BIOL 3000 Project 1: People Walk at Different Speeds

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HYPOTHESIS

Hypothesis 1:
People's energy levels influence walking speed.

Hypothesis 2:
Walking speed is influenced by level of distraction.

Hypothesis 3:
The location someone is walking in will influence their walking speed.

PREDICTIONS

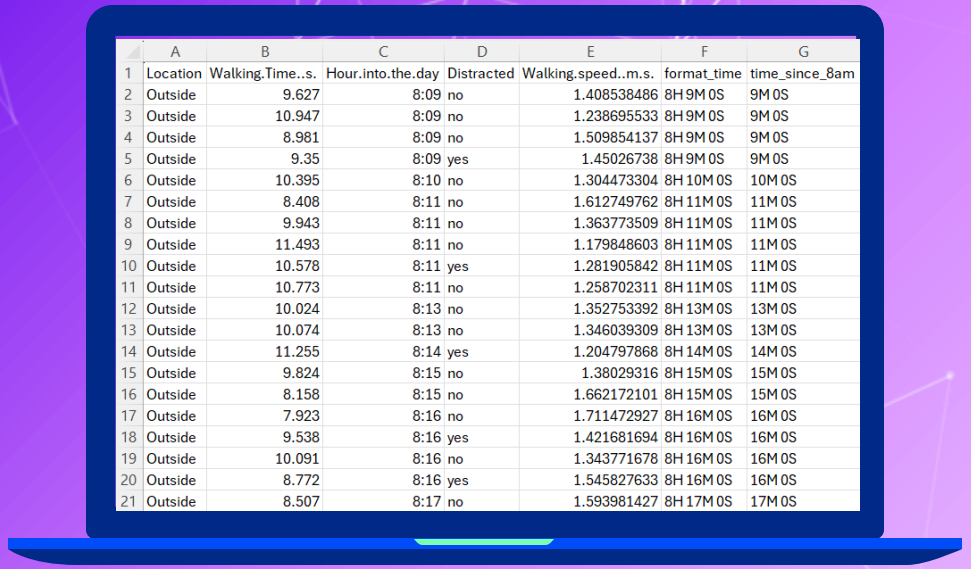
Prediction 1:
People are more energetic in the morning, so walking speed will decrease throughout the day (Kawai et al., 2021).

Prediction 2:
Walking speed will increase if people are not distracted by talking to others, by a large group, or by their phone (Moussaid et al., 2010; Wang et al., 2022).

Prediction 3:
Walking speeds will be faster outdoors when compared to walking speeds indoors (Willen et al., 2013; Murtagh et al., 2021).

METHODS

1. Identify two locations to measure walking time (outside and inside).
2. Measure distance between point A and B.
3. Observe people walking at both locations for 20 min in the morning, afternoon, and evening.
4. Measure the time it takes people chosen at random to walk from point A to point B.
5. Record if people walking are not distracted or distracted (in a group or on phone).
6. Calculate walking speed (m/s).



	A	B	C	D	E	F	G
1	Location	Walking.Time..s.	Hour.into.the.day	Distracted	Walking.speed..m.s.	format_time	time_since_8am
2	Outside	9.627	8:09	no	1.408538486	8H 9M 0S	9M 0S
3	Outside	10.947	8:09	no	1.238695533	8H 9M 0S	9M 0S
4	Outside	8.981	8:09	no	1.509854137	8H 9M 0S	9M 0S
5	Outside	9.35	8:09	yes	1.45026738	8H 9M 0S	9M 0S
6	Outside	10.395	8:10	no	1.304473304	8H 10M 0S	10M 0S
7	Outside	8.408	8:11	no	1.612749762	8H 11M 0S	11M 0S
8	Outside	9.943	8:11	no	1.363773509	8H 11M 0S	11M 0S
9	Outside	11.493	8:11	no	1.179848603	8H 11M 0S	11M 0S
10	Outside	10.578	8:11	yes	1.281905842	8H 11M 0S	11M 0S
11	Outside	10.773	8:11	no	1.258702311	8H 11M 0S	11M 0S
12	Outside	10.024	8:13	no	1.352753392	8H 13M 0S	13M 0S
13	Outside	10.074	8:13	no	1.346039309	8H 13M 0S	13M 0S
14	Outside	11.255	8:14	yes	1.204797868	8H 14M 0S	14M 0S
15	Outside	9.824	8:15	no	1.38029316	8H 15M 0S	15M 0S
16	Outside	8.158	8:15	no	1.662172101	8H 15M 0S	15M 0S
17	Outside	7.923	8:16	no	1.711472927	8H 16M 0S	16M 0S
18	Outside	9.538	8:16	yes	1.421681694	8H 16M 0S	16M 0S
19	Outside	10.091	8:16	no	1.343771678	8H 16M 0S	16M 0S
20	Outside	8.772	8:16	yes	1.545827633	8H 16M 0S	16M 0S
21	Outside	8.507	8:17	no	1.593981427	8H 17M 0S	17M 0S

Figure 1. Data collection sheet.

RESULTS: Time of Day

- Walking speed decreased very slightly throughout the day.
- Regression analysis confirmed a non-linear relationship by an R^2 of 0.01161.
- A p-value of 0.1093 meant the null hypothesis could not be rejected, confirming there was no significant difference between walking speed over time.
- Large spread in data for each time point indicated another variable was likely influencing walking speed.

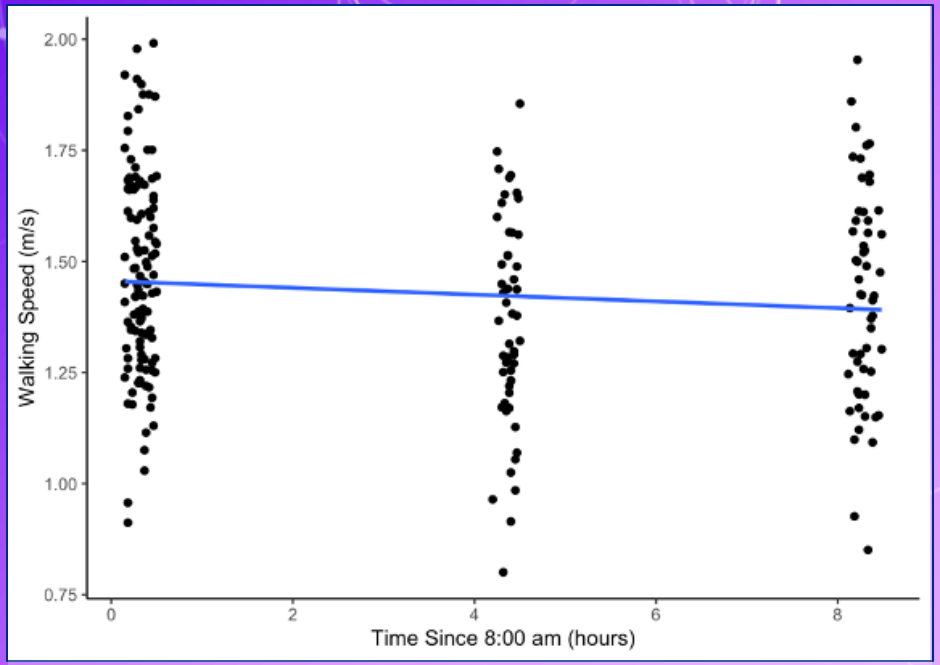


Figure 2. Walking speed as time since 8:00 am increases.

RESULTS: Distracted or Not

- Distraction level influences walking speed.
- Distracted mean walking speed: 1.30 m/s.
- Non-distracted mean walking speed: 1.50 m/s.
- Two sample t-test:

  t = 6.4903

  t-value > 1.96
- Mean walking speed of distracted people was significantly slower than non-distracted people.

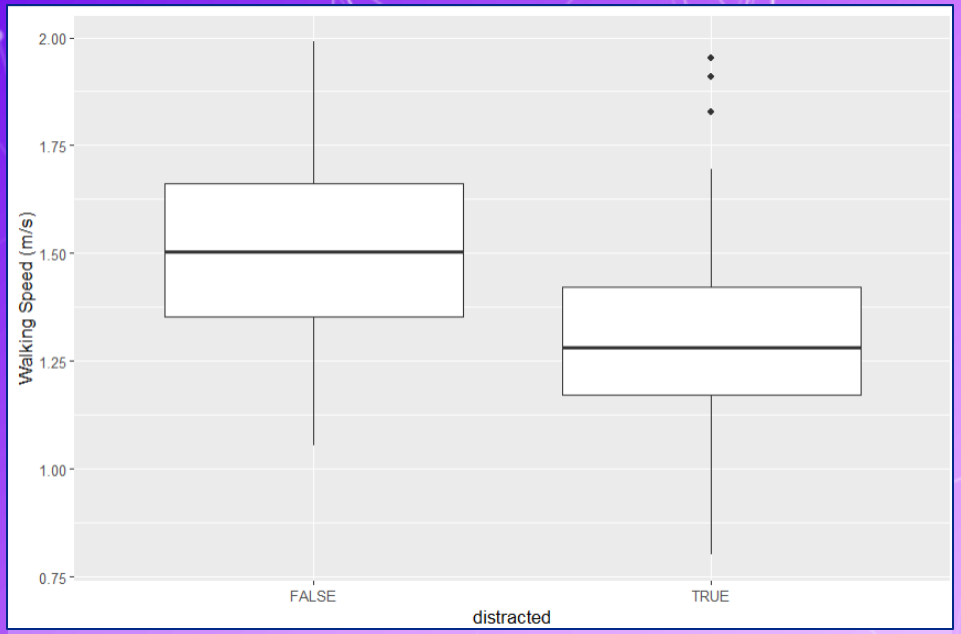


Figure 3. Walking speed with different distraction levels.

RESULTS: Inside or Outside

- Walking speed, on average, was higher inside (n=102) than outside (n=120).
- Mean walking speed inside: 1.46 m/s
- Mean walking speed outside: 1.40 m/s
- Larger spread among speeds recorded inside.
- Two sample T-test:
  T-value: 1.7789 (< 1.96)
- Mean walking speed outside was not statistically different from mean walking speed inside.

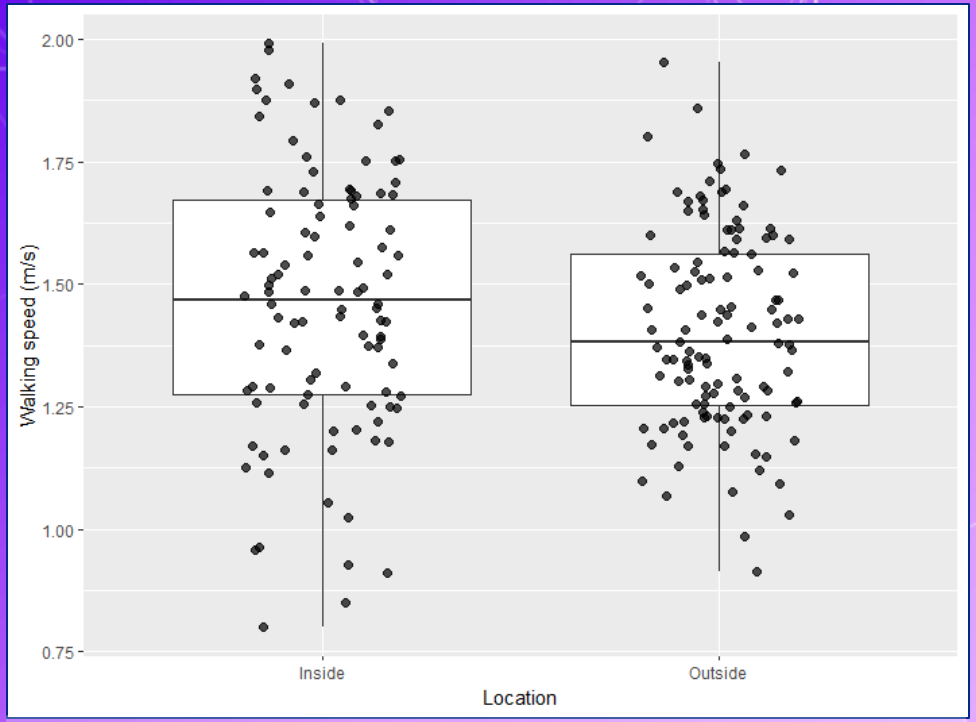


Figure 4. Walking speed in m/s measured at two locations, inside and outside.

MAIN TAKEAWAYS

1. Hypothesis that energy level influences walking speed was not supported.
2. Hypothesis that location influences walking speed was not supported.
3. Hypothesis that distraction level influences walking speed was supported.

Future Analyses:

Since distraction level affects walking speed, participants who were distracted should be excluded from analyses examining the effects of location or time of day.

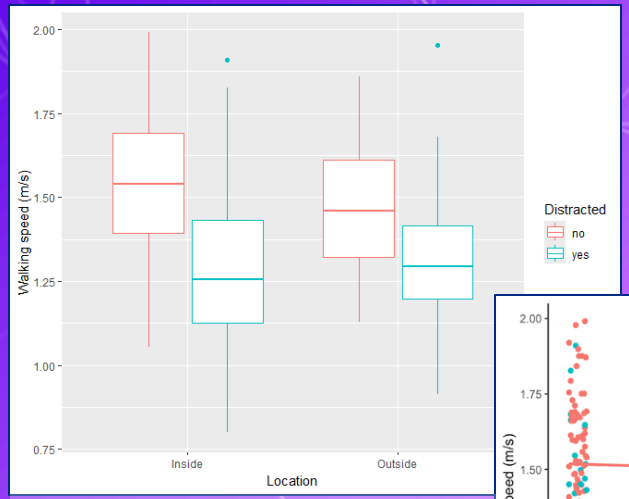


Figure 5. Walking speed in different locations with different distraction levels.

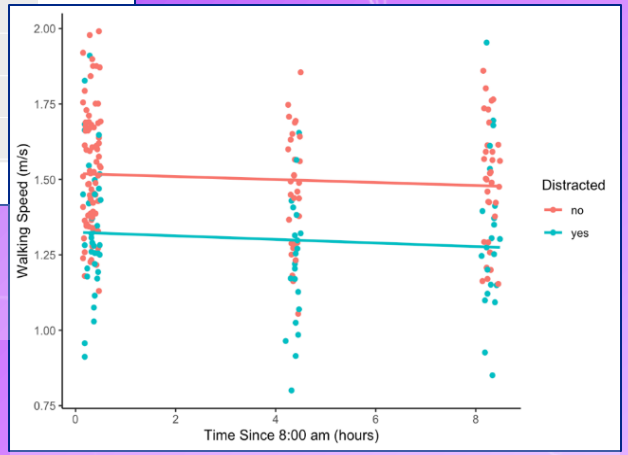


Figure 6. Walking speed throughout the day with different distraction levels.

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