, Ally Sandino, and Shannon Cavanaugh

How many hours of sleep do you get on average per night on school nights? (Sunday-Thursday) \*

- less than 3 hours
- 4-5 hours
- 5-6 hours
- 6-7 hours
- 7-8 hours
- 8-9 hours
- 10 or more hours

Please note: for the following questions, 8 pm means 8 pm to 8:59 pm, 9 pm means 9 pm to 9:59 pm, and so on.  
So, for example, if you go to bed at around 10:30, then you would select 10 pm.

What time do you normally go to sleep for the night on school nights? (Sunday-Thursday) \*

- 8 pm
- 9 pm

Figure 1: Schoolwide Survey

Date:


Did you do your sleep strategy last night: (please be honest; please explain why you didn't if you answer no)

yes     no

Describe your dream in 1-2 sentences (if you remember it)

In one word, describe the tone of your dream (example: stressful or happy)  
->

How are you feeling this morning?  
(Color in/Circle the happy face and provide one word to describe your mood)



List any stress factors that are currently affecting you (such as exams)

**Figure 2:** Sleep Study Packet

## VI. RESULTS

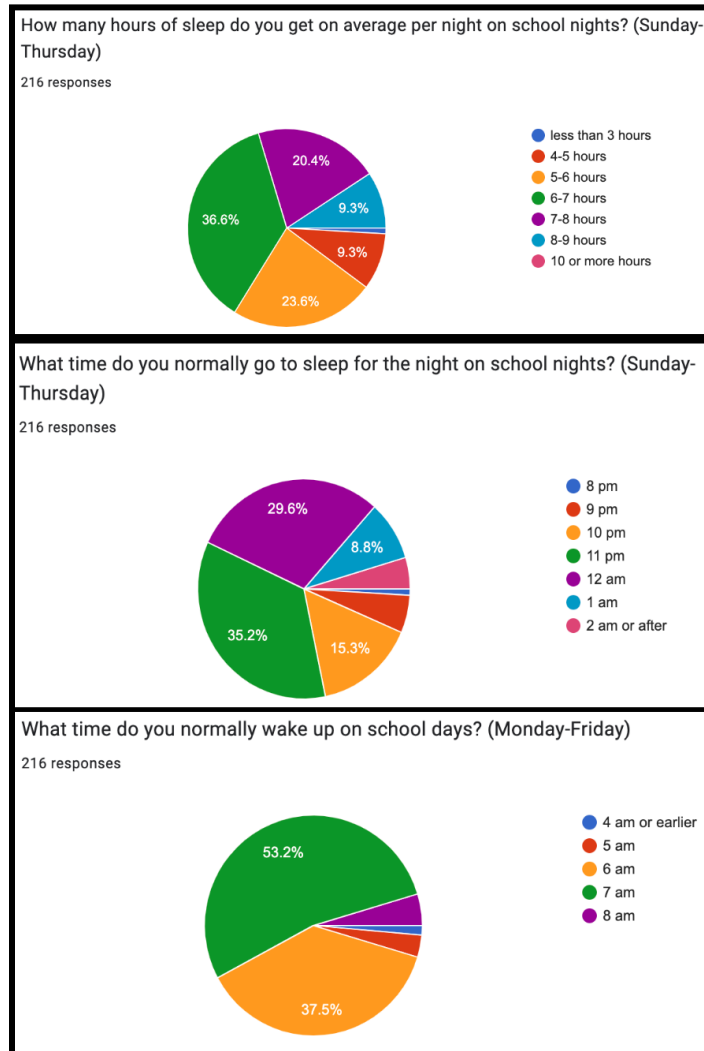
From the Sleep Study Survey, the research team discovered that most people in the Flintridge Sacred Heart school community get 6-7 hours of sleep per night during the weeknight and 8-9 hours of sleep on the weekends (Figure 3). This validated the first half of the team's hypothesis, as they predicted that students at Flintridge Sacred Heart are not meeting the recommended 9-10

hours of sleep per night. Additionally, they discovered that most students go to bed around 11 pm and 12 am during the school week and wake up between 6 am and 7 am (Figure 3).

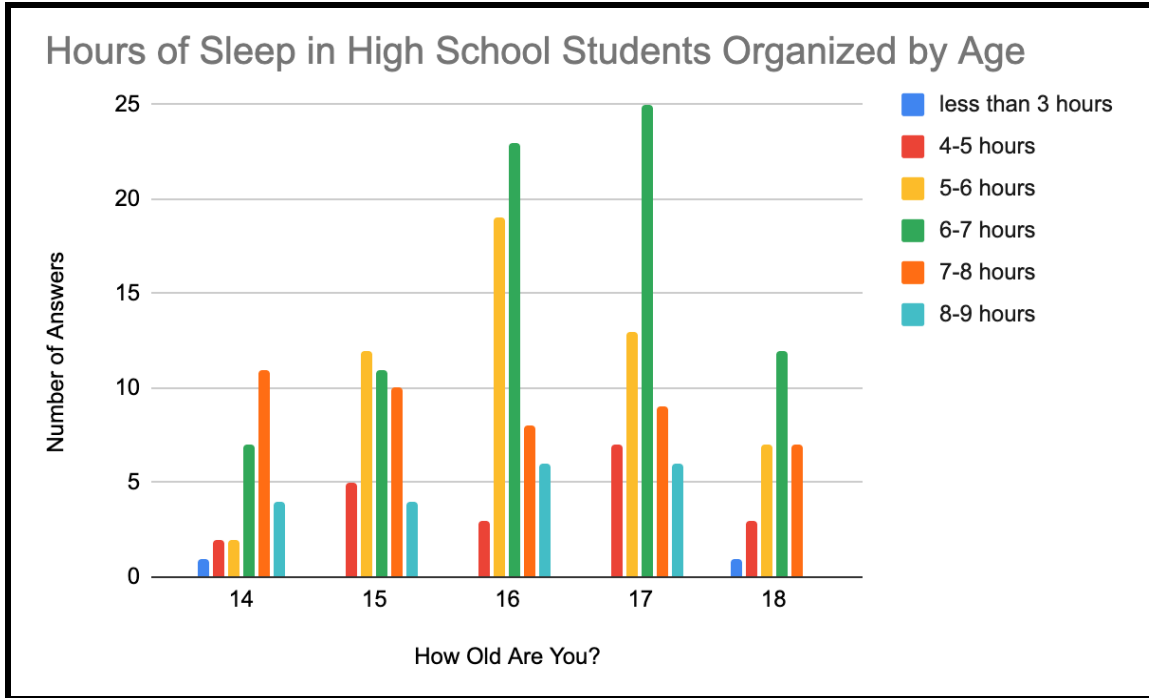
While analyzing the data, the team also noticed two very interesting trends while comparing two sets of data. First, the team recognized that, when comparing the participants' ages to the amount of sleep they get during the weekday (Figure 4), younger students (in the range from fourteen to fifteen years old) tend to have more sporadic sleeping schedules when compared to older students (in the range of sixteen to eighteen years old). The researchers hypothesized that this may be due to the younger students (namely Freshmen and Sophomores) adapting to high school and figuring out what sleep routine works best for them while balancing extracurriculars and the rigor of high school. Additionally, while comparing the amount of sleep to the number of AP/Honors classes students take (Figure 5), the team found that students who take none of these classes tend to get the most sleep, averaging 7-8 hours per night. However, students taking two APs tend to sleep the least when compared to the rest, even those students who take five or more APs. The team hypothesized that this could be due to the organizational skills of those students who are taking more advanced classes, as they know the study skills and have the motivation to get their work done efficiently and thoroughly. Students only taking two AP courses may be balancing other extracurricular activities on top of these more challenging classes, therefore having difficulty balancing all of these obligations.

Moving onto the sleep study, unfortunately, the team only obtained seven sleep study packets back from the various participants: two were from the control group (two seniors who changed nothing during the two-week study), one from the staying off of technology strategy, and four from the wind-down yoga routine strategy. Due to the lack of follow-through with participation, the team was unable to have any conclusive results, as they did not have enough

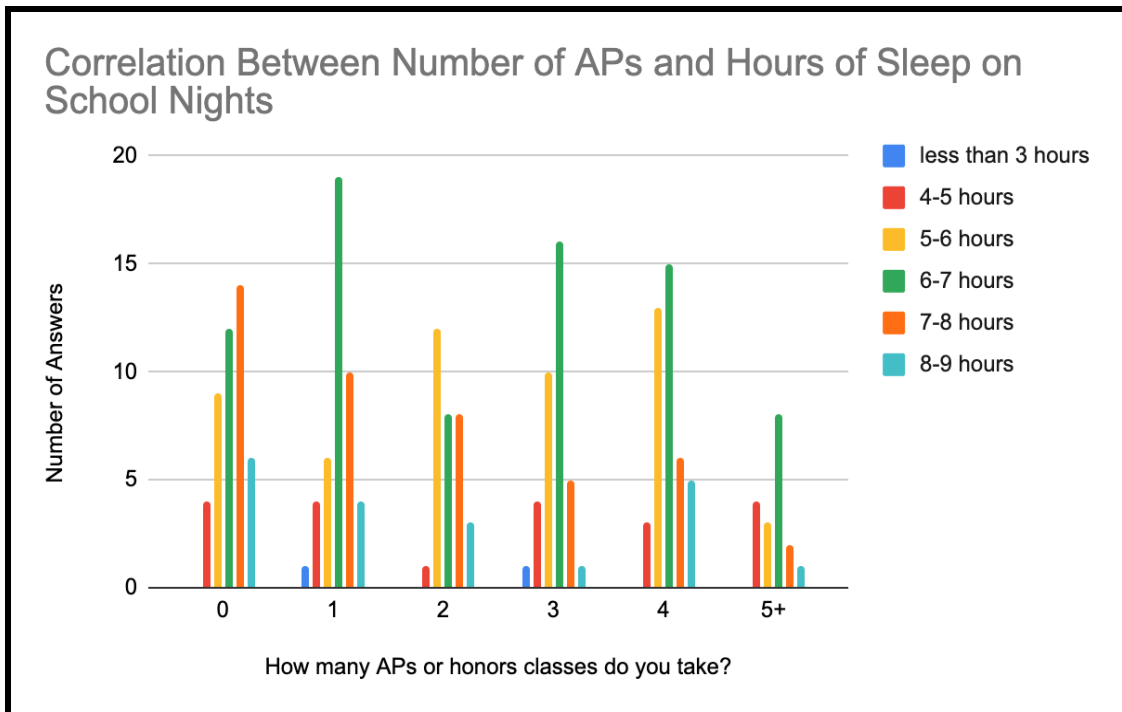
data to solidify their findings that support or disprove their hypothesis. However, while analyzing the dream journals, the group found that, for the participant who followed through with staying off of technology for an hour before going to bed, for the nights that she remembered to perform the strategy, she would usually have positive dreams or not remember her dreams at all. However, on the nights that the participant forgot to follow the strategy, she would have more negative dreams and nightmares. Again, this is only one result, so there is not enough evidence to prove that this is an effective strategy. However, this would be interesting to test in the future to compare other people’s results with these findings.



**Figure 3:** Various Responses from the Sleep Survey Google Form



**Figure 4:** Hours of Sleep in High School Students Organized by Age



**Figure 5:** Correlation Between Number of APs and Hours of Sleep on School Nights

## **VII. DISCUSSION**

Though this project was an overall success, it was far from flawless. If the research team could go back and do it over again, there are quite a few changes that would be made to the overall study. First, the psychology teacher left just before research collection was slated to start, so the schedule for general data collection and the two-week study was pushed back by about a month. Because of this, there was less time to test the survey, create packets, and conduct data analysis. Ideally, there would have been more data analysis on the schoolwide survey before beginning the two-week study in order to use what was found to place people into sleep strategies that would best suit their sleep schedules and routines. Additionally, the research team wanted to have the study take place earlier in the year because, due to the timing of the study, the senior participants had to be the control group as the study overlapped with Kairos, a four-day overnight retreat. They felt as if time was working against them at some points, and ideally wished they could have spread out the process more to increase the efficiency and effectiveness of the process.

Another major challenge that they faced was participation. Although they received plenty of people to participate in the school-wide survey initially (with forty people volunteering), it was difficult to get people to show up to meetings, respond to emails, and follow through with their strategy. Additionally, a majority of participants were going to be seniors, as they understood the importance of following through to help aid the research team with their projects as they too were conducting a research project as well. However, since they were only the control group, this limited the number of active participants significantly. At the introductory meeting, where the research team distributed packets and explained their tasks, so few people showed up that they had to find them all individually at later dates and explain the study to each of them. If the research team could go back, they definitely would find a better way to communicate with the



participants and be more insistent on attendance and participation, possibly considering other ways to guarantee participation, such as offering extra credit in a class or having some other incentive.

Finally, to future researchers exploring this topic, the dream team would advise you to plan your schedule early and leave yourself plenty of time for data collection and analysis. Although you may think you are prepared for anything, they guarantee that things will pop up, seemingly out of nowhere, and threaten to derail you. They hope you can work with the data they collected as a baseline for your research and possibly start from where the team left off, holding the sleep study closer to the beginning of the year when people tend to be less busy. Finally, they advise you to have motivation from the beginning and keep that throughout the entirety of your study because all of your hard work will truly pay off in the end.

## **VIII. ACKNOWLEDGEMENTS**

The research team would like to thank multiple members of the Flintridge Sacred Heart community for their assistance and contributions to their research, starting with Mr. Badzey, who welcomed them to the world of psychology and started them down this amazing Senior Research Project (SRP) journey. Similarly, thank you to Mrs. Murphy, who followed them through the SRP to the very end, was always available to help, and kept the team on track. Thank you to Mr. Buxman for assisting with data analysis, specifically working with graphs and charts in Google spreadsheets. And thank you to Ms. Eisenstein for helping with packet construction and allowing the team's library use. And finally, thank you to the participants of the survey and sleep study for reading Julianna's countless emails and helping to achieve the dream team's goals with this project. The team genuinely appreciates the flexibility and helpfulness of the Flintridge Sacred

Heart community throughout this entire project, and this project would not have been remotely possible without their contributions.

## IX. REFERENCES

- Eisen, J., MacFarlane, J., & Shapiro, C. M. (1993). Psychotropic Drugs And Sleep. *BMJ: British Medical Journal*, 306(6888), 1331–1334. <http://www.jstor.org/stable/29719618>
- Fass, G. (1971). Sleep, Drugs, and Dreams. *The American Journal of Nursing*, 71(12), 2316–2320. <https://doi.org/10.2307/3422235>
- McIntyre, M. (2022, December 16). *Why Not Getting Enough Sleep Could Be Harming Your Mental Health*. Psycom.net. Retrieved February 7, 2023, from <https://www.psycom.net/sleep-and-mental-health>
- McNamara, P. (2011, December 4). Psychopharmacology of REM Sleep and Dreams. *Psychology Today*. Retrieved February 7, 2023, from <http://www.psychologytoday.com/us/blog/dream-catcher/201112/psychopharmacology-rem-sleep-and-dreams>
- Nightmare disorder - Symptoms and causes*. (2021, June 5). Mayo Clinic. Retrieved February 7, 2023, from <https://www.mayoclinic.org/diseases-conditions/nightmare-disorder/symptoms-causes/syc-20353515>
- Nicholson, C. (2007, September 20). *Strange but True: Less Sleep Means More Dreams*. *Scientific American*. Retrieved February 7, 2023, from <https://www.scientificamerican.com/article/strange-but-true-less-sleep-means-more-dreams/>

Pacheco, D. (2022, March 18). How Do Dreams Affect Sleep Quality? Sleep Foundation.

Retrieved February 3, 2023, from

<https://www.sleepfoundation.org/dreams/how-do-dreams-affect-sleep>

Saeidi, M. (2022, August 10). *Risk Factors and Psychosocial Correlates of Emotionally Negative Dreams in Patients Referred to a Cardiac Rehabilitation Centre*. Retrieved

February 3, 2023, from <https://doi.org/10.21315/mjims2020.27.1.10>

Saleh, N. (2020, March 25). What are lucid dreams, and are they clinically significant? *MDLinx*.

Retrieved February 7, 2023, from

<https://www.mdlinx.com/article/what-are-lucid-dreams-and-are-they-clinically-significant/lfc-3291>

Soriano, K. (2018, May 28). What Your Dreams Are Trying To Tell You About How Well You

Sleep. *Psycom.net*. Retrieved February 7, 2023, from

<https://www.psycom.net/what-dreams-say-about-how-well-you-sleep>

Taylor, C. (2019, December 8). Stress dreams are made of finals. *The Pitt News*. Retrieved

February 7, 2023, from

<https://pittnews.com/article/153390/arts-and-entertainment/stress-dreams-are-made-of-finals/>

Tull, M. (2020, December 12). Imagery Rehearsal Therapy to Treat Nightmares With PTSD.

*Verywell Mind*. Retrieved February 7, 2023, from

<https://www.verywellmind.com/imagery-rehearsal-therapy-2797304>

van der Kloet, D., Merckelbach, H., Giesbrecht, T., & Jay Lynn, S. (2012). Fragmented Sleep,

Fragmented Mind: The Role of Sleep in Dissociative Symptoms. *Perspectives on*

*Psychological Science*, 7(2), 159–175. <http://www.jstor.org/stable/41613553>

Vedfelt, O. (2020). Integration versus conflict between schools of dream theory and dreamwork:

integrating the psychological core qualities of dreams with the contemporary knowledge of the dreaming brain. *Journal of Analytical Psychology*, 65(1), 88–115.

<https://doi.org/10.1111/1468-5922.12574>

Westphalen, D., Jewell, T., Carter, A., Herndon, J., & Raman, R. (2020, February 25). Melatonin

Dreams: Does Melatonin Cause Vivid Dreams? *Healthline*. Retrieved February 7, 2023,

from <http://www.healthline.com/health/sleep/melatonin-dreams>

## **X. APPENDICES**

[Sleepy Time Study Google Form](#)

[Dream Journal for Participants](#)

[Directions for Wind-Down Yoga Routine Strategy](#)

[Directions for Extra Hour of Sleep Strategy](#)

[Directions for Staying off of Screens for an Hour Before Bedtime Strategy](#)