CS26/L – Software Fundamentals and Development (4381)

Nyx

Sleep Tracker System

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Figure 1. Logo

The Project:

Nyx sleep tracker is an intuitive sleep tracker system application designed to improve the sleep quality and overall well-being of users. Its easy-to-use interface allows users to track their sleep session durations, set bedtimes, and schedule alarms, helping users maintain consistent sleep schedules and monitor their sleep progress over time.

Problem 1: Irregular Sleep Patterns

Maintaining a consistent sleep schedule is one of the many struggles users face due to work, school, or lifestyle factors. Experiencing irregular sleep patterns usually leads to fatigue, decreased productivity, and long-term health risks. Without proper tracking, users often find themselves confused about how to change their habits to establish healthy routines (Messman et al., 2024).

Solution 1: Session Tracking and Statistics

Nyx Sleep Tracker addresses this issue by recording the user's sessions with detailed timestamps and durations. The system aggregates, calculates averages, and provides statistics insightful for the user. By visualizing the data, we can identify trends like average sleep per week and irregular sleep patterns, allowing the user to adjust their routine accordingly.

Problem 2: Lack of Personalized Sleep Insights

Generic sleep advice typically doesn't consider individual habits, duration of sleep, or factors in lifestyle, making much of the generic advice to become ineffective. Users are often guessing about their sleep quality, leading to the misinterpretation of the effects of their own routines on their overall health.

Solution 2: Personalized Analytics and Graphs

Nyx Sleep Tracker provides tailored analytics to users by analyzing their sleep sessions. Generating graphs that show patterns such as sleep differences between weekdays and weekends, and monthly session trends. Giving the user a personalized report of their sleep routine helps them understand the impact of their habits on their rest quality and daily productivity, empowering them to make informed adjustments to their lifestyle.

Problem 3: Challenges of maintaining sleep goals

Individuals who set sleep goals typically fail to monitor or track their progress correctly. Comparing sleep habits without a dedicated program can hamper the motivation to stay true to their goals(Timmons, n.d.).

Solution 3: Goal-oriented settings and reminders

Nyx Sleep Tracker includes features for setting customized sleep goals, enabling bedtime and alarm reminders, and tracking goal achievement over time. Users can turn on bedtime alerts to maintain consistency and monitor their progress through statistics. This structured approach converts abstract sleep goals into viable, trackable steps.

Conclusion:

In summary, Nyx Sleep Tracker addresses three key challenges: irregular sleep patterns, lack of personalized insights, and difficulty maintaining sleep goals. By providing detailed logging, visual analytics, and goal-oriented reminders, the system empowers users to gain a clear understanding of their sleep behavior, identify trends, and take actionable steps toward healthier, more consistent sleep. Together, these solutions not only improve daily productivity and energy levels but also support long-term well-being, making Nyx Sleep Tracker a comprehensive tool for anyone aiming to optimize their sleep habits.

Tools

The tools used in creating the Nyx Sleep Tracker program are the following:

- Python - Primary programming language
- Kivy - Cross-platform Python framework for GUI development
- MySQL - A Relational database management system for data storage
- phpMyAdmin via XAMPP - Database administration and management tool
- MySQL Connector for Python - Python database driver for MySQL connectivity
- Matplotlib - Python library for data visualization and graph generation
- Kivy Garden Matplotlib - Integration package for embedding Matplotlib in Kivy applications
- win10toast - Python library for Windows desktop notifications
- Visual Studio Code - Integrated development environment (IDE)
- Claude AI - AI assistant for code development and debugging support
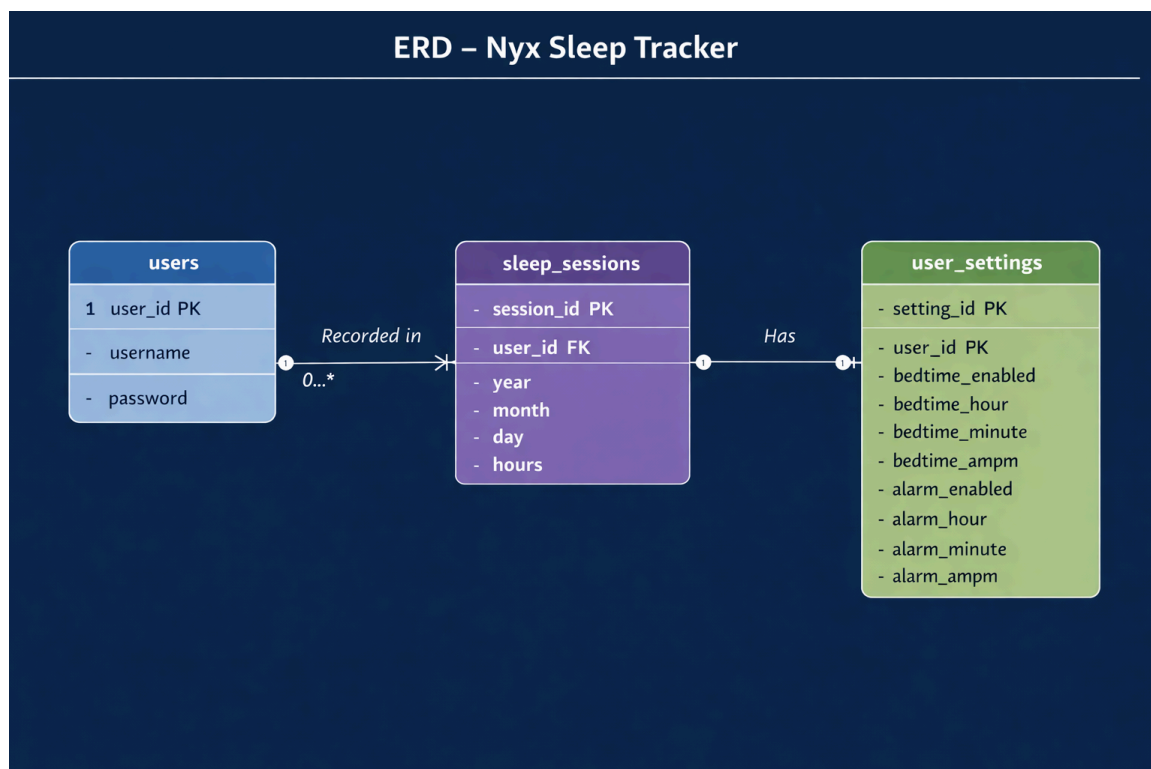
Entity Relation Diagram(ERD)

Figure 2. Nyx ERD

Data Dictionary:

	#	Name	Type	Collation	Attributes	Null	Default	Comments	Extra
☐	1	user_id 🔑	int(11)			No	*None*		AUTO_INCREMENT
☐	2	username 🔍	varchar(50)	utf8mb4_general_ci		No	*None*		
☐	3	password	varchar(255)	utf8mb4_general_ci		No	*None*		
☐	4	created_at	timestamp			No	current_timestamp()		

Figure 3.1 User Table

	#	Name	Type	Collation	Attributes	Null	Default	Comments	Extra
☐	1	session_id 🔑	int(11)			No	*None*		AUTO_INCREMENT
☐	2	user_id 🔍	int(11)			No	*None*		
☐	3	year	int(11)			No	*None*		
☐	4	month	int(11)			No	*None*		
☐	5	day	int(11)			No	*None*		
☐	6	hours	decimal(5,2)			No	*None*		
☐	7	created_at	timestamp			No	current_timestamp()		

Figure 3.2. Sleep Session Table

	#	Name	Type	Collation	Attributes	Null	Default	Comments	Extra
☐	1	setting_id 🔑	int(11)			No	*None*		AUTO_INCREMENT
☐	2	user_id 🔍	int(11)			No	*None*		
☐	3	bedtime_enabled	tinyint(1)			Yes	0		
☐	4	bedtime_hour	varchar(2)	utf8mb4_general_ci		Yes	10		
☐	5	bedtime_minute	varchar(2)	utf8mb4_general_ci		Yes	00		
☐	6	bedtime_ampm	varchar(2)	utf8mb4_general_ci		Yes	PM		
☐	7	alarm_enabled	tinyint(1)			Yes	0		
☐	8	alarm_hour	varchar(2)	utf8mb4_general_ci		Yes	06		
☐	9	alarm_minute	varchar(2)	utf8mb4_general_ci		Yes	30		
☐	10	alarm_ampm	varchar(2)	utf8mb4_general_ci		Yes	AM		
☐	11	created_at	timestamp			No	current_timestamp()		
☐	12	updated_at	timestamp			No	current_timestamp()		ON UPDATE CURRENT_TIMESTAMP()

Figure 3.3. User Setting Table

#	Name	Type	Collation	Attributes	Null	Default	Comments	Extra	Action		
☐ 1	id 🔑	int(11)			No	*None*		AUTO_INCREMENT	🖊 Change	⊖ Drop	More
☐ 2	email 🔑	varchar(255)	utf8mb4_general_ci		No	*None*			🖊 Change	⊖ Drop	More
☐ 3	code 🔑	varchar(6)	utf8mb4_general_ci		No	*None*			🖊 Change	⊖ Drop	More
☐ 4	used	tinyint(1)			Yes	0			🖊 Change	⊖ Drop	More
☐ 5	expires_at 🔑	datetime			No	*None*			🖊 Change	⊖ Drop	More
☐ 6	created_at	timestamp			No	current_timestamp()			🖊 Change	⊖ Drop	More

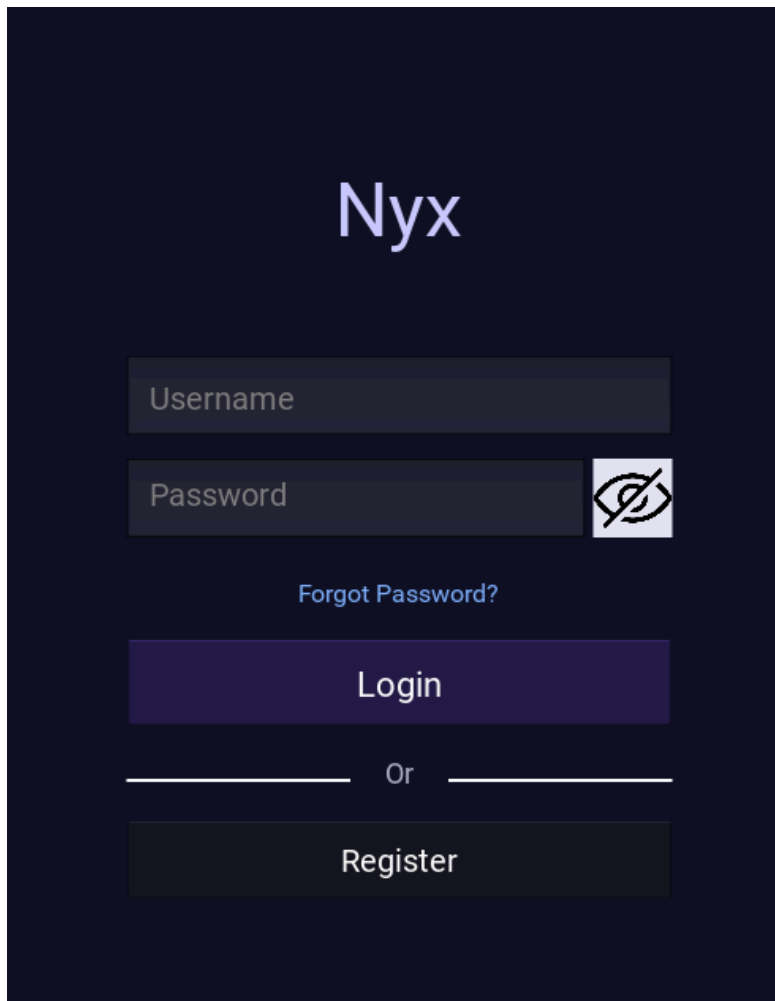**Figure 3.4. password_resets table**

User Interface

Figure 4.1. Login Screen

The Login Screen serves as the entry point to the Nyx Sleep Tracker application. Users input their username and password credentials to access their personalized sleep tracking data. The screen features a minimalist dark blue theme with the application name "Nyx" prominently displayed at the top. Users can toggle password visibility using an eye icon. A "Forgot Password?" link provides access to password recovery, and visual separators with "Or" text improve navigation between login and registration options. New users can navigate to the registration screen via the "Register" button, while existing users authenticate through the "Login" button.

Error messages appear below the input fields to guide users in case of invalid credentials, ensuring a smooth authentication process.
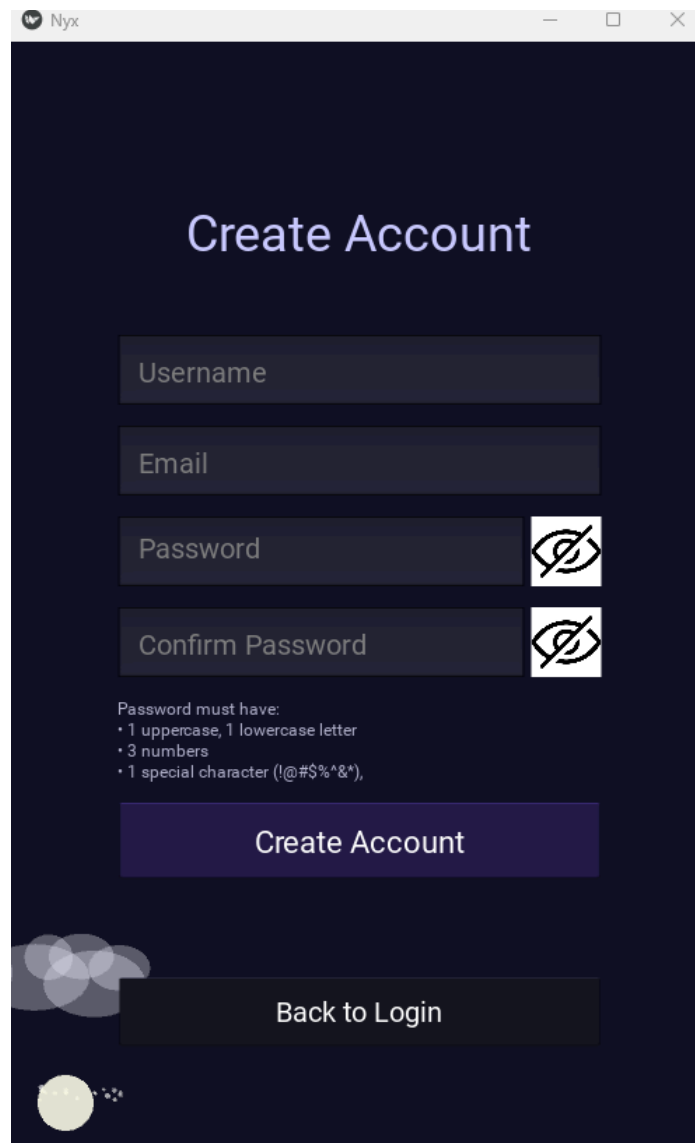

Figure 4.2. Registration Screen

The Registration Screen allows new users to create an account within the Nyx Sleep Tracker system. Users must provide a unique username and a secure password, which they confirm by entering it twice to prevent typos. The interface enforces validation rules, requiring usernames to be at least 3 characters and passwords to be at least 8 characters long, must have 1 uppercase, 1 lowercase, 3 numbers, and 1 special character. Upon successful registration, users receive a confirmation message and are automatically redirected to the login screen. A "Back to Login" button is available for users who already have an account.
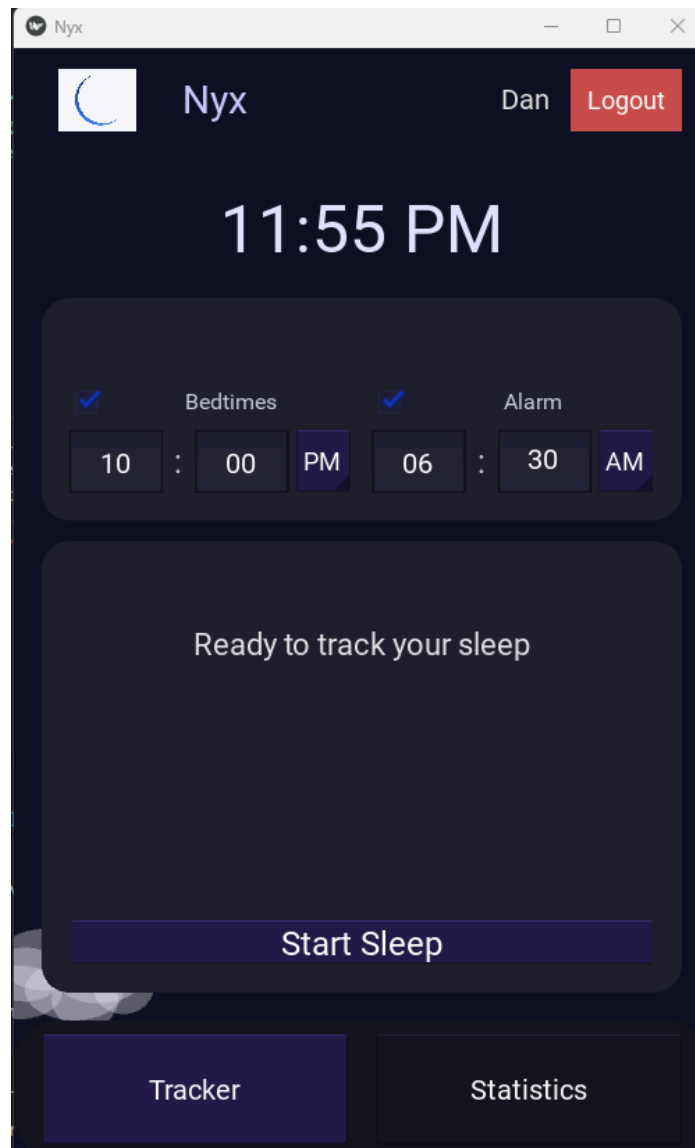
Figure 4.3. Tracker Screen

The Tracker Screen is the main hub for sleep session monitoring and alarm management. At the top, users see the current time and their username, with a logout button for easy access control. The interface includes two optional time-setting sections: Bedtime and Alarm, each with checkboxes to enable or disable notifications. Users can customize the hours, minutes, and AM/PM settings for both features. The central sleep tracking card displays the current session status and a "Start Sleep" button that transforms into "End Sleep" when a session is active, showing elapsed time in real-time. The bottom navigation bar allows seamless switching between the Tracker and Statistics screens.
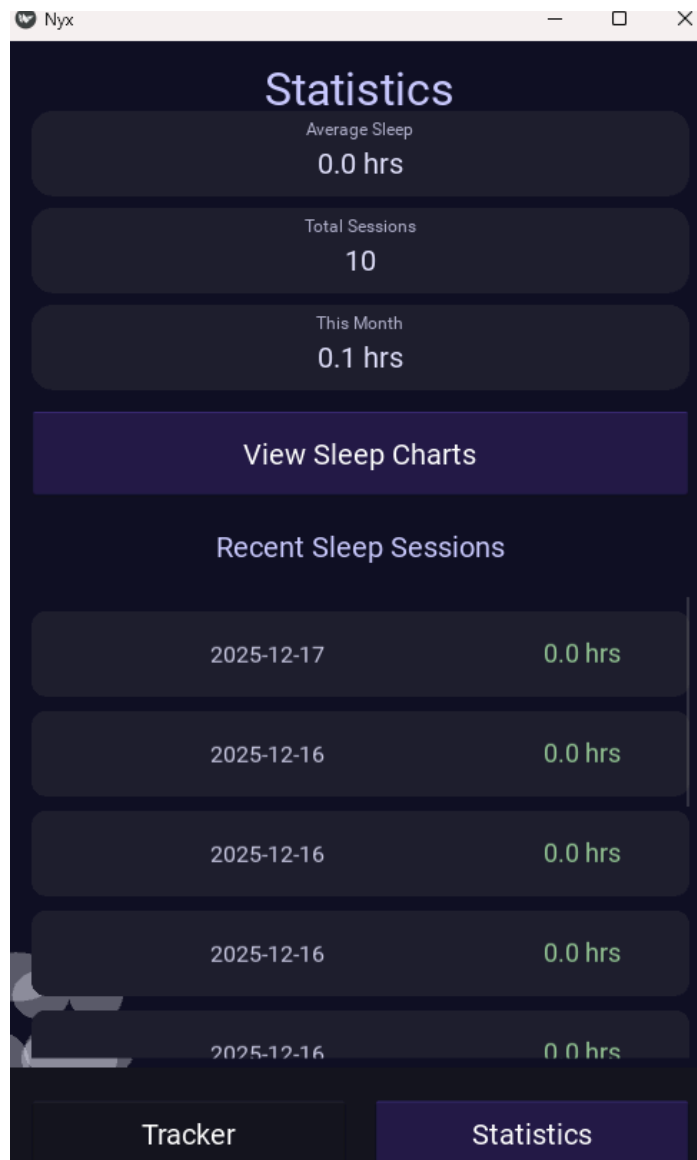
Figure 4.4. Statistics Screen

The Statistics Screen provides users with comprehensive insights into their sleep patterns through summary cards and a detailed session history. Three prominent stat cards display key metrics: Average Sleep (hours per session), Total Sessions (lifetime count), and This Month (current month's total hours). Below these cards, a "View Sleep Graphs" button offers access to visual analytics. The main section lists recent sleep sessions in reverse chronological order, showing the date and duration of each session. This organized presentation helps users quickly assess their sleep habits and identify patterns at a glance.

Figure 4.5. Graph Screen

The Graph Screen transforms sleep data into visual analytics, making patterns and trends easy to identify. Users can view two main charts: "Average Sleep by Day of Week," which displays color-coded bars distinguishing weekdays (purple) from weekends (pink), and "Weekday vs Weekend Sleep Comparison," which shows a side-by-side analysis of sleep patterns over the last 8 weeks. Each graph includes labeled axes, value indicators, and a legend for clarity. A "Back" button at the top allows users to return to the Statistics Screen. This visual approach empowers users to recognize trends such as weekend sleep debt or midweek sleep deficits.
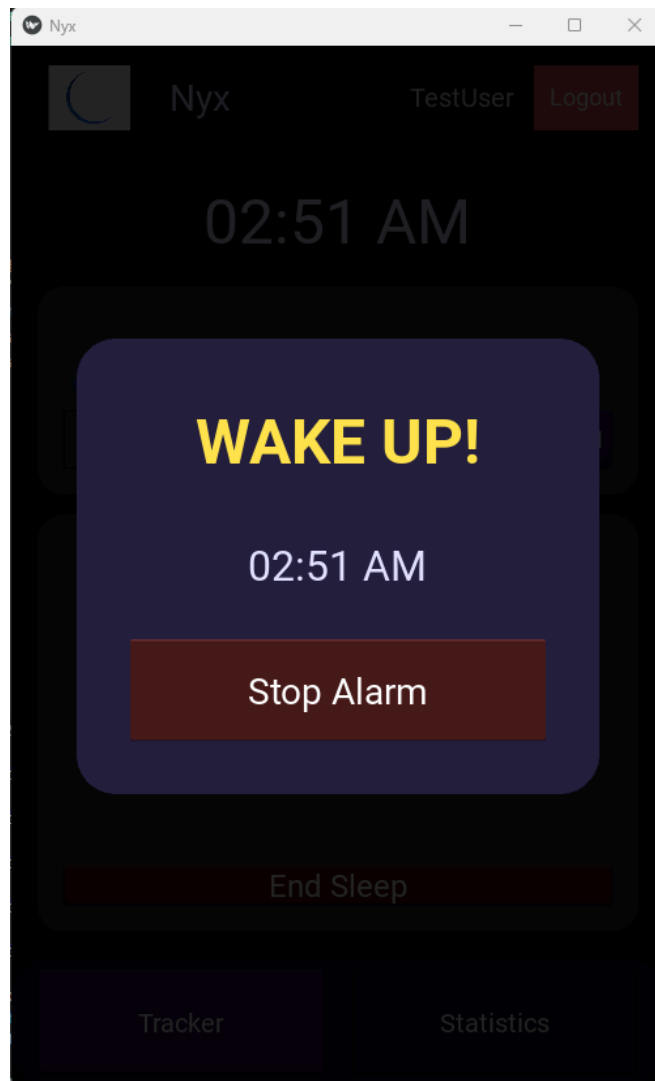
Figure 4.6. Alarm Overlay

The Alarm Overlay appears as a full-screen modal when the user's set alarm time is reached. The interface features a semi-transparent dark background that overlays the entire application, ensuring the alarm cannot be ignored. A centered card displays "WAKE UP!" in bold yellow text, accompanied by the current time and a prominent "Stop Alarm" button. The overlay plays a looping alarm sound (if configured) that continues until the user dismisses it by pressing the stop button. This design ensures users are effectively alerted while maintaining a clean, user-friendly interface that prevents accidental dismissal.

References

Messman, A., Wiley, F., Fieldman, E., Deitch, R., Teller, J., & Slavish, C. (2024). Sleep Health. *Irregular Sleep Is Linked to Poorer Mental Health: A Pooled Analysis of Eight Studies*, *10*(4), 493–499. https://www.sciencedirect.com/science/article/abs/pii/S2352721824000603

Timmons, C. F. (n.d.). Goal setting in sleep and nutrition to improve perceived performance in active college students. Digital Commons @ Cal Poly Humboldt. https://digitalcommons.humboldt.edu/etd/2316/