MythBusters Data Collection

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ABSTRACT
Multitasking is the ability to perform multiple tasks at the same time. Logically, it would make sense to focus on one task at a time, but multitasking has been proven to keep you productive.[1] Multitasking can be considered as a skill, but it is still not a skill that comes easy to everyone. A common myth many may have come across is that women are better than men at multitasking.[2] This project aims to compare the multitasking performance of men and women using two sets of tasks. Using a power test we concluded that we would need at least a total sample size of 60 to have a large effect size. In practice, we interacted with 80 participants.

Author Keywords
Multitasking, productivity, brain, male, female, hypothesis

INTRODUCTION
Multitasking can encompass two types – simultaneous and non-simultaneous. Simultaneous involved doing multiple tasks at the same time. An example of simultaneous multitasking is folding clothes and reading a book at the same time. Non-simultaneous multitasking involves doing tasks one after the other in rapid succession. An example is perhaps taking calls and making notes after.

Our project is going to study simultaneous multitasking from a gender perspective. We will conduct a two-tailed hypothesis test, utilizing statistical concepts and R Studio.

STUDY DESIGN
The following are the attributes for our study:
Population: All males and females
Sample: Students from University of Maryland

The tasks are structured are as follows:
Task 1:
Read a passage (260 words) while folding clothes (5 pieces; a mix of t-shirts, shirts, pants and a skirt) at the same time.

Task 2:
Dribble a ball by hand while answering 10 questions about math and general knowledge.

Scoring Rubric:
For Task 1 we will record the time taken to fold clothes and the number of words read out by the participant.

For Task 2 we will record the time taken to answer the questions and the number of questions correctly answered.

HYPOTHESIS TESTING
The hypotheses testing for our study is as follows:

Null hypothesis: There is no difference in the multitasking abilities of men and women
Alternative Hypothesis: There is a difference in the multitasking abilities of men and women.

Symbolically,
H_0: $\mu_M = \mu_F$
H_A: $\mu_M \neq \mu_F$

Before collecting data, we conducted a power analysis. The main purpose of power analysis is to help determine which is the smallest sample size that is suitable to detect the effect of our test at a significance value (alpha). For our study, we conduct a power analysis with *alternative=two sided* because our hypothesis is two-tailed.
Using R, we conducted the power test as follows:

```
> pwr.t.test(n=30,d=0.8,sig.level=0.05,type="two.sample", alternative="two.sided")

     Two-sample t test power calculation

              n = 30
              d = 0.8
      sig.level = 0.05
          power = 0.8614225
    alternative = two.sided

NOTE: n is number in *each* group
```

Fig 1. Result of Power Analysis

The results of the power analysis test show that with a sample size of 30 in each group and significance value 0.05 for a large effect, we are 86% confident of rejecting the null hypothesis and not committing Type II error.

DATA COLLECTION
According to the power test, the minimum sample size required for each group was 30 (total 60 observations). We collected data of sample size 40 each i.e total data collect was with 80 observations.

The data collected comprises of two sample groups : Male and female.

The following is a snapshot of the data collected:

Sr. No	Participant	Age	Gender	Education	T1(time)	T1(words)	T2(score)	T2(time)	Avg tim
1	Rohan	25	M	MSIS	88	260	7	44	6
2	Ameya	22	M	MSIS	62	137	7	32	4
3	Shikhar	23	M	MSIS	49	139	6	65	5
4	Kramik	22	M	MSIS	57	109	8	34	4
5	Asmita	21	F	MSIS	45	148	9	33	3
6	Vaibhav	27	M	MSIS	47	96	9	32	3
7	Shivangi	26	F	MSIS	50	124	9	34	4
8	Won	22	F	Finance	59	105	5	57	5
9	Haley	21	F	Public Policy	64	121	8	43	5
10	Kristine	20	F	Kinesiology	51	184	10	46	4

Fig 2. Screenshot of Excel File

The data comprises of the 9 variables. Namely:

- Participant Name
- Age
- Gender
- Education
- Time taken to complete Task 1
- Number of words read in Task 1
- Number of correctly answered question in Task 2
- Time taken to complete Task 2
- Average time taken to complete both tasks

The independent variable in our study is Gender and the dependent variable is Average time taken to complete both tasks.

SOURCES OF BIAS

- **Environment**: A windy weather and chilly environment made it slightly tougher to fold clothes efficiently and thus took a little longer time.
- **Age Range**: Having access to University of Maryland students limited the participant age range to 18-30
- **Participant Pool**: Having access to University of Maryland, the sample was limited to university students who might not be used to folding their own clothes yet.
- **Gender Identity**: This project would be limited to individuals who identify as male or female so further research should be conducted to include the entire spectrum of gender.

CONCLUSION

The first step of data analysis is always data collection. The data collection of this project involved setting up a stall in the University campus at various locations such as Van-Munching Hall, McKeldin Library and Adele H. Stamp Student Union Building. The power analysis conducted aids in setting a suitable sample size to reject the null hypothesis and decrease the Type II error.

REFERENCES

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