

NCEA Level 2 Mathematics (Homework)

23. Probability Distributions

Reading

Go and watch...

<https://www.youtube.com/watch?v=UCmPmkHqHXk>

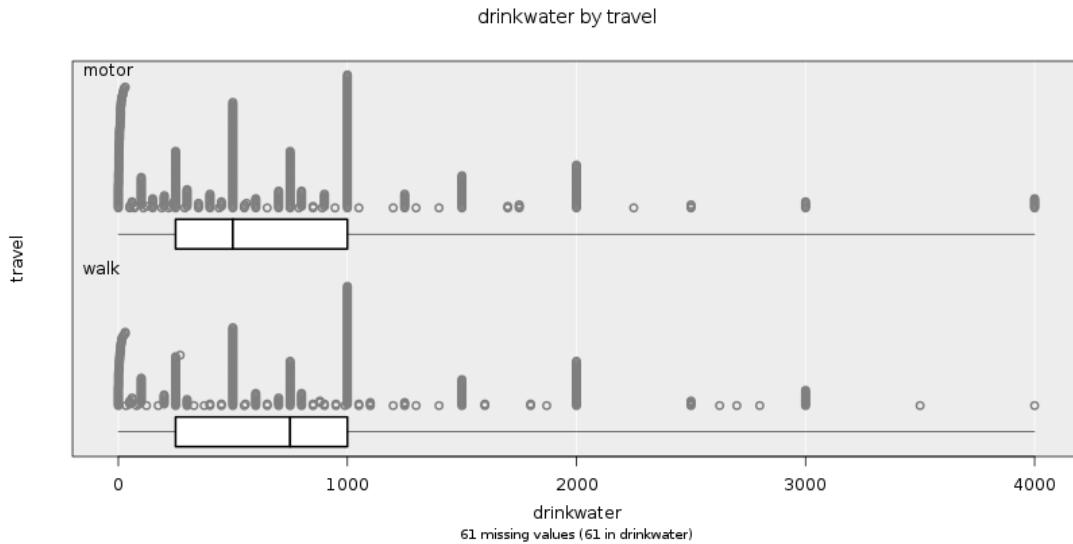


<https://www.smbc-comics.com/comic/stats-gang>

Questions

1. How are probability distributions related to the kind of data analysis we began probability with? Discuss. (Write around half a page, and do some research.)
2. In 2017, one of the Census at School questions asked for the amount of water, in millilitres, drunk in the last day. The following graphs and statistical information shows the data for this question for students

who drove to school, and for students who walked.



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iNZight Summary

Primary variable of interest: travel (categorical)
 Secondary variable: drinkwater (numeric)

Total number of observations: 1000
 Number omitted due to missingness: 61 (61 in drinkwater)
 Total number of observations used: 939

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Summary of drinkwater by travel:

	Min	25%	Median	75%	Max	Mean	SD	Sample Size
motor	0	250	500	1000	4000	728.5	707.1	530
walk	0	250	750	1000	4000	825.9	733.1	409

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- (a) Compare and contrast the shapes of the statistics for the two groups.
- (b) Is there any meaningful difference between the volume of water drunk in the last day between the two groups?
- (c) Calculate the probability that a randomly chosen person from each group drank more than 800 millilitres in the last day. What is the relative risk — is a walker more likely to have drunk more than 800 millilitres compared to a motorist?
- (d) Suppose that at a particular school the mean value for water drunk in the last day (over all students) was 712 mL. The survey also shows that only 10% of students drank less than 400 mL.
 - i. What is the standard deviation of the sample in this case?
 - ii. What is the minimum amount of water for a student to have drunk in the last day in order to be in the top 5% of water drinkers, at this school?