

Reading Formats & Effects



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Data Collection



14 Days of reading data collected on nights in which I read before going to sleep.



Sleep data logged with fitness tracker.

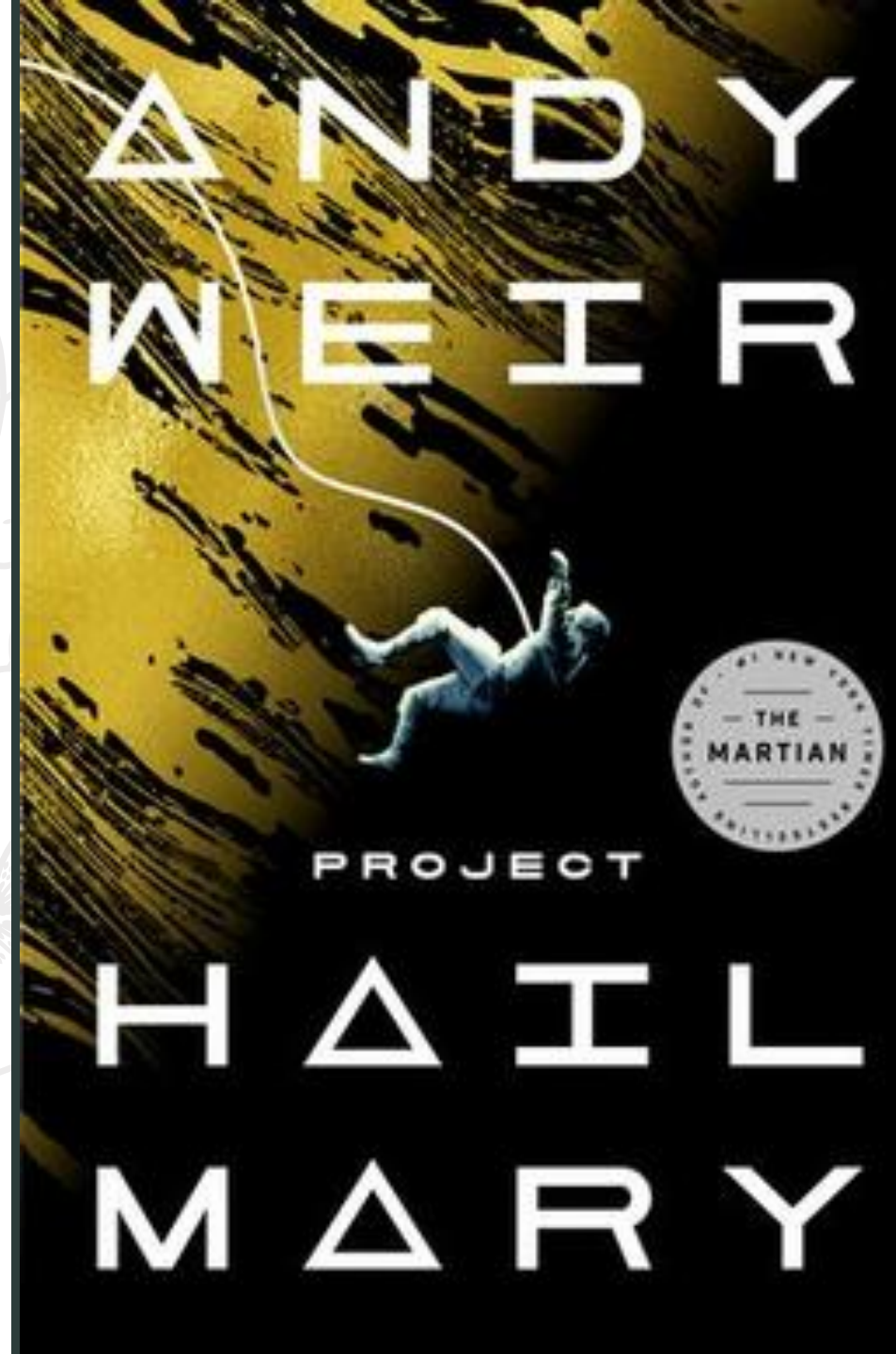


Pages read logged using TheStorygraph app

Variable Mitigation



- I read the same book, *Project Hail Mary* by Andy Weir, in both formats to ensure that the only difference was the format itself.
- I used TheStorygraph app to calculate the number of pages read to account for changes in font size and spacing between formats.
 - I paused data collection during travel to avoid skewed sleep data.
- I alternated between e-ink and physical formats and ensured equal observations for each.



Date	Format	Start time	End time	Pages	Time asleep	REM	Deep	Light	MinutesT oSleep	MinutesR eading	PagesPer Minute	TotalTime Asleep	DayofWeek
3/31/2025	physical	8:36:00 PM	10:47:00 PM	78	10:54:00 PM	73	68	147	7	131	1.68	288	Monday
4/2/2025	eink	1:45:00 AM	2:30:00 AM	23	2:48:00 AM	45	43	88	18	45	1.96	176	Wednesday
4/4/2025	physical	12:10:00 AM	1:22:00 AM	15	1:28:00 AM	134	104	156	6	72	4.80	394	Friday
4/5/2025	eink	12:17:00 AM	12:21:00 AM	1	12:26:00 AM	114	85	227	5	4	0.25	426	Saturday
4/6/2025	physical	9:50:00 PM	10:07:00 PM	12	10:11:00 PM	128	100	318	4	17	1.42	546	Sunday
4/7/2025	eink	11:31:00 PM	11:49:00 PM	10	11:57:00 PM	93	56	156	8	18	1.80	305	Monday
4/9/2025	physical	10:40:00 PM	11:06:00 PM	42	11:09:00 PM	86	83	221	3	26	0.62	390	Wednesday
4/11/2025	eink	10:45:00 PM	1:07:00 AM	83	1:19:00 AM	18	32	90	12	142	1.71	140	Friday
4/21/2025	physical	8:52:00 PM	10:01:00 PM	43	10:08:00 PM	80	75	264	7	69	1.60	419	Monday
4/22/2025	eink	9:50:00 PM	11:06:00 PM	48	11:12:00 PM	92	109	191	6	76	1.58	392	Tuesday
4/23/2025	eink	10:57:00 PM	11:06:00 PM	6	11:13:00 PM	61	87	129	7	9	1.50	277	Wednesday
4/24/2025	eink	12:50:00 AM	1:50:00 AM	30	1:58:00 AM	74	89	189	8	60	2.00	352	Thursday
4/26/2025	physical	12:22:00 AM	1:28:00 AM	38	1:42:00 AM	105	91	243	14	66	1.74	439	Saturday
4/27/2025	physical	9:14:00 PM	11:17:00 PM	95	3:09:00 AM	61	66	144	240	123	1.29	271	Sunday

- Variables
 - Date
 - Format
 - Pages read
 - Pages read per minute
 - Day of Week
 - Minutes in Light Sleep
 - Minutes in Deep Sleep
 - Minutes in REM
 - Total Time slept
 - Total Time to Fall Asleep

About My Data

Hypothesis Testing





Does the format I use affect how
long I spend reading?



Hypothesis 1



Claim: There is a significant difference in the minutes spent reading based on the format of the book.

Dependent Variable: Minutes Reading

Independent Variable: Format

```
##
## Welch Two Sample t-test
##
## data: MinutesReading by Format
## t = -0.8722, df = 11.854, p-value = 0.4004
## alternative hypothesis: true difference in means between group Eink and group Physical is not equal to 0
## 95 percent confidence interval:
## -75.03211 32.17497
## sample estimates:
##      mean in group Eink mean in group Physical
##      50.57143      72.00000
```

- **Step 1:**

- H_0 : There is no difference in minutes spent reading between formats.
- H_a : There is a significant difference in minutes spent reading between formats.

- **Step 2:**

- Use two sided T- Test

- **Step 3:**

- Test Statistic: -0.8722
- P-Value: .4004

- **Step 4:**

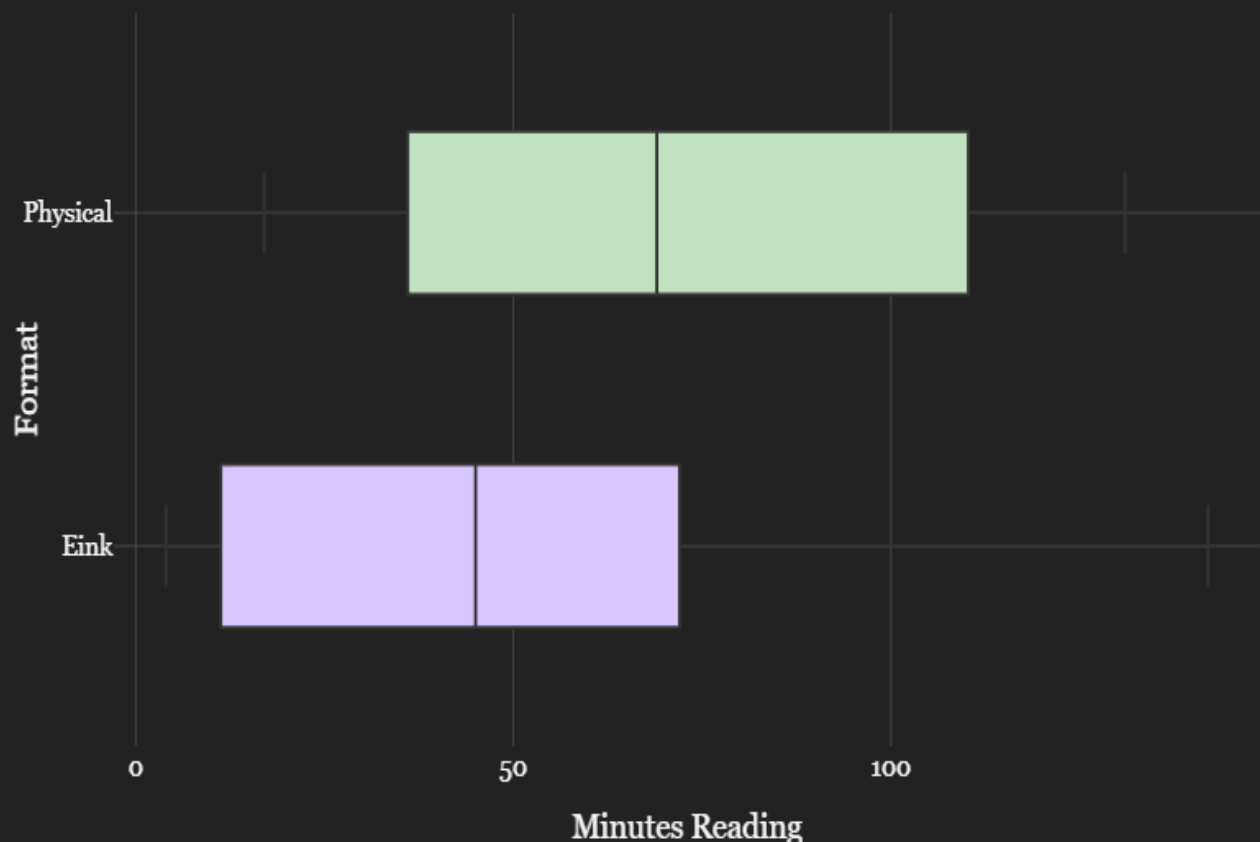
- Using a significance level of .05, fail to reject the null hypothesis.

Hypothesis 1: Testing

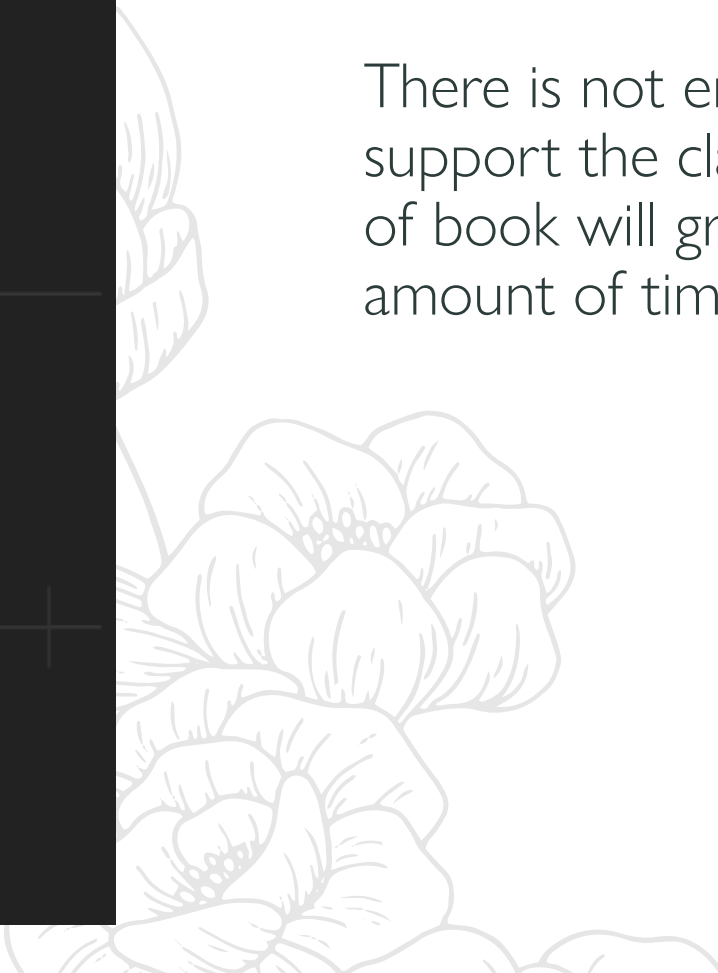
Hypothesis 1: Conclusion



Reading Time by Format



There is not enough evidence to support the claim that the format of book will greatly affect the amount of time spent reading.





Is the amount of sleep I get affected
by the format I read before bed?



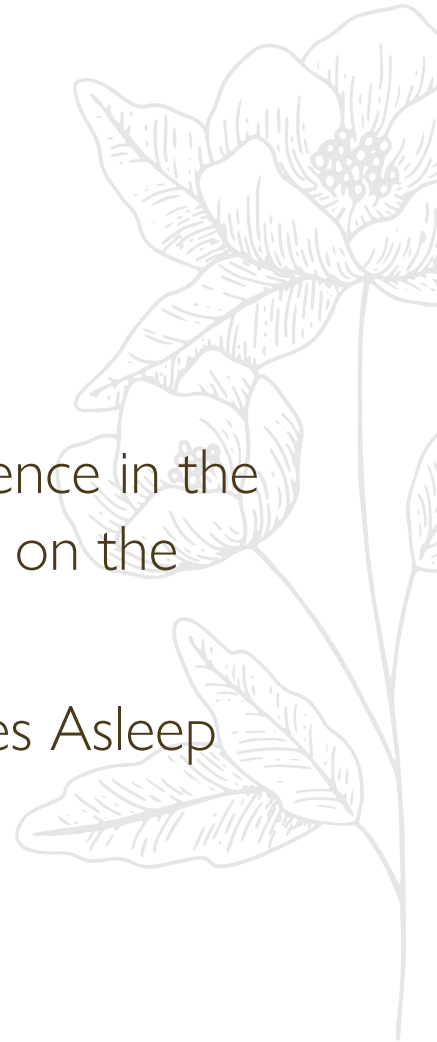
Hypothesis 2



Claim: There is a significant difference in the total minutes of sleep I get based on the format I read before bed.

Dependent Variable: Total Minutes Asleep

Independent Variable: Format



```
##
## Welch Two Sample t-test
##
## data: TotalTimeAsleep by Format
## t = -1.8106, df = 11.784, p-value = 0.09576
## alternative hypothesis: true difference in means between group Eink and group Physical is not equal to 0
## 95 percent confidence interval:
## -213.96426 19.96426
## sample estimates:
## mean in group Eink mean in group Physical
## 295.4286 392.4286
```

- **Step 1:**

- H_0 : There is no difference in the Total Minutes Slept between formats.
- H_a : There is a significant difference in the Total Minutes Slept between formats.

- **Step 2:**

- Use two sided T- Test

- **Step 3:**

- Test Statistic: -1.8106
- P-Value: .09576

- **Step 4:**

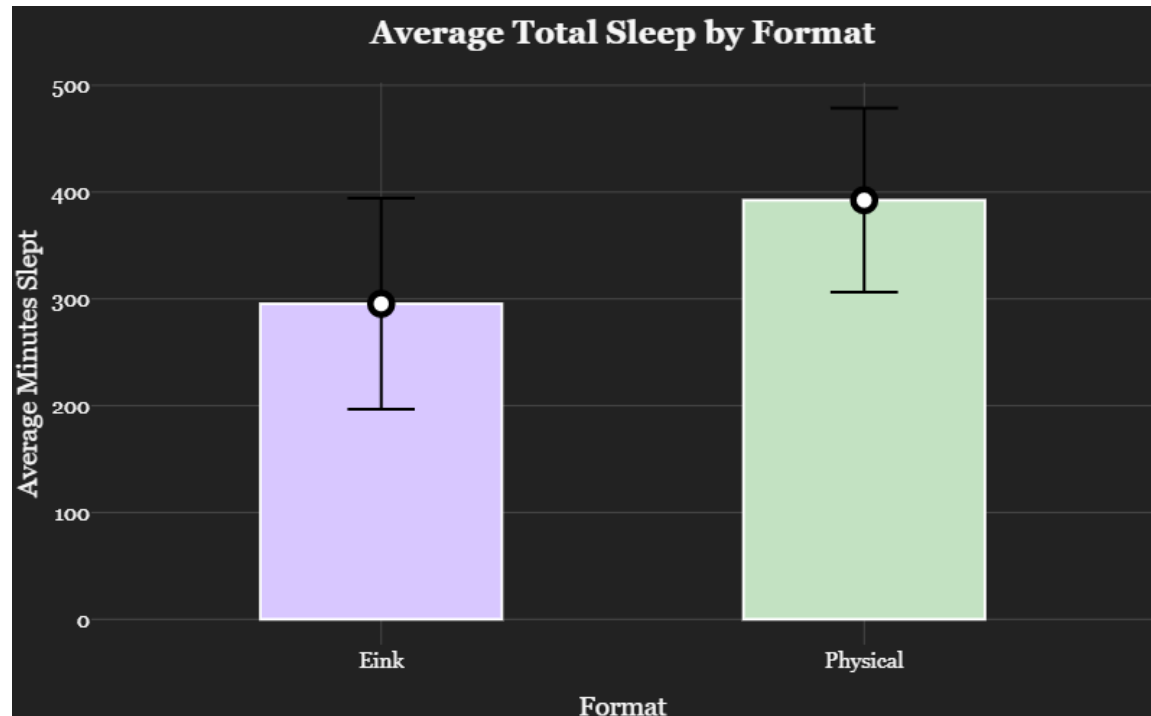
- Using a significance level of .05, fail to reject the null hypothesis.

Hypothesis 2: Testing

Hypothesis 2: Conclusion



There is not enough evidence to support the claim that the format of book will greatly affect the minutes I sleep.





Does the format that I use affect the
speed at which I read?

Hypothesis 3



Claim: There is a significant difference in the average pages read based on format.

Dependent Variable: Avg Pages Per Minute

Independent Variable: Format



```
##
## Welch Two Sample t-test
##
## data: PagesPerMinute by Format
## t = -0.60393, df = 8.2984, p-value = 0.562
## alternative hypothesis: true difference in means between group Eink and group Physical is not equal to 0
## 95 percent confidence interval:
## -1.608408  0.937481
## sample estimates:
##      mean in group Eink mean in group Physical
##      1.543333      1.878797
```

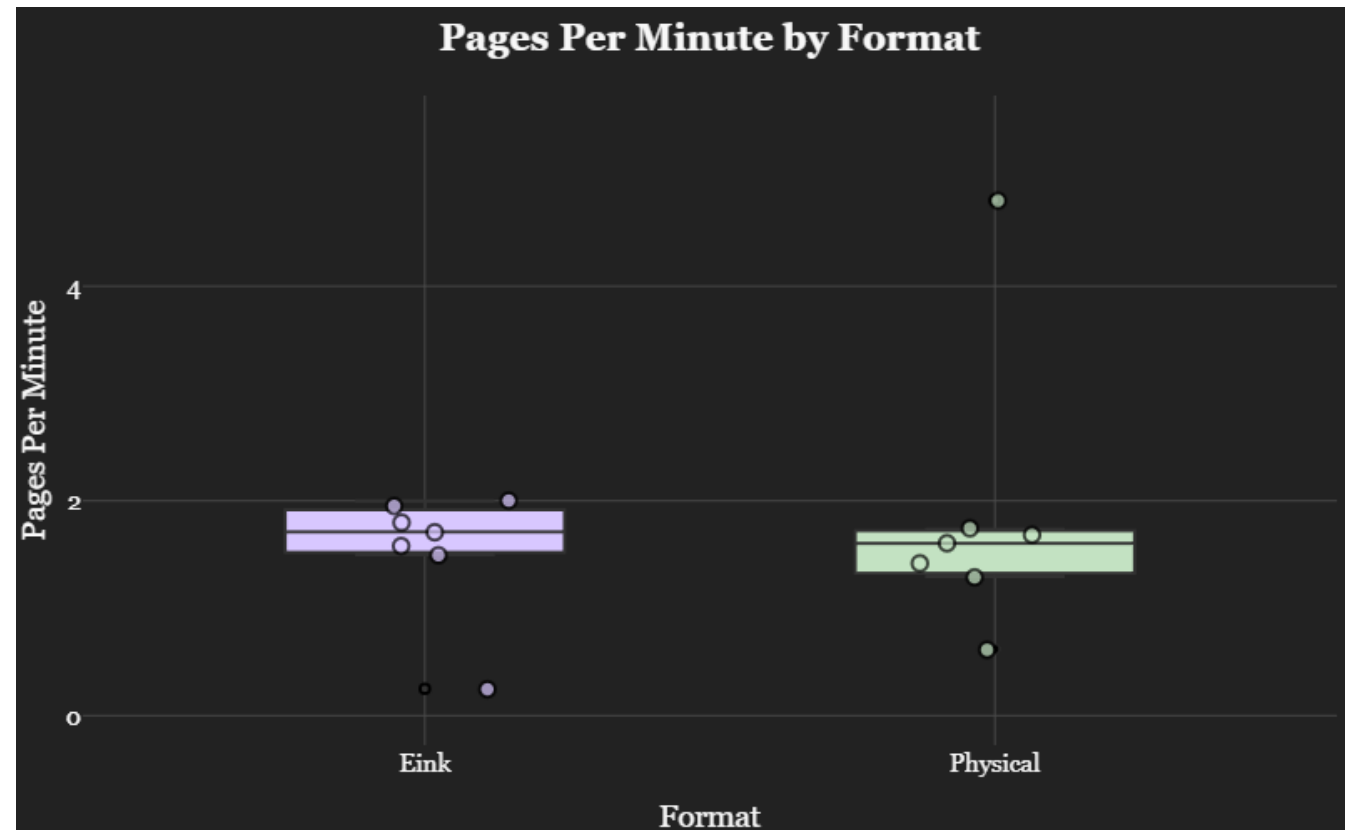
- **Step 1:**
 - H_0 : There is no difference in pages per minute between formats.
 - H_a : There is a significant difference in pages per minute between formats.
- **Step 2:**
 - Use two sided T- Test
- **Step 3:**
 - Test Statistic: -.60393
 - P-Value: .562
- **Step 4:**
 - Using a significance level of .05, fail to reject the null hypothesis.

Hypothesis 3: Testing

Hypothesis 3: Conclusion



There is not enough evidence to support the claim that the format of book greatly affects my reading speed.





Does the format that I use affect
how quickly I fall asleep?

Hypothesis 4



Claim: There is a significant difference in the average time it takes me to fall asleep based on the book format.

Dependent Variable:
Time to fall asleep

Independent Variable:
Format

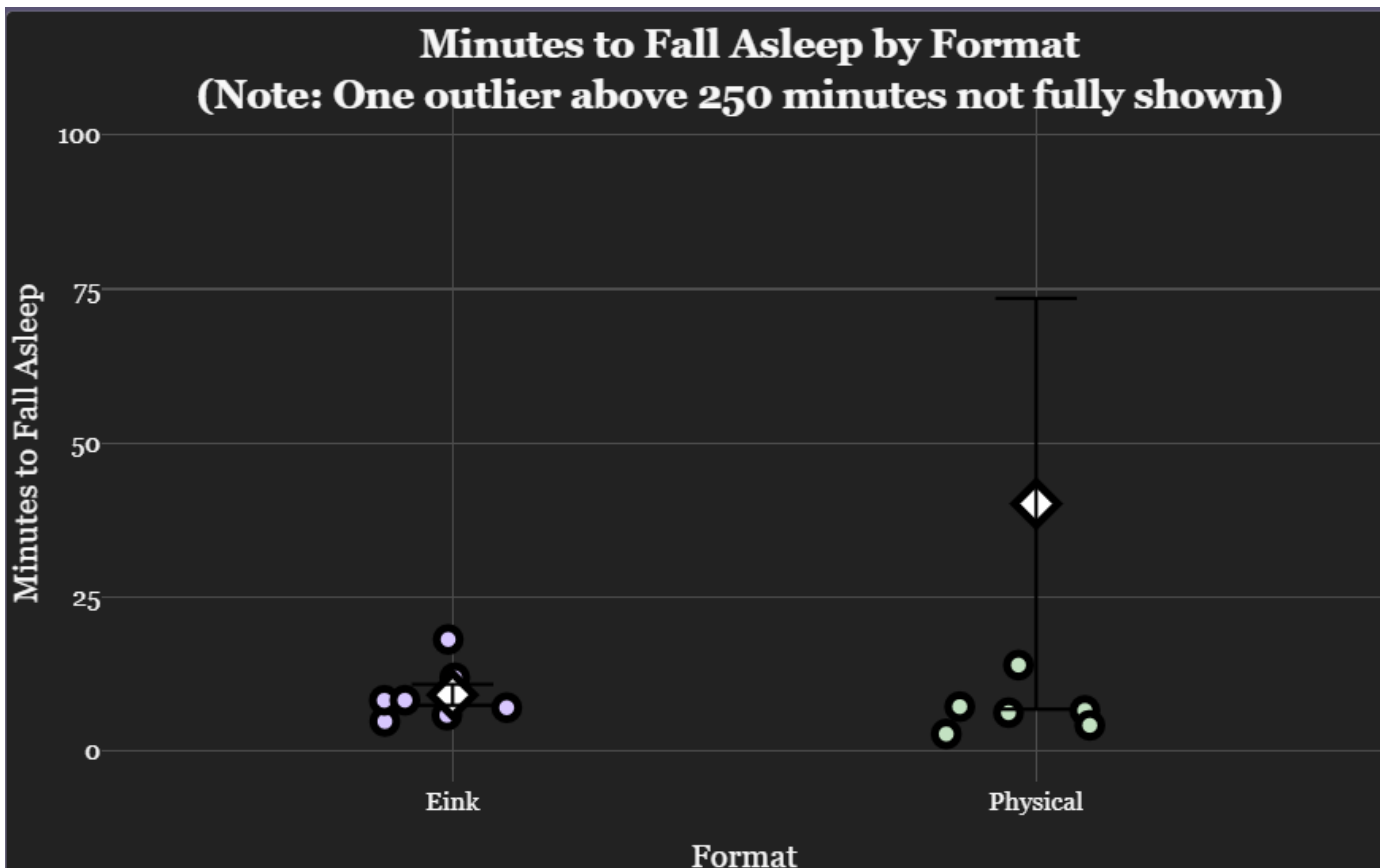


```
##  
## Welch Two Sample t-test  
##  
## data: MinutesToSleep by Format  
## t = -0.92872, df = 6.0311, p-value = 0.3887  
## alternative hypothesis: true difference in means between group Eink and group Physical is not equal to 0  
## 95 percent confidence interval:  
## -112.57453 50.57453  
## sample estimates:  
## mean in group Eink mean in group Physical  
## 9.142857 40.142857
```

- **Step 1:**
 - H_0 : There is no difference in minutes to fall asleep between formats.
 - H_a : There is a significant difference in minutes to fall asleep between formats.
- **Step 2:**
 - Use two sided T- Test
- **Step 3:**
 - Test Statistic: -.92872
 - P-Value: .3887
- **Step 4:**
 - Using a significance level of .05, reject the null hypothesis.

Hypothesis 4: Testing

Hypothesis 4: Conclusion



There is not enough evidence to support the claim that the format of book will greatly affect the minutes I sleep.

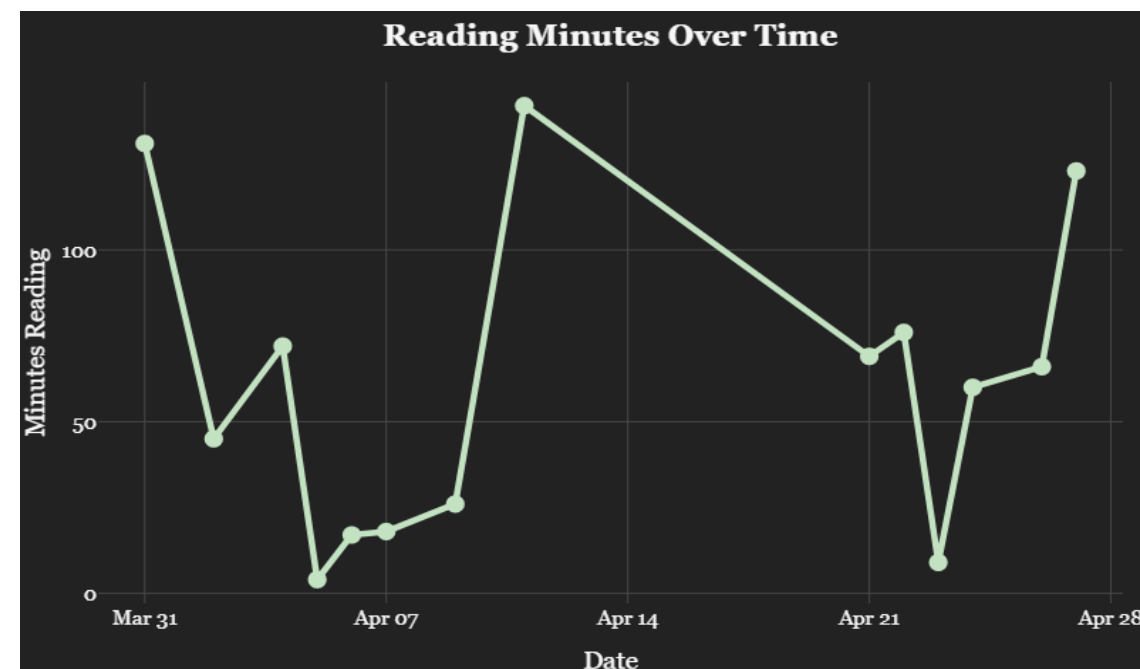
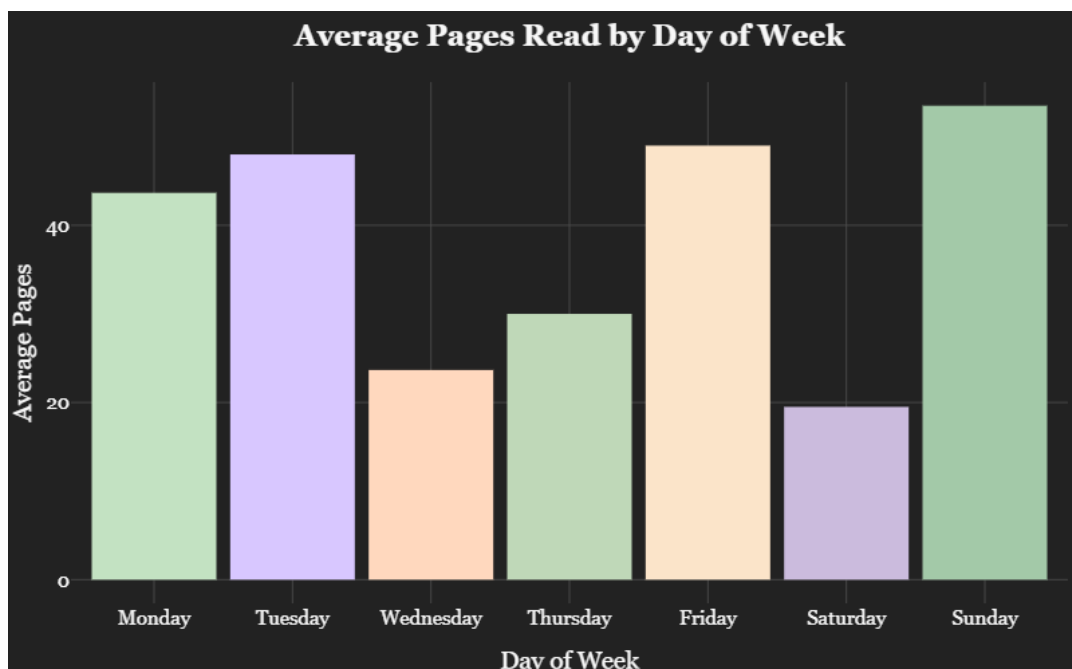


Special Notes

A note on sample size



Sample size of 7 observations per format, collected over 14 nights.



Final Notes

Overall, the data suggests that format does not have any significant effects on sleep and reading habits. With a larger sample over a longer period of time, subtle effects of format on reading or sleep habits might become detectable.

