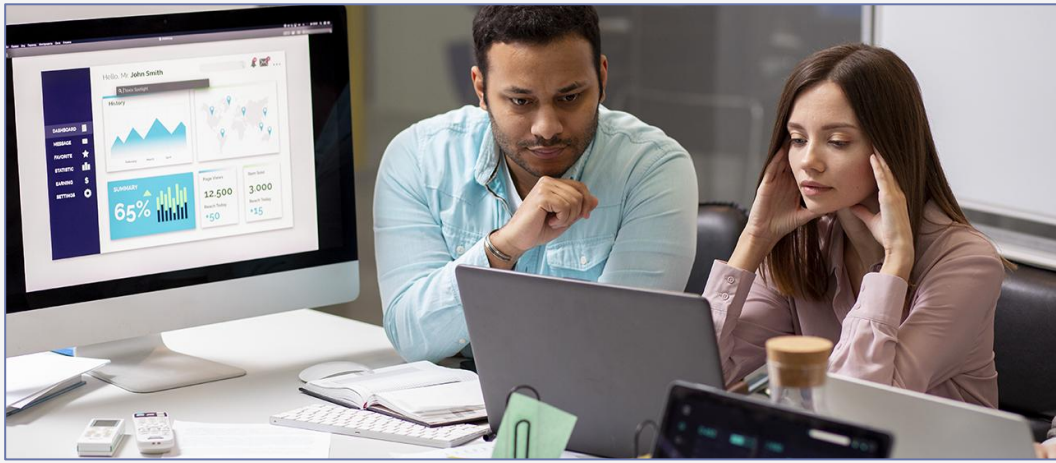
Effects of Napping on Workplace Productivity

Group 6: Tracey Ho, Victor Zhan, Yi (Billy) Chen, Yi Ching (Sunny) Wang, Samantha Yung



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Statement of the Problem

The Napping Debate

Traditional View:

- Napping = Laziness & Productivity Loss

Emerging Evidence:

- Companies like Google, NASA, Ben & Jerry's support workplace napping
- Short naps (13-30 minutes) can:
  - Improve focus
  - Increase creativity
  - Reduce errors
- Previous unstructured studies show mixed reviews

Research Goal

Experimental investigation of napping's impact on workplace productivity

Purpose

Develop evidence-based napping recommendations for modern organizations

Research Questions

01

Does a 15-minute nap help improve work productivity compared to no nap?

02

Does a 15-minute nap help improve subjective energy levels compared to no nap?

Hypotheses

01 Null Hypothesis

There will be **no significant difference** in productivity and energy levels between entry-level workers who nap for 15 minutes daily and those who do not nap.

02 Alternative Hypothesis I

Entry-level workers who nap for 15 minutes daily will exhibit **significantly higher work productivity** compared to those who do not nap.

03 Alternative Hypothesis II

Entry-level workers who nap for 15 minutes daily will have **significantly higher energy levels** compared to those who do not nap.

Study Effects

Increased Productivity Levels

- Improved cognitive performance
- Increased task completion rates
- Enhanced problem-solving capabilities
- Reduced afternoon performance decline
- Decreased error rates in complex tasks

Enhanced Energy Levels

- Improvements in subjective energy ratings
- Reduced perceived fatigue
- Enhanced mood and motivation
- Better emotional regulation
- Increased overall work engagement

Research Plan

Framework

Population of Interest

1. Ages 22 ~ 26
2. Average 40 working hours
3. Finance, Consulting, and Technology Fields

Sample Selection, Sample Size, Statistical Power

1. 78 participants split 50/50 between control and experimental group
2. 90% Statistical Power

Data collection

1. Pre-study surveys
2. Occupational Self-efficacy Scale (OSS)
3. Subjective Units of Disturbance Scale (SUDS)

Operational Procedures

1. Randomly assigned
2. Naps scheduled after lunch in a quiet, controlled environment

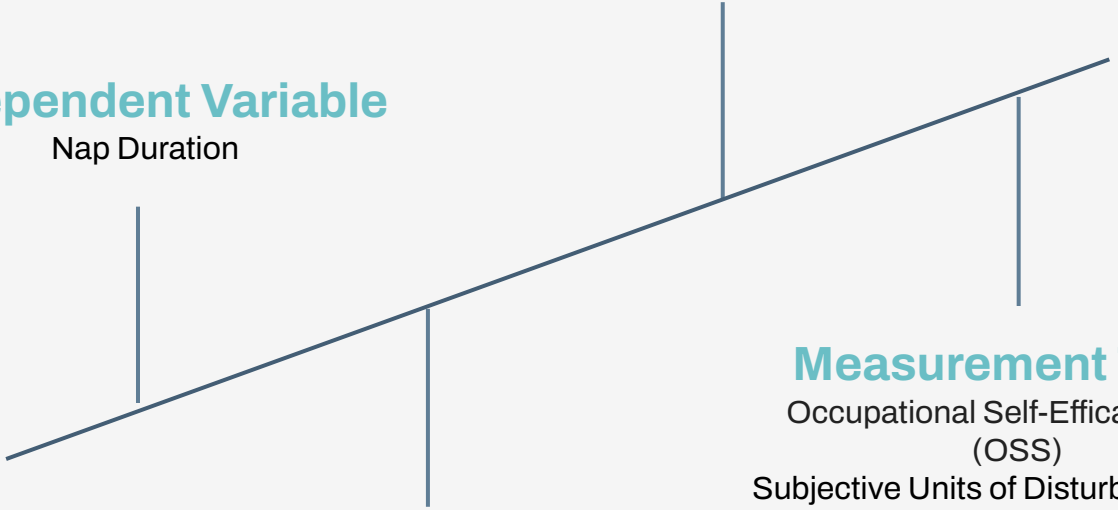
Variables

Control Factors

Nap Timing
Nap Quality

Independent Variable

Nap Duration



Measurement Tools

Occupational Self-Efficacy Scale (OSS)
Subjective Units of Disturbance Scale (SUDS)

Dependent Variable

Work Productivity
Energy Level

Research Question 1 Code - Productivity

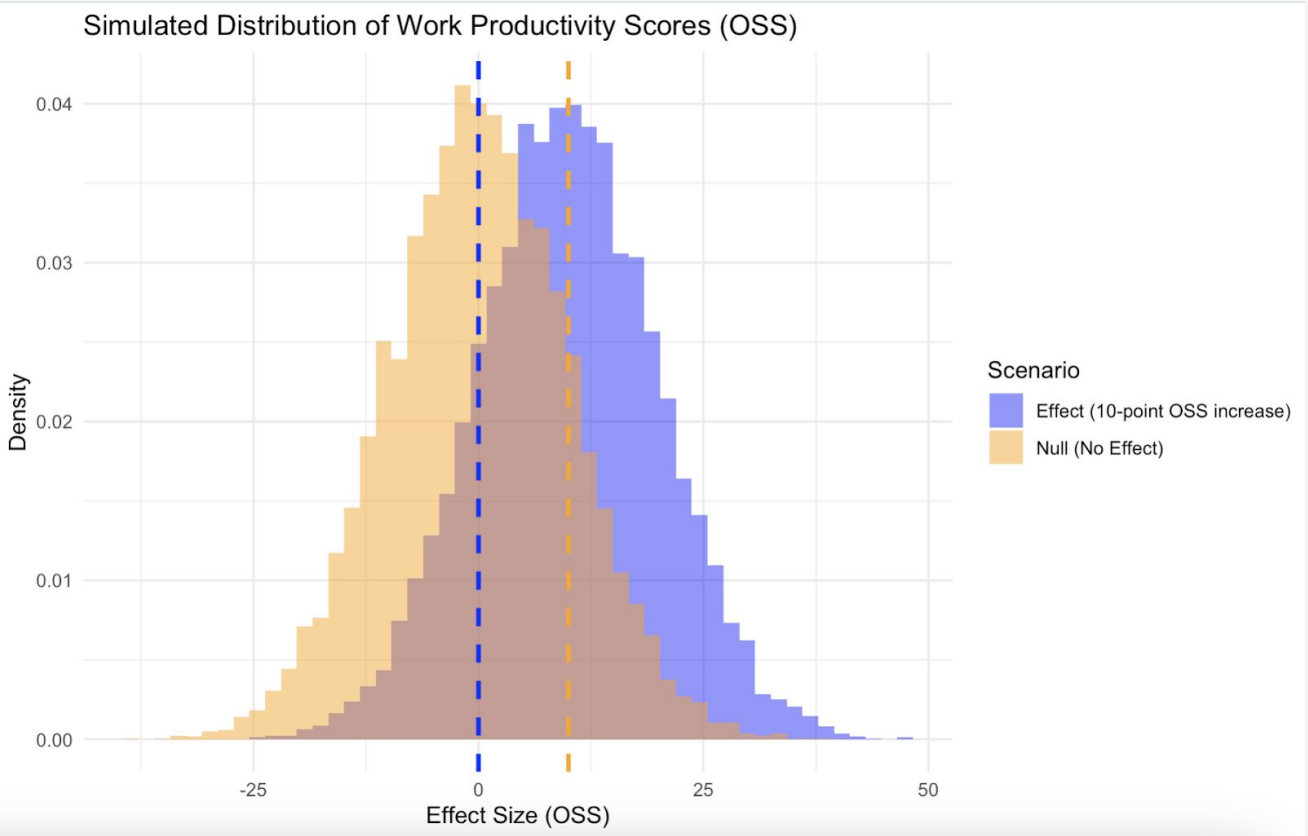
```r
# Run simulations
n_sims <- 10000
productivity_n <- 39  # Sample size for productivity study
energy_n <- 39        # Sample size for energy study

# Storage for results
results <- list(
  prod_null = replicate(n_sims, simulate_productivity(productivity_n, FALSE)),
  prod_effect = replicate(n_sims, simulate_productivity(productivity_n, TRUE)),
  energy_null = replicate(n_sims, simulate_energy(energy_n, FALSE)),
  energy_effect = replicate(n_sims, simulate_energy(energy_n, TRUE))
)
set.seed(135)

simulate_productivity <- function(n_per_group, is_effect = FALSE) {
  # Control group: mean OSS score of 70, SD = 10
  control <- rnorm(n_per_group, mean = 70, sd = 10)

  # Treatment group
  treatment_mean <- if(is_effect) 80 else 70
  treatment <- rnorm(n_per_group, mean = treatment_mean, sd = 10)

  # Perform t-test
  test <- t.test(control, treatment, var.equal = TRUE)

  # Effect size
  effect_size <- mean(treatment) - mean(control)

  return(list(p_value = test$p.value, effect = effect_size))
}
```

Research Question 2 Code - Energy

```r
simulate_energy <- function(n_per_group, is_effect = FALSE) {
  # Control group: mean energy level of 5, SD = 2
  control <- rnorm(n_per_group, mean = 5, sd = 2)

  # Treatment group
  treatment_mean <- if(is_effect) 6.5 else 5
  treatment <- rnorm(n_per_group, mean = treatment_mean, sd = 2)

  # Perform t-test
  test <- t.test(control, treatment, var.equal = TRUE)

  # Effect size
  effect_size <- mean(treatment) - mean(control)

  return(list(p_value = test$p.value, effect = effect_size))
}
```

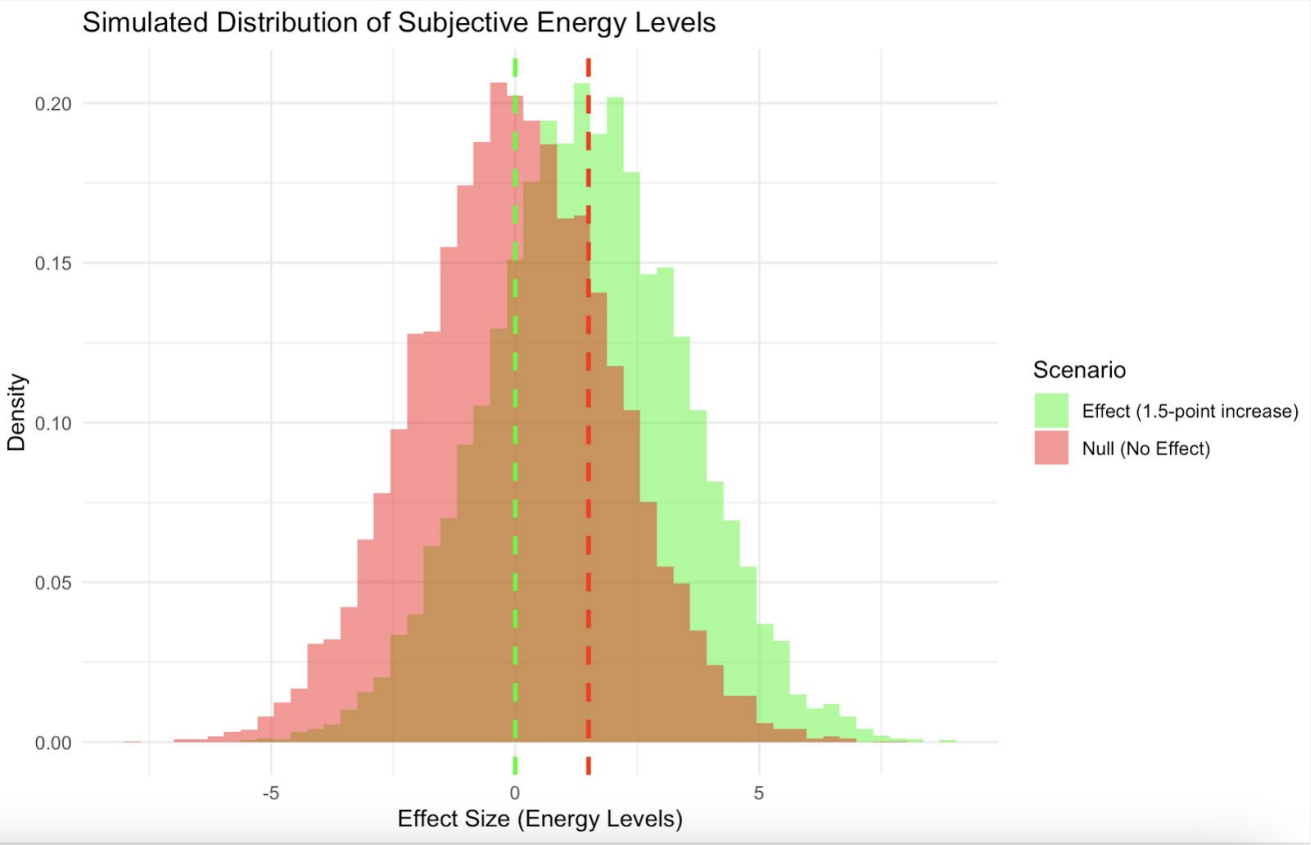
Simulation Results

	Research Question	Scenario	Mean Effect in Simulated Data	95% Confidence Interval of Mean Effect	Percentage of False Positives	Percentage of True Negatives	Percentage of False Negatives	Percentage of True Positives
1	Question 1 (Work Productivity)	No Effect	-0.03	(-4.43, 4.35)	4.9%	95.1%	N/A	N/A
2	Question 1 (Work Productivity)	Effect: 10-point OSS increase	10.04	(5.68, 14.40)	N/A	N/A	0.7%	99.3%
3	Question 2 (Energy Levels)	No Effect	-0.00	(-0.89, 0.88)	5.1%	94.9%	N/A	N/A
4	Question 2 (Energy Levels)	Effect: 1.5-point energy level increase	1.50	(0.60, 2.39)	N/A	N/A	9.5%	90.5%



Research Question 1 Analysis - Productivity

The separation between these distributions highlights the study's ability to detect a true effect. A smaller overlap between them indicates higher power (99.3% true positives).



Research Question 2 Analysis - Energy

The smaller standard deviation (SD = 2) makes these distributions narrower, and the 90.5% true positive rate indicates that the study design can reliably detect a meaningful improvement.

Limitations

Generalizability

↓

Short-Term Focus

↓

Self-Reporting Bias

↓

Variability in Baseline Fatigue

↓

Sleep Inertia

Uncertainties

Optimal Nap Duration

↓

Individual Differences

↓

Impact of Work Type

↓

Confounding Factors

↓

Policy Implementation

Key Findings and Recommendations

Observed Increases

Evidence of positive effect on work productivity and energy level with 15-minute nap assuming if the simulation was conducted in reality

Hypothesis Outcome

Support alternative hypothesis that napping improves work productivity and energy levels

Favor to reject the null hypothesis

Conclusion

Napping demonstrates a positive impact on workplace performance

Recommendations

- Destigmatize workplace breaks
- Develop clear HR guidelines
- Promote strategic rest as a productivity enhancement strategy