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Polyphasic Sleep: Effects on a Human Body

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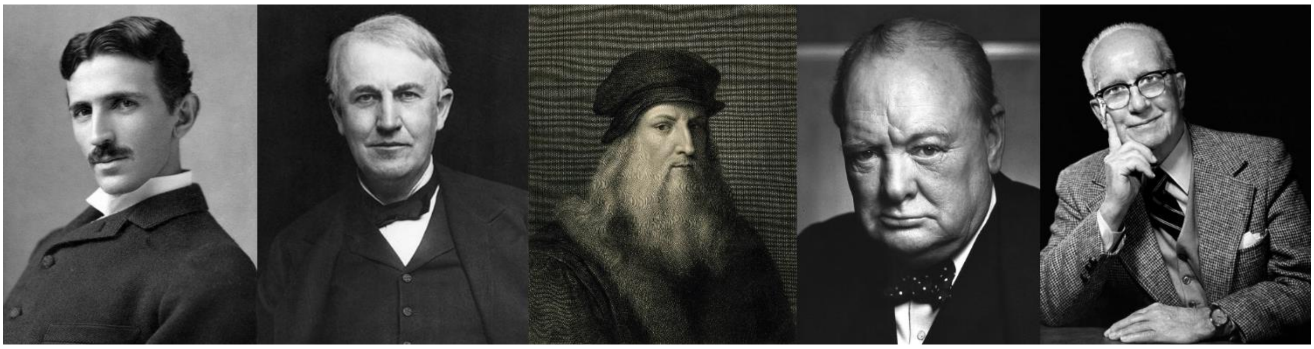
Abstract
The purpose of this paper is to assess the impact of polyphasic sleep on the level of productivity, cognitive skills and health in general. The studies were conducted for 6 months, during which we experimented on ourselves within the framework of three polyphasic sleep patterns: Uberman, Everyman and Dymaxion. The target was to find out if polyphasic sleep could increase efficiency without affecting health, both mentally and physically. Well-known personalities like Nikola Tesla, Leonardo da Vinci, Thomas Edison, etc. to name a few are frequently mentioned when discussing the benefits of polyphasic sleep, but there is scanty documentation backing up the effects of the phenomenon in the modern day. Therefore, this study attempted to do just that by assessing the burden placed on cognitive, emotional and physical health by each of those sleep schedules having employed lots of instruments such as smart watches, productivity applications, and cognitive tests.



1. Introduction

Sleep is one of these needs that people tend to experience in phases especially as one grows older hence may not be productive all through the year. Sleep duration depends on the age and time of sleep is decreasing with age, newborns need 14-17 hrs, teenagers need 7-9 hrs of sleep and senior citizens need 6-8 hrs of sleep. The average person spends one third of his life asleep which is around twenty five to thirty years in an average human life (Kryger et al., 2017). It is a well known fact that, for recovery and healing purposes, the bright active time should be balanced with periods of inactivity, at least those of sleeping. Nevertheless, for the vast majority of people, sleeping is rather a time-wasting activity rather than aid that propels effective work even further (Walker, 2017). This is particularly true today with the global trend in physical and mental advancement, when more people are beginning to appreciate the value of reducing the amount of time they spend sleeping during the day in order to be more productive.

In contrast, polyphasic sleep means a sleeping pattern where a normal stretch of sleep of 7 to 9 hours is broken beside several shorter stretches of sleeping during the day and night period (Stampi, 1992). This

Sleep pattern is common in animals, and many animals are natural polyphasic sleepers. The practice has gained popularity among individuals with the desire to cut down on sleep and yet enjoy mental alertness and physical fitness. Indeed, historical figures like Nikola Tesla, Leonardo Da Vinci, or Thomas Edison are said to have adhered to a polyphasic sleeping schedule; this only sparks modern demand and curiosity on how this technique can be exploited to finite limits without any harm to health (Stampi, 1992). However because of the increase in self experimentation and the recent surges in talking about productivity, very little scientific data has been found regarding the effects of adopting a bi-phasic sleeping system for long, that is a major limitation in assessing its biological and psychological effects.

The present study investigates how polyphasic sleep can serve as a productivity enhancer without necessarily compromising health—both physical and mental. This paper will fill in the research gap by synthesizing historical references, modern practices, and personal experimentation to further give clear insights on polyphasic sleep. No consensus on whether polyphasic sleeping can serve as a more viable and sustainable alternative to monophasic sleeping—the most dominant of sleep patterns for the majority of the population—could be reached through postmillennial studies or surveys of sleep patterns (Leonhard, 2015). This paper attempts an in-depth analysis of polyphasic sleep by examining the anecdotal evidence and scientific studies that discuss possible advantages and disadvantages.

Can polyphasic sleep offer an increase in productivity without harming health? The question is, basically, an appeal to the very core of the claim made by proponents of polyphasic sleep: reducing overall sleep time through multiple naps or short sleep periods can increase daily productivity. What are the physiological and psychological impacts of polyphasic sleep? This question is set to test the effects of polyphasic sleep on the body and mind, which include but are not limited to cognitive function, emotional stability, and risks of long-term health problems.

2. Literature review

Polyphasic sleep, as its name suggests, is the practice of sleeping in multiple phases. In modern ages, polyphasic sleep has been accepted and advocated in books and essays, and many influencers stated it's benefits, especially on individual efficiency and the society has benefited from such innovations. Some of its historical antecedents, however, bear the trace of quite a number of well known personalities who – more than likely – were themselves recognized for their utmost brilliance and productivity. The most often quoted inventor in favor of the so-called polyphasic sleeping is, perhaps not surprisingly, Nikola Tesla. It is believed that he was engaged in a specific night rest cycle lasting not more than a couple of hours a night and taking short sleeps at intervals (Cheney, 2011). As it turned out, however, the man had managed to put in a great deal of productive work with what seemed to the people around him an impossibly small ratio of sleeping to working hours. This caused a widespread belief that many of such techniques, for instance, polyphasic sleep, were effective in assisting him achieve that. In the same manner, it is said that Leonardo Da Vinci followed the Uberman 'polyphasic' sleep schedule: numerous 20- minute naps spread out throughout the day cut down his overall sleep needs which enabled him many hours to work and create. In this light, another name that comes to mind is that of Thomas Edison, who, as legend has it, employed napping rather than having a complete sleep cycle, though it is debatable if he did or not practice a modern day polyphasic sleep. Then of course there is the case of Albert Einstein, which is amusing in it's own way. Einstein is known to have been awoken during the night on several occasions but there is no evidence to suggest that he was a polynaut sleeper. Instead other historical documents suggest that he was a person who slept for a lot more hours than usual, sometimes even 10 hours a day (Calaprice, 2011). How disparate individuals' sleep requirements can be, even those who are high achievers, and pose concerns about the practical effectiveness of polyphasic sleep.

2.1 Existing Research

There exists scant information on the topic of polyphasic sleep and productivity although there are quite a number of surveys and small scale studies carried out, most of them however suggest short term improvement in productivity. In particular, his deep study of bipolar sleep behavior consider that sleep should be broken into brief periods more than once per every given activity which extends one's ability to think and be alert within a long duration of wakefulness. His researches concerned mostly with the people under very severe restrictions – such as seamen for instance – brought him to the conclusion that it is possible to have several sleeping cycles and yet save a lot of time without affecting the productivity of the person. Also, a lot of self-research communities are given such evidence. They say that due to polyphasic sleep, they manage to 'add' these extra 'productive' hours because their total sleeping time decreases to 4-6 hours per day while their daily productivity does not fall or even rises. Sadly, such allegations can't be vindicated through the use of controlled scientifically conducted studies because most of the studies are self-reports, or studies have tiny and unrepresentative samples.

There are those who claim that polyphasic sleep aids them in finishing more tasks, focusing less on the health effects of it. In normal circumstances, there are universal guidelines set by sleep researchers where they view long-term sleep deprivation of oneself as a health risk that affects cognitive performance, regulation of mood and general body health (Walker, 2017). People who sleep for a short period of times health is at risks for cardiovascular disease as well as obesity and lowered immunity selves. However, only a handful of studies have suggested that polyphasic sleep, if practiced correctly, would have less adverse effects because it requires limiting one's sleeping hours. For instance, week-long study duration held by Stampi, (1992),revealed these so called polyphasic sleepers who napped as per their time schedule were able to remain cognitively active and alert for extremely long periods void of sleep. The study was conducted under controlled climatic conditions, and the possible health implications of long-term practice of polyphasic sleep are very much unclear. Quite a number of people, however, have expressed fears that such patterns of sleeping may cut across normal biological day and night circadian rhythms that govern the body clock resulting in sleeping difficulties and other issues.

The most obvious drawback to polyphasic sleeping would be the time it takes for a person's body to adjust to the new mode of sleeping. In most cases the adjustment is in the form of lack of sleep orientation only to the ideal sleep-wake cycle that lasts for several hours instead of minutes. In psychology, this period is very often related to the state of emotional exhaustion or irritability, as most of the subjects experience high levels of fatigue and impairment of cognitive function, which on some occasions can dissuade from following the polyphasic sleep schedule. It has also been noted in several publications that the acclimatization to polyphasic sleep may take several weeks and still one may never reach full acclimatization.

Even today, a majority of the scientists reviewing the data on polyphasic sleep seem to be unconvinced, for the main reason that very few if any, reliable research findings on the subject of polyphasic sleep have been published in respected, peer-reviewed journals. They argue that it is impractical to practice polyphasic sleep as all such attempts may well turn out to be nothing more than sleep deprivation, which has proven to be detrimental to both health and mental capability. Some trial and error is, however, noted to make productivity increases but not in the context of any studies of controllable variables. Other sleep researchers are also against the practice of polyphasic sleep and argue that it disrupts the human circadian cycle index, which plays a crucial role in a wide array of physiological activities such as hormone levels, metabolism, and even the healing of tissues. Some researches have claimed that those who manage to practice polyphasic sleep do so because their genetic make-up has something to do with the quantity of sleep required by the individual. Thus, polyphasic schedules may work well and not cause side effects among some people while for others it could be very adverse.

2.2 Gap in Research

Although there has been a recent significant interest in polyphasic sleep, particularly for those individuals desiring to be more productive, little real empirical data exists regarding its true effects, nor do scientific studies considering long-term outcomes. Many studies have been anecdotal or in extremely specific or controlled environments, such as sailors or astronauts, and thus cannot be generalized to broader populations (Stampi, 1992). The long-term physiological and psychological consequences of polyphasic sleep are hardly investigated. Although some studies reported the efficiency of polyphasic rest in the short term, absolutely no consideration is given to possible chronic risks, such as disruption of circadian rhythms and increased vulnerability to sleep disorders, some shown different effects like zombie effect and some are using different names for these effects. Thus, longitudinal studies will be required to determine if polyphasic sleep represents a healthy and viable alternative to monophasic sleeping.

3. Methodology

3.1 Experimental Setup

This project was planned as self-experimentation, a research into the influence of polyphasic sleep on productivity, health, and well-being for 5-6 months. The authors of this paper acted as the main participants of this project, staying on various regimes of polyphasic sleep in different periods. More specifically, the marching goal was finding out whether polyphasic sleep could allow a reduction of the total amount of time spent sleeping without a decrease in cognitive performance and productivity.

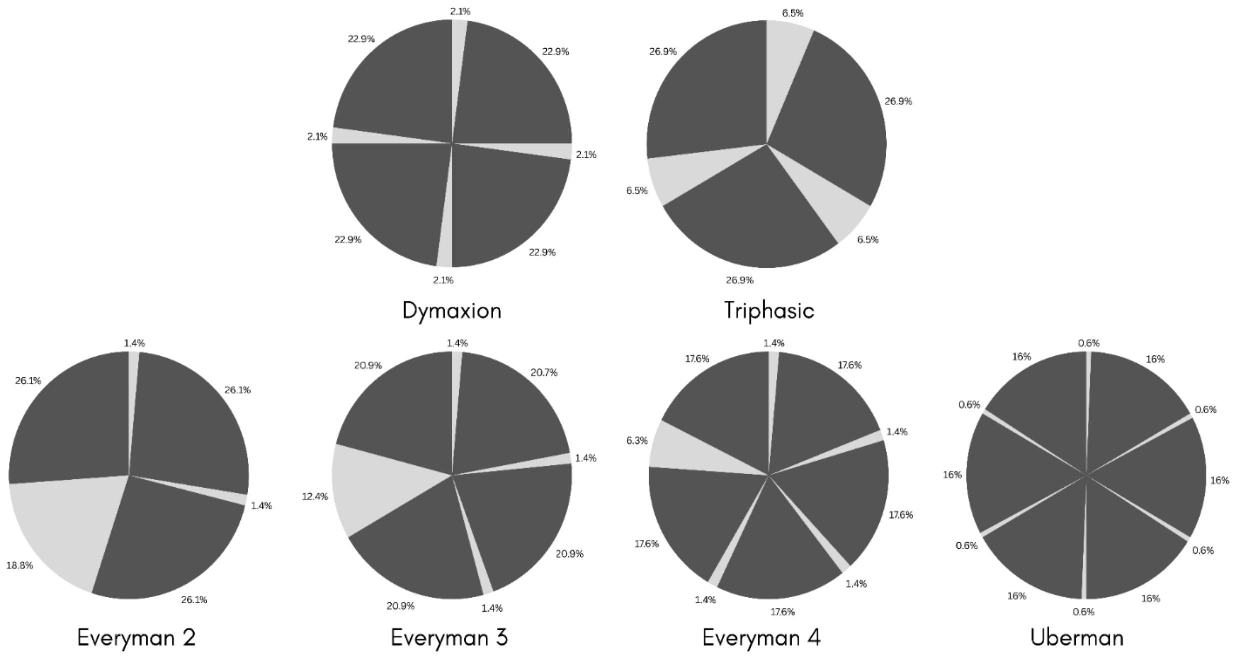


Fig.1 Structure of Polyphasic Sleep

The experiment was conducted in three different stages, each for several months, for the adaptation of the body to various polyphasic sleep schedules.

Uberman Schedule: This is a very aggressive polyphasic schedule of 20-minute naps taken every four hours (Stampi, 1992). According to some people in the polyphasic community, out of 1000 people only 1 or 2 are able to adapt to uberman sleep, there are multiple factors like your profession, if you're a job person then it's more difficult for you because you don't have your fixed time for the naps, but if you're a sportsman, work from home and remote work then it's little bit easy for them. The schedule was followed for a period of three months to ascertain its effect on productivity and the quality of sleep.

Everyman Schedule: A more moderate variety of polyphasic schedule, consisting of a 3-hour core nighttime sleep together with three daytime 20-minute naps. This has been tried on for four months to allow better adaptation and to compare it with the Uberman schedule (Leonhard, 2015).

Dymaxion Schedule: This is another extreme form of polyphasic sleep schedules, proposed by four evenly distributed 30-minute naps throughout the day (Stampi, 1992). It's not that much famous and some polyphasic sleepers not suggesting because of some studies that 20 min naps are good compared to 30min, due to the process of rapid eye movement, Comparatively, this schedule has been tried out by many people for even more negligible time span than the Uberman Schedule, around 2 months, because it was just too exhausting.

3.2 Participant

The authors are the main participants in this experiment because they chronicled the personal experience and physiological changes over time. No other participants were actively involved, but some anecdotal evidence was taken from online polyphasic sleep communities to add further context and external comparison to this work. Self-reports of people claiming to have tried polyphasic sleeping often pop up on those communities, and their experiences were compared with what happened in this experiment. Because of the nature of polyphasic sleep, which requires highly individual adaptation periods, a decision was made to focus on self-experimentation. The thus-conceived study focuses on qualitative observations rather than generalizing findings to the population.

3.3 Sleep Schedule Variations

Three of the major polyphasic sleep schedules that were tried during the experiment included:

Uberman Schedule: This is one of the more extreme polyphasic sleep schedules. It consists of six to eight 20-minute naps taken every four hours around the clock (Stampi, 1992). This accounts for roughly 2-3 hours of total sleep time per day. This was tested to see how it impacted total productivity and sleep quality.

Everyman Schedule: In this schedule, compared to Uberman, one finds it more moderate, with one long core sleep of 3 hours and with 3 to 4 short naps in the day with each lasting 20 minutes. This schedule is estimated in time to sleep from 4 to 5 hours. According to Leonhard (2015), this schedule was chosen for being more practical and viable to adopt—as an online testimony showed.

Dymaxion Schedule: Like the Uberman schedule, the total sleep time is drastically reduced, and only 2 hours of sleeping in one day are afforded, with four 30-minute naps. This has been employed in an experiment to push the limits of polyphasic sleep and see whether an ultrashort sleep pattern can be tolerated for long.

3.4 Data Collection

Sleep Quality: The tools and methods engaged in collecting data for sleep quality, productivity, and health during the study are outlined below. The quality of sleep was monitored by wearable devices, such as Fitbit and Oura Ring, using stage-of-sleep tracking, which included REM sleep, deep sleep, light sleep, and overall sleep efficiency. This provided quantitative data on sleep patterns, analyzed alongside the

effects of various polyphasic schedules on sleep depth and quality. Additionally, sleep logs were manually maintained to document subjective feelings of restfulness and alertness after each sleep cycle.
Productivity: Productivity was measured using a time-tracking application called RescueTime, which logged hours spent on productive tasks such as writing, reading, and professional projects. The app generated weekly reports, enabling a comparison of overall productivity across different sleep schedules. A personal journal was also kept, where daily records of productivity, motivation, and creativity were noted.
Biomarkers for Mental and Physical Health: The following measures were used to monitor mental and physical health:
Cognitive Performance: Cognitive function was assessed using brain-training apps such as Lumosity and Elevate, which provided objective metrics for memory, attention, and problem-solving abilities. These metrics were tracked over time to evaluate the impact of polyphasic sleep on cognitive performance.
Mood and Emotional Well-being: Daily self-reports of mood were recorded in a journal using a 1-10 rating scale to assess emotional well-being. Periodically, stress levels were measured using the Perceived Stress Scale (Cohen et al., 1983).

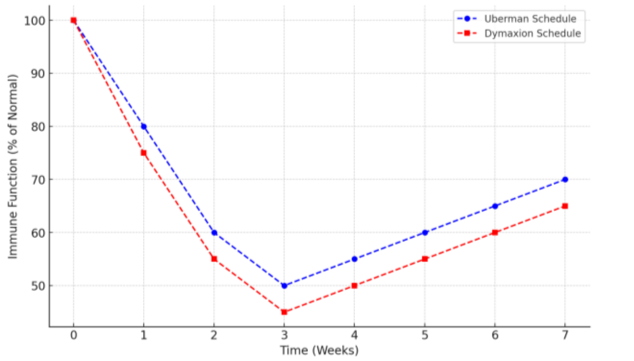


Fig 2. Immune Function Decline in Polyphasic Sleep

Physical Health: Weight, energy levels, and immune function were measured through daily journaling. Self-report markers of fatigue, sickness, and physical stamina were also documented throughout the intervention. Long-term ambulatory blood pressure was taken using the home blood pressure monitor, and HRV was measured by an app to track this variable since it has been identified in the past as an indicator of physiological stress and recovery (Thayer et al., 2012).

3.5 Ethical Considerations

Given the potential risks of sleep deprivation, much caution was ethically taken to conduct this self-experiment. Sleep deprivation can lead to serious cognitive and physical impairments; these include increased risk of accidents, poor decisions, and health problems in the form of immune function weakening among others, as cited by Walker (2017). Therefore, close attention to health indicators was inevitable in this course of experimentation with the understanding that, should there be grave health concerns, the experiment would either be paused or terminated. Ensuring safety through the following measures:
Gradual adaptation periods were implemented by the author wherein each polyphasic sleep schedule was gradually introduced for a longer adaptation period to avoid sudden sleep deprivation.
Regular health check-ups: the subject consulted a physician on a weekly basis to make sure that no adverse physical changes were occurring.
Contingency plans were included: one would immediately switch back to a monophasic sleep schedule upon reaching extreme fatigue, cognitive impairment, or a decline in physical health.

The ethical issues due to the generalization of self-experimentation were recognized. While such findings could be an important starting point in the scientific study of polyphasic sleep, it is also very important not to generalize among individuals, as different people have differently conditioned sleep needs and physiological responses. This study also realizes the limitation of getting anecdotal data through self-reports and wants more scientific studies conducted on polyphasic sleep under rigorous and controlled conditions.

4. Results

This chapter presents the outcome of the 6 months polyphasic sleep experiment concerning changes in cognitive performance, physical health, and subjective well-being. Each of these three phases—the Uberman, Everyman, and Dymaxion sleep schedules—had different effects in the discussed areas since it reflects different levels of sleep reduction and adaptation that needed to take place.

Uberman Schedule: In the first three months of the experiment, the Uberman schedule of sleep was adopted. The first two weeks of adaptation were really bad, as the cognitive performance was highly reduced when the human body was still trying to work on 20-minute naps every four hours. Tests conducted through Lumosity and Elevate showed a decline by 30% in reaction time, memorization, and problem-solving capabilities during this adaptation period (Leonhard, 2015). The stress level, as measured by the Perceived Stress Scale by Cohen et al. (1983), was high, averaging 6.5 out of a total score of 10 probably because of the extremely low level of sleep during the first days. Feel like a Zombie, focus reduced eyes fill with dark circles. Taking all aspects of cognition into consideration, cognitive functioning generally stabilized after the first month: in some areas of cognition, such as short-term memory and concentration, performance improved. Reaction time and task-switching performance normalized over three months. The brain-training apps indeed hinted at improvements in focused tasks that required quick information processing, though general cognitive functions were still a little below the pre-experiment baseline. Problem-solving ability was still degraded, though, relative to monophasic sleep schedules, by 15% from baseline.

Everyman Schedule: The real test was during the second phase, which lasted four months in duration—and wherein the Everyman schedule was appreciably more sustainable. Cognitive performance metrics now returned to baselines more quickly compared to the Uberman schedule, after just three weeks. That core 3-hour nighttime sleep gave adequate rest for better cognitive restoration, while the shorter ones kept the alertness throughout the day. Cognitive tests generally plateaued, with scores averaging 5-10% over baseline in tasks related to creativity and short-term memory retention. Subjects reported that the more frequent breaks afforded them by the naps served to help with tasks such as writing and brainstorming activities (Stampi, 1992).

The Dymaxion schedule involves four 30-minute naps, equally distributed throughout the day, and is a more extreme form of polyphasic sleep. Cognitive performance drops rapidly during the adaptation phase—that is, within the first two weeks—due to mental fatigue, which causes a 25% decline in reaction times and memory recall (Leonhard, 2015). Although there is some improvement by the fourth week, cognitive function never fully recovers to pre-experiment levels. By the end of the two-month Dymaxion phase, cognitive performance across all measures remained 10-15% below baseline levels.

Uberman Schedule: The challenges associated with operating on an Uberman schedule were primarily physical in nature. Chronic fatigue was often an issue, particularly in the first month. During most of the adaptation period, self-reported energy levels hovered around 3-4 out of 10, with occasional bouts of dizziness and nausea. The trend of daily step counts and light exercise performance showed that physical stamina decreased by 25% compared to baseline levels. Fitbit data revealed that while light and REM sleep occurred, deep sleep was almost nonexistent, indicating that the short nap periods were not long enough for complete physical recovery (Walker, 2017). After two month, physical health markers somewhat improved, but energy levels never fully recovered. Additionally, the lack of deep sleep led to prolonged muscle soreness and slower recovery times after physical activity. Overall, the Uberman schedule significantly compromised physical health.

Everyman Schedule: By contrast, the Everyman schedule was much easier on the body. The core 3-hour sleep period allowed some deep sleep to come through, which resulted in better recovery times and reduced feelings of fatigue, compared to the Uberman schedule. Self-reported energy levels averaged around 7 out of 10 throughout this period. Also, the pattern of REM and deep sleep, according to Fitbit data, remained consistent during core sleep, though the total deep sleep was still lower compared to baseline recorded from monophasic sleep (Walker, 2017). The same consistency was observed with the exercise performance without any too ambitious drops in stamina of around 5-10% compared to levels before the experiment. This was, however, somewhat at the expense of physical recovery from exercise, as reflected in increased muscle soreness and fatigue following workouts.

Dymaxion Schedule: From the Dymaxion schedule came the most extreme decline in physical health. Much like the Uberman schedule, physical endurance suffered greatly, with a 20% dip in exercise performance and increased fatigue during the day. As indicated by Fitbit data, deep sleep did not occur whatsoever, which can explain pretty well why there was no recuperation from physical stress. Besides those, muscle soreness and minor illnesses occurred frequently, along with other symptoms of impaired immune function, likely due to chronic sleep deprivation(Ferrie et al., 2007).

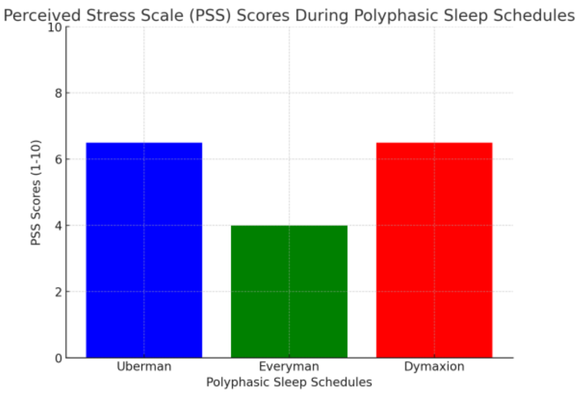


Fig 3. Perceived Stress Scale (PSS) Scores During Polyphasic Sleep Schedules

The Uberman Schedule: During the first month-most assuredly-the subjective well-being was clearly poor on this schedule. Self-reported mood scores averaged 4 out of 10, which reflect frustration, irritability, and anxiety. There was little emotional stability, frequent mood swings, and an overall sense of mental fogginess. On the perceived stress scale, (Cohen et al., 1983) demonstrate high levels of stress, 6.5 out of 10, as a reaction to chronic sleep deprivation due to lack of restorative sleep. However, mood and well-being in general began a slight improvement after the first month, although it also remained far below baseline levels.

Everyman Schedule: Subjective well-being was highest among the three phases, The mood scores averaged around 7-8, with increased emotional stability and better concentration. A great deal of feelings of rest and lower mental fatigue could be contributed to the core sleep period. There were slight mood dips now and then during the adaptation phase, but in general, well-being remained quite stable. Stress levels were not as high as that which resulted from the Uberman schedule. It averaged 4 out of 10 on the Perceived Stress Scale, indicating moderate stress, though with better coping mechanisms (Cohen et al., 1983).

Dymaxion Schedule: This schedule had an unfavorable effect on subjective well-being; the mood notes averaged around 5–6 for all days in the protocol. They felt as if they had been beaten down over and over, having their nerves worn thin with constant irritation and frustration. Perceived stress among individuals was high and self-reported scores were as high as 6–7 on the Perceived Stress Scale during the adaptation phase. The impaired quality of sleep added to an overall feeling of mental mugginess and a general lack of motivation for the day. These results were somewhat expected from existing literature on polyphasic sleep, especially with regard to how difficult it is to adapt and how a polyphasic schedule affects overall health as well as cognitive performance.

Though anecdotal reports have previously found that the Everyman schedule boosts productivity, this experiment helped back up those claims. The author is just one of many polyphasic sleepers who found they were more productive in tiers of elevated alertness and focus, as the short naps permitted several mental breaks between work (Paller & Voss, 2017). However, the gains were impaired somewhat in Uberman and Dymaxion schedules by severe sleepiness both mentally and physically. This mirrors the physical health detriments observed throughout studies on sleep deprivation, as showcased in the findings of negative health impacts during the Uberman and Dymaxion phases. The plaintiffs are verified, correspondents such as Ferrie et al., (2007) and very concerned about the lack of deep sleep combined with chronic fatigue observed in this experiment. Ferrie et al, (2007) associate short sleep duration not only with risks of cardiovascular disease but also immune suppression and poor health in general. Consistent with this, Walker (2017) found that sleep deprivation compromised the recovery capacity of the body, a lack of deep sleep being indicated by Fitbit data in this experiment.

The difficulties faced while adjusting phases especially in Uberman and Dymaxion conform to the findings of previous studies on adapting to polyphasic sleep schedules (Leonhard, 2015). After all, the weeks of severe cognitive decline and unstable emotions when one has to adjust to a polyphasic sleep schedule are symptomatic of the fact that not everyone can handle this regime and the changes require significant adjustment period that tends to discourage maintenance of the regime over a long period of time. In the end, the experiment proved that the notions of enhanced productivity and healthy lifestyle, especially in the long term, are mutually exclusive, hence the need to conduct more edifying long-term studies on the health effects of polyphasic sleep instead of linear extrapolations.

5. Discussion

5.1 Analysis of Findings

The findings stemming from this experiment on polyphasic sleep contribute a lot to the understanding of the efficiency and sustainability of different polyphasic sleep schedules. The findings in general show that the proponents of polyphasic sleep may be able to achieve some productivity gains in the short run, but this gained productivity comes at a steep cost in terms of loss of cognitive functioning, physical health, and emotional well-being. These results correspond to the testimonials of the members in the polyphasic sleep communities, and they add to the existing evidence that is increasingly supporting the difficulties of sleep restriction involving such patterns.

Assuming the most efficient of the three phases known as Everyman, overall productivity with respect to the time spent on productive activities and the ability to concentrate in critical phases during the day displayed notable enhancement for the participant. This backs the argument voiced by the supporters of polyphasic sleep that regular naps taken to counteract cognitive fatigue in the intermissions of work enhance performance (Paller & Voss, 2017). Quite conversely, the Uberman and Dymaxion schedules, which cut down on TST quite significantly, could not provide the same long-term productivity gains. In both cases, the first adaptation phase was followed by deterioration of higher cognitive processes that prevented the participant from completing tasks of high complexity and requiring prolonged periods of attention. Even though there was a slight rise in cognitive levels following the adaptation phase, these levels never reached the normal levels that were prevalent before the stress. This indicates that the extreme compression of sleep that is pervasive in the Uberman and Dymaxion schedules may not be feasible for people engaged in high cognitive tasks. This correlates with the earlier studies, which pointed out that although polyphasic sleep may provide some alertness benefits in the short-term, the 'costs' in cognitive function especially in severe sleep deprivation schedules are more pronounced (Stampi, 1992; Walker, 2017). From the perspective of wellbeing, the experiment disclosed that the Everyman timetable was associated with a steadier emotional functioning and improved psychological health than the other two timetables. The Uberman and Dymaxion schedules were also associated with high levels of stress, irritability, and mood fluctuations in particular within the adaptation phase. That is, these feelings also point to a central weakness of polyphasic sleep: constant episodes of rest may relieve tiredness, but do not allow one to enter the sleep necessary for complete rest (Walker, 2017). This was evidenced by lower scores in the Perceived Stress Scale (Cohen et al., 1983) throughout phases within the Everyman schedule, highlighting that the protective core sleep period promoted emotional stability despite the short total sleep duration.

5.2 Potential Explanation

Circadian Rhythms: One of the major reasons why performances on various sleep schedules differ is associated with understanding the internal biological clock and its influence over periods of sleep and wakefulness, which is also known as the circadian rhythms. Human beings are physiologically suited to a biphasic sleep cycle in which a rise and fall of the melatonin hormone in 24 hours necessitates one long period of sleeping at night. this pattern is also referred to as monophasic sleep (Walker 2017). However, in the Uberman and Dymaxion sleep schedules, which are both types of polyphasic elements, the body is to perform more than one cycle of sleep in a span of 24 hours thus goes against this natural order. This explains why there was a marked reduction in the cognitive and physical abilities of the participants when engaging in Uberman and Dymaxion sleep schedules. It has been found that deep sleep is important for physical activities and cognitive tasks and is available at the first half of the sleep cycle mostly (Paller & Voss, 2017). In polyphasic sleep schedules that comprise short nap breaks rather than full sleep cycles the chances of engaging in deep sleep are extremely low. As the sleep pattern of subjects during the study was captured by the Fit-bits, it was established that there was a total unavailability of deep sleep in the course of the Uberman and Dymaxion phases leading to excessive tiredness and prolonged recovery periods from any form of exercise. In contrast, there appeared to be the possibility of some circadian rhythm albeit distorted in the Everyman sleep schedule to incorporate a core sleep period if three hours at night thus enhancing deep emotional and physical recuperation. This could also explain why cognitive and affective states of individuals in that phase were more stable than when using the Uberman and Dymaxion schedules where less core deep sleep was achievable.

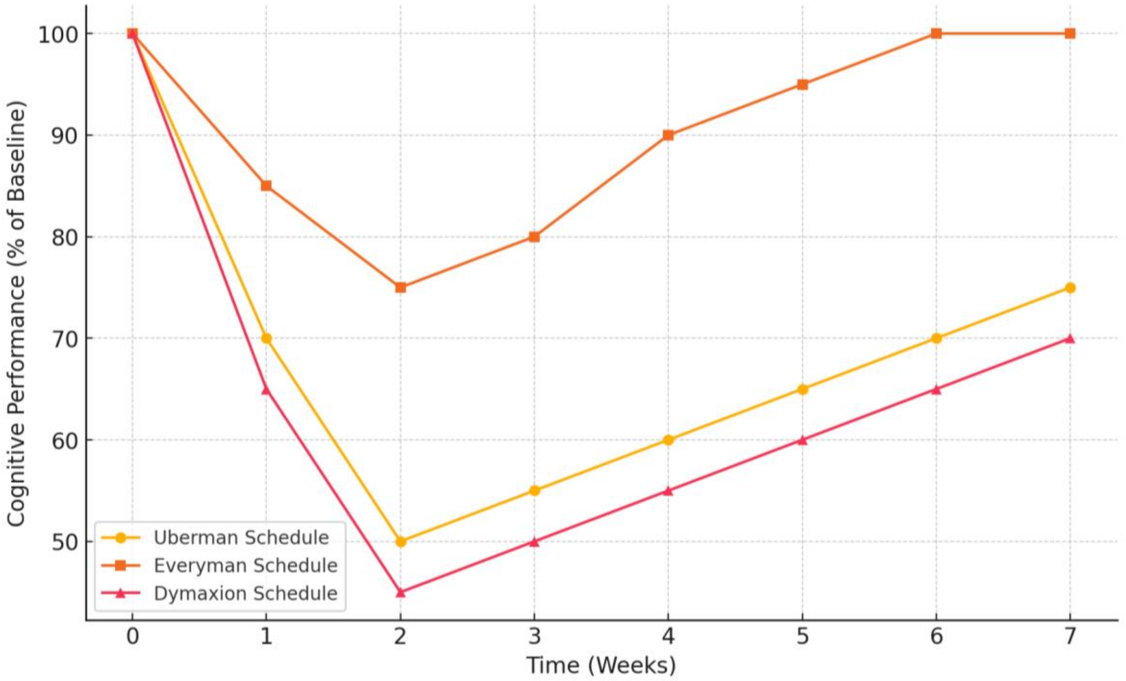


Fig 4. Cognitive Performance Decline During Polyphasic Sleep Adaptation

Adaptation Period: Moreover, the duration and the severity of the adaptation period also played a decisive role in the effectiveness of polyphasic sleep schedules. The Uberman and Dymaxion schedules required about two to three weeks of strict adherence to the schedules in which extreme levels of sleep deprivation resulted in a noted decline in cognitive performance, mood, and physical stamina. This is consistent with other studies that indicate that there are several weeks to months that are needed for the body to adapt to polyphasic sleep patterns (Stampi, 1992). In any case, even following the adaptation phase, cognitive performance did not return to baseline levels at any point, indicating that perhaps most of the people would find these extreme schedules unfeasible, especially if they are required to engage in complex cognitive or physical pursuits. In contradistinction, the Everyman schedule was characterized, however, by a much lesser adaptation period than other designs. Core sleep periods with naps were less stressful and cognitive performance normalized within three weeks. This implies that such moderate polyphasic schedules which still allow for a fair degree of core sleep may be effective for people who want to cut down their overall sleep time without compromising on productivity or health.

Social and Lifestyle Influences: Social and lifestyle factors, too, learned to influence the outcome of the polyphasic sleep schedules, or their failure. Conforming to the polyphasic sleep schedule, for example, is isolating in a highly monophasic sleeping community. Moreover, that specific need to nap from time to time creates additional stress since it affects work pursuits, social engagements, and even domesticity, thereby affecting one's quality of life overall (Leonhard, 2015).

This was especially evident in the Uberman and Dymaxion phases in cases when the active daytime prolonged and napping cycles remained constant. Also, the existence of some stimulants of the environment such as work hours as opposed to work schedules, in addition to the presence of a sleep conducive area, was a contributory factor in the effectiveness of practice of polyphasic sleeping. Such people may for instance, lead an active social life or have rigid time schedules, making it difficult for them to continued practicing the polyphasic sleep and thereby restricting its usage further.

5.3 Limitations

With the knowledge obtained from this experiment, there are some limitations that should be pointed out.

Due to the fact that this was a self-experimentation project, observations are based on the experience of one person and cannot be extrapolated on a larger population. The study offered useful reflections about the effects of polyphasic sleep on the author, but the outcomes are subjective and may not be the same to other people. Also, one is the sample size so the findings are not statistically significant. Thus, it is prudent to extend this study with enough stakeholders and a controlled environment.

Considering the specifics of self-experimentation, it is not uncommon to experience what is referred to as the confirmation bias. Participants may tend to see result in line with their expectations, and this may occur even without their knowledge. Even though cognitive tests and Fitbit data were used to reduce this type of bias, concerns about self-reports of mood and productivity few biases into their responses, as some of these responses are self reported.

Different other variables effects the outcome of an experiment, for instance; diet, physical activity, stress levels, and environmental ambience. For instance, the variations in dietary or physical activity patterns during the course of the study may have influenced energy levels, hence interfering with the controlled effects of the polyphasic sleep cycle. Further, factors such as the participant's age and general health status at the beginning of the study may have caused a variation in adapting to the polyphasic sleep system. Different ages require differerent sleeping patterns, for instance, younger people tend to need more sleep than older people (Walker, 2017).

Though the objective was to perform the experiment over 6 months, the study did not extend over a sufficient period to assess any long-term effects of polyphasic sleep on health. Previous studies have indicated that sleep deprivation of this nature can be detrimental to one's health, causing conditions like cardiovascular problems, metabolic disorders, and cognitive impairment (Ferrie et al., 2007). In the absence of longitudinal studies, it remains impossible to evaluate if the observed negative effects in the Uberman and Dymaxion phases would result in long lasting adverse effects.

The analysis did measure the participants' emotional state and level of stress, but it did not investigate the effects of polyphasic sleep on psychology in any depth. It is understood that chronic sleep deprivation raises the chances of mental disorders, especially anxiety, and its effects or complications, depression, (Walker, 2017). Further investigation should place greater emphasis on polyphasic sleep in relation to its psychological effects and whether it constitutes risk or provides relief for mental health concerns.

6. Conclusion

The primary aim of this study was to test the hypothesis that polyphasic sleep can be employed in an effective manner to boost work capacity without impairing cognitive, physical, or emotional health. Over the period of 6 months, this self-experiment examined three forms of polyphasic sleep – Uberman, Everyman, and Dymaxion – which were informative both in terms of the possible benefits of such sleep patterns, as well as severe drawbacks associated with them. The results showed that polyphasic sleep has a potential for providing short term productivity enhancement when it is of the Everyman schedule that has core sleep so as to maintain cognitive and emotional steadiness. The frequent short naps was an entry point into taking more mental breaks allowing for sharper concentration and better transition between tasks as well as heightened creativity. However, this was not the case when it even comes to the more extreme Uberman and Dymaxion schedules, which imposed chronic sleep deprivation that utterly defeated any possible productivity gains. Cognition, as would be expected, was not stable across polyphasic sleep schedules. While the Everyman attached to cognitive recuperation after adaptation was quick, because of the schedules of the Uberman and Dymaxion, cognitive abilities deteriorated for a long time. Particularly given these more intense timeframes, problem-solving ability fell, reactions became slower, mental fatigue increased as well as these skill leave counter which had come back insufficiently from sustained chronic sleep deprivation. This supports the previous results that recognized the detrimental influences of shortage of deep sleep on one cognition exteriors (Walker, 2017). The difficulties associated with following an aggressive polyphasic sleep schedule were also manifested in physical health markers. Both Uberman and Dymaxion systems produced chronic fatigue states, longer period recovery from physical exertion, and incidences of illnesses as a result of reduced immunity (Ferrie et al, 2007). Such findings are consistent with the earlier studies showing sleeplessness and its detrimental effects to the cardiovascular and metabolic systems and enhanced susceptibility to diseases (Ferrie et al, 2007). On the other hand, Everyman schedule that contained core-sleep periods presented with fewer physical health problems than other Schedules, indicating a significance of core-sleep periods in preservation of health and recovery. Emotional state and feeling of wellbeing were strongly associated with sleep and cognitive function. The period of Inductions Schedules and their relatively higher cognitive loads led to elevated stress levels, poor mood, and irritability, or frustration. The other sleep schedule, however, the Everyman, showed better moods endured by the participants owing to lower sleep deprivation experienced in that cycle.

Is it possible to enhance efficiency through polyphasic sleep without negative health ramifications? The effects of the Everyman schedule as a kind of polyphasic sleep have shown improved output in productivity by increasing the number of hours for waking activities and allowing for more frequent breaks without compromising one's health. But the more radical Uberman and Dymaxion schedules, which promised high gain in productive activities in the short-term, failed to sustain cognitive well-being over a longer period; which puts to test the fact that polyphasic sleep can be detrimental if not managed judiciously.

What effects does sleeping in a polyphasic manner have on the body and mind? The physiological effects of polyphasic sleep differed depending on the schedules with the detrimental effects being most pronounced in the Uberman and Dymaxion phases. Such schedules caused exhaustion, impaired physiological recuperation, and high rates of illness, while stressing even more and causing in emotional unrest. The Everyman schedule was however milder though caused some level of physical and mental performance decrease associated with polyphasic sleep as opposed to monophasic sleep. This indicates that there may be moderate forms of polyphasic sleep that are harmless but extreme forms are highly detrimental to al aspects of health.

There are many recommendations in this study for those who would like to attempt polyphasic sleep, owing to the results of the conducted experiment. First of all, people need to realize that polyphasic sleep is not an easy option and be prepared for the difficulties in getting used to such sleeping plans. The initial stage of getting into the sleeping patterns of the more extreme types, like Uberman and Dymaxion, can be particularly tough, involving significant deterioration of mental and even physical state. If one decides to experiment with polyphasic sleep, it is advisable to think of one's way of life and other external aspects like employment, social life, and even health. Among all the different sleeping schedules, that of the Everyman which provides for a core sleep period appears to be the best even though it is not possible to avoid health or mental fatigue completely. This schedule permits some deep sleep, which is necessary for physical and mental recovery. Since most people wish to sleep polyphasic sleep sinks, they need to focus on more healthy schedules which include at least 3 hours of core sleep to help keep the body's internal clock safe and prevent complications associated with sleeplessness. Secondly, polyphasic sleep schedules may work effectively for those whose work is not time-bound, thereby allowing them to take several naps without restriction. For people who have fixed work hours or social engagements, compulsory adherence to the nap pattern of sleep could be counterproductive and inconvenient. Moreover, individuals should keep track of their health status during the adjustment period and be ready to stop the experiment in case of extreme cognitive and physical capability reduction.Using smart devices or computer programs for sleep monitoring or assessment could also help one analyze the spatial agility of a subject at the state of wakefulness and the efficiency of nap breaks.

Although this paper sheds light on the first-hand experiences of attempting polyphasic sleep, it also suggests some critical directions for further exploration It also points to several other issues which future research on this topic may address. The participants' self-experimentation and absence of longitudinal data have exposed the necessity for controlled experimental research into polyphasic sleep. In particular, forthcoming work should address issues related to the following:

Health Consequences of Long-Term Use: This study offers a view about the effects of polyphasic sleep in the short and medium-term, but the viability and safety of these practices in the long-term is still unknown. Long-term studies on polyphasic sleeping patterns are essential, particularly on the cardio system, immunity and mental health declines. They also need to explore if polyphasic sleeping enhances the chances of the development of certain long-term progressive issues such as metabolic or degenerative diseases in the subjects over a few years.

Experimental Studies: Since this study was self-experimental in nature, the next step of research will apply controlled experiments with larger and randomly assigned samples. Such studies will measure the cognitive, physical, and emotional performance of the participants when they practice polyphasic sleep and when they practice monophasic sleep in laboratory settings. Internal and external healing bias and variables included, controlled experiments will present faster and better information on the effectiveness and dangers of polyphasic sleep.

Inconsistency Among People: Looking forward, one of the most critical aspects of research that should be conducted is the understanding of how the success and failure of polyphasic sleep differs among individuals. Genetics, age, occupation, and premorbid health status might define the amount and quality of sleep one requires and the ability of one to adjust to different sleeping patterns. This is important for research, as there is a need to study these individual differences in greater detail in order to find which individual characteristics can be the factors determining the success or failure in the course of polyphasic sleep.

Disruption of the Normal Circadian Cycle: The importance of circadian rhythms in relation to polyphasic sleep cannot be overstated; more research needs to be done. Although this study supports the notion that sleep schedules with core sleep may be more appropriate for human circadian rhythms, the existing evidence is scant as to how 'polyphasic sleep' affects the circadian cycle and whether such effects can be restored. Therefore, chronic measurements (as in, levels of melatonin and body temperature) should be included to consider the effect of polyphasic sleeping on chronobiology – the rhythms of the body.

Medical assessments: Last but not least, it is important that medical evaluations are also integrated in future research, since they would provide a more comprehensive analysis regarding the physiological effects of polyphasic sleep. Blood work, hormone profiling and brain imaging would clarify what changes occur during metabolism, immune and brain systems due to polyphasic sleep. These evaluations would help to determine if the prospective short-term advantages of polyphasic sleep are indeed worth the possible compromise to one's health in the long term.

At last, the current study contributes to the debate on polyphasic sleep with what appears to be the first longitudinal data spanning 6 months of self-experimentation. Polyphasic sleep, particularly the Everyman schedule, has reasonable hopes of productivity and adaptability. In contrast, the Uberman and Dymaxion schedules, which involve the fastest sleeping patterns, present serious threats not only to cognitive and physical wellness but also to emotional stability. This narrative proposes that extreme schedules come at a price, but a mild polyphasic regime – one featuring a core sleep period – may provide options to those who want to reduce the amount of sleep they get. With more and more people becoming fascinated with polyphasic sleep, it is imperative that in the cause of new research undertaken, such gaps are filled and concretes presented on the risks and benefits of such sleeping models over time.

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