

PSC 202

SYRACUSE UNIVERSITY

INTRODUCTION TO POLITICAL ANALYSIS

DESCRIBING VARIABLES

HOUSEKEEPING

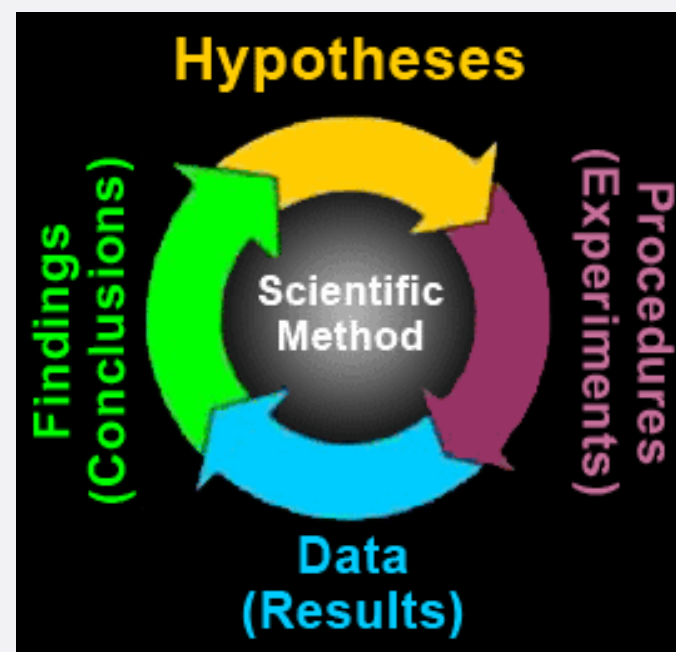
- **October 4: Exam 1**
 - **Wednesday next week**

CLASS SURVEY

- Take it here: rebrand.ly/202surveyfall23
 - 85% response rate: extra credit for whole class

WHERE WE ARE

- Formulate research question
- Propose explanation/theory, hypotheses
- Data collection process
- Use data to evaluate hypotheses
- Reassess explanation



OPERATIONALIZATION

Concept



**Precise Definition of Concept
(Conceptual Definition)**



**Measurement Strategy
(Operational Definition)**



Variable

VARIABLES

- **Variables**
 - Properties of variables
 - How to describe variables

LEVELS OF MEASUREMENT

	Nominal	Ordinal	Interval
Relative Differences	✓	✓	✓
Ranking	X	✓	✓
Exact Differences Between Units	X	X	✓

INCOME

- Values: Dollars per year
- Relative Differences? YES
- Ranking? YES
- Exact differences between units? YES

INCOME

	Nominal	Ordinal	Interval
Relative Differences	✓	✓	✓
Ranking	X	✓	✓
Exact Differences Between Units	X	X	✓

- There is an ordering to the values, and the distance between them is known

MARITAL STATUS

- Values: single, married, divorced
- Relative Differences? YES
- Ranking? NO
- Exact differences between units? NO

MARITAL STATUS

	Nominal	Ordinal	Interval
Relative Differences	✓	✓	✓
Ranking	X	✓	✓
Exact Differences Between Units	X	X	✓

- Values just represent a category, there is no ordering to the values

HEALTH INSURANCE

- **"The United States should have universal health insurance"**
- **Values: strongly agree, agree, disagree, strongly disagree**
- **Relative Differences?**
- **Ranking?**
- **Exact differences between units?**

HEALTH INSURANCE

- “The United States should have universal health insurance”
- Values: strongly agree, agree, disagree, strongly disagree
- Relative Differences? **YES**
- Ranking?
- Exact differences between units?

HEALTH INSURANCE

- “The United States should have universal health insurance”
- Values: strongly agree, agree, disagree, strongly disagree
- Relative Differences? **YES**
- Ranking? **YES**
- Exact differences between units?

HEALTH INSURANCE

- “The United States should have universal health insurance”
- Values: strongly agree, agree, disagree, strongly disagree
- Relative Differences? **YES**
- Ranking? **YES**
- Exact differences between units? **NO**

HEALTH INSURANCE

	Nominal	Ordinal	Interval
Relative Differences	✓	✓	✓
Ranking	X	✓	✓
Exact Differences Between Units	X	X	✓

- There is an ordering to the values, but the distance between each of the values is unknown

SOME EXERCISES

- **“How often do you attend religious services?”**
 - **Never; Less than once/year; Once/year; Several times/year; Once/month; 2-3x/month; Nearly every week; Every week; More than once/week**
- **Nominal, ordinal, or interval?**

SOME EXERCISES

- **“How many times have you attended religious services in the past year?”**
- **Nominal, ordinal, or interval?**

SOME EXERCISES

- **“In what religion were you raised?”**
 - Protestant, Catholic, Jewish, Muslim, etc.
- **Nominal, ordinal, or interval?**

VARIABLES

- **Variables**
 - **Properties of variables**
 - **How to describe variables**

DESCRIBING A VARIABLE

	A	B	C	D
1	Respondent	Income	Marital Status	Universal Health Insurance
2	A	20,000	Single	Agree
3	B	55,000	Married	Disagree
4	C	35,000	Divorced	Strongly disagree
5	D	30,000	Married	Strongly disagree
6	E	80,000	Married	Strongly agree

- How can we describe/summarize variables with many observations in a simple manner?

DESCRIBING A VARIABLE

- What is a “typical” value?
- Central tendency

CENTRAL TENDENCY

	A	B	C	D
1	Respondent	Income	Marital Status	Universal Health Insurance
2	A	20,000	Single	Agree
3	B	55,000	Married	Disagree
4	C	35,000	Divorced	Strongly disagree
5	D	30,000	Married	Strongly disagree
6	E	80,000	Married	Strongly agree

- **Income:** What is the “typical income”?

CENTRAL TENDENCY

	A	B	C	D
1	Respondent	Income	Marital Status	Universal Health Insurance
2	A	20,000	Single	Agree
3	B	55,000	Married	Disagree
4	C	35,000	Divorced	Strongly disagree
5	D	30,000	Married	Strongly disagree
6	E	80,000	Married	Strongly agree

- **Income: What is the “typical income”?**
- **Mean, average**

CENTRAL TENDENCY

	A	B	C	D
1	Respondent	Income	Marital Status	Universal Health Insurance
2	A	20,000	Single	Agree
3	B	55,000	Married	Disagree
4	C	35,000	Divorced	Strongly disagree
5	D	30,000	Married	Strongly disagree
6	E	80,000	Married	Strongly agree

- Income: What is the “typical income”?
- Mean, average
- $(20,000 + 55,000 + 35,000 + 30,000 + 80,000) / 5 = 44,000$

CENTRAL TENDENCY

	A	B	C	D
1	Respondent	Income	Marital Status	Universal Health Insurance
2	A	20,000	Single	Agree
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- **Universal Health Insurance: What is the “typical” value?**

CENTRAL TENDENCY

	A	B	C	D
1	Respondent	Income	Marital Status	Universal Health Insurance
2	A	20,000	Single	Agree
3	B	55,000	Married	Disagree
4	C	35,000	Divorced	Strongly disagree
5	D	30,000	Married	Strongly disagree
6	E	80,000	Married	Strongly agree

- **Universal Health Insurance: What is the “typical” value?**
 - Cannot compute mean
 - How else could we describe the central tendency of this variable?

CENTRAL TENDENCY

	A	B	C	D
1	Respondent	Income	Marital Status	Universal Health Insurance
2	A	20,000	Single	Agree
3	B	55,000	Married	Disagree
4	C	35,000	Divorced	Strongly disagree
5	D	30,000	Married	Strongly disagree
6	E	80,000	Married	Strongly agree

- Line them up in order:
 - Strongly agree
 - Agree
 - Disagree
 - Strongly disagree
 - Strongly disagree

CENTRAL TENDENCY

	A	B	C	D
1	Respondent	Income	Marital Status	Universal Health Insurance
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4	C	35,000	Divorced	Strongly disagree
5	D	30,000	Married	Strongly disagree
6	E	80,000	Married	Strongly agree

- Line them up in order:
 - Strongly agree
 - Agree
 - **Disagree**
 - Strongly disagree
 - Strongly disagree
- "Median": Middle point of the variable

CENTRAL TENDENCY

	A	B	C	D
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2	A	20,000	Single	Agree
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- What's the median of income?

CENTRAL TENDENCY

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- What's the median of income?
 - 20,000
 - 30,000
 - 35,000
 - 55,000
 - 80,000

CENTRAL TENDENCY

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CENTRAL TENDENCY

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- **Marital Status: what is the “typical” marital status?**

CENTRAL TENDENCY

	A	B	C	D
1	Respondent	Income	Marital Status	Universal Health Insurance
2	A	20,000	Single	Agree
3	B	55,000	Married	Disagree
4	C	35,000	Divorced	Strongly disagree
5	D	30,000	Married	Strongly disagree
6	E	80,000	Married	Strongly agree

- **Marital Status: what is the “typical” marital status?**
 - Mean?
 - Median?

CENTRAL TENDENCY

	A	B	C	D
1	Respondent	Income	Marital Status	Universal Health Insurance
2	A	20,000	Single	Agree
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- What is the most common value?

CENTRAL TENDENCY

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1	Respondent	Income	Marital Status	Universal Health Insurance
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5	D	30,000	Married	Strongly disagree
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- What is the most common value?
 - Married
 - "Mode": most common value

CENTRAL TENDENCY

	A	B	C	D
1	Respondent	Income	Marital Status	Universal Health Insurance
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- What is the mode of health insurance?
 -
- What is the mode of income?
 -

CENTRAL TENDENCY

	A	B	C	D
1	Respondent	Income	Marital Status	Universal Health Insurance
2	A	20,000	Single	Agree
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4	C	35,000	Divorced	Strongly disagree
5	D	30,000	Married	Strongly disagree
6	E	80,000	Married	Strongly agree

- What is the mode of health insurance?
 - Strongly disagree
- What is the mode of income?
 - All of them are a mode

CENTRAL TENDENCY

- Can give mode for all variables
- For some variables, can provide median too
- For some, can even provide mean
- Why levels of measurement are important...

CENTRAL TENDENCY

	Nominal	Ordinal	Interval
Mode	✓	✓	✓
Median	X	✓	✓
Mean	X	X	✓

CENTRAL TENDENCY

	A	B	C	D
1	Respondent	Income	Marital Status	Universal Health Insurance
2	A	20,000	Single	Agree
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6	E	80,000	Married	Strongly agree

- **Income**
 - Mode: all of them
 - Median: 35,000
 - Mean: 44,000
- Different central tendencies may give different results

CENTRAL TENDENCY

Respondent	Income	Marital Status	Universal Health Insurance
A	20,000	1	2
B	55,000	2	3
C	35,000	3	4
D	30,000	2	4
E	11,500,000,000	2	1

- **Danger when using the mean: heavily influenced by outliers**
- **Suppose respondent E was someone like Elon Musk or Bill Gates**

CENTRAL TENDENCY

Respondent	Income	Marital Status	Universal Health Insurance
A	20,000	1	2
B	55,000	2	3
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D	30,000	2	4
E	11,500,000,000	2	1

- **Danger when using the mean: heavily influenced by outliers**
- **Suppose respondent E was someone like Elon Musk or Bill Gates**
- **Mean: 2,300,028,000**

CENTRAL TENDENCY

Respondent	Income	Marital Status	Universal Health Insurance
A	20,000	1	2
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D	30,000	2	4
E	11,500,000,000	2	1

- **Danger when using the mean: heavily influenced by outliers**
- **Suppose respondent E was someone like Elon Musk or Bill Gates**
- **Mean: 2,300,028,000**
- **Good reflection of “central tendency”?**

CENTRAL TENDENCY

Respondent	Income	Marital Status	Universal Health Insurance
A	20,000	1	2
B	55,000	2	3
C	35,000	3	4
D	30,000	2	4
E	11,500,000,000	2	1

- What's the median income?

CENTRAL TENDENCY

Respondent	Income	Marital Status	Universal Health Insurance
A	20,000	1	2
B	55,000	2	3
C	35,000	3	4
D	30,000	2	4
E	11,500,000,000	2	1

- What's the median income?
 - 20,000
 - 30,000
 - 35,000
 - 55,000
 - 11,500,000,000
- In this case, describes central tendency better

CENTRAL TENDENCY

	Mode	Median	Mean
Nominal	✓	X	X
Ordinal	✓	✓	X
Interval	✓	✓	✓

DESCRIBING VARIABLES

- Central tendency
- Frequency tables
- Dispersion

FREQUENCY TABLE

Primary News Source	Number	Percentage
Internet (no social media)	66	56.4
Social Media	24	20.5
Print	13	11.1
TV	6	5.1
Radio	4	3.4
Conversations	2	1.7
Other	2	1.7

- **Nominal-level variable**

FREQUENCY TABLE

Cannabis Should Be Legalized	Number	Percentage	Cumulative Percentage
Strongly agree	71	60.7	60.7
Somewhat agree	24	20.5	81.2
Neither agree nor disagree	10	8.5	89.7
Somewhat disagree	5	4.3	94.0
Strongly disagree	7	6.0	100.0

- Ordinal-level variable

FREQUENCY TABLE

Age	Number	Percentage	Cumulative Percentage
17	1	0.9	0.9
18	27	23.3	24.2
19	42	36.2	60.4
20	25	21.6	82.0
21	17	14.7	96.7
22	4	3.4	100.1

- Interval-level variable

CENTRAL TENDENCY

- So far: computing central tendencies from list of observations
 - 4, 4, 5, 6, 7
 - mean: $(4+4+5+6+7)/5=5.2$
 - median: 5
 - mode: 4
- now: compute central tendencies from frequency table

FREQUENCY TABLE

Primary News Source	Number	Percentage
Internet (no social media)	66	56.4
Social Media	24	20.5
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TV	6	5.1
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Conversations	2	1.7
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- What central tendencies can we compute?

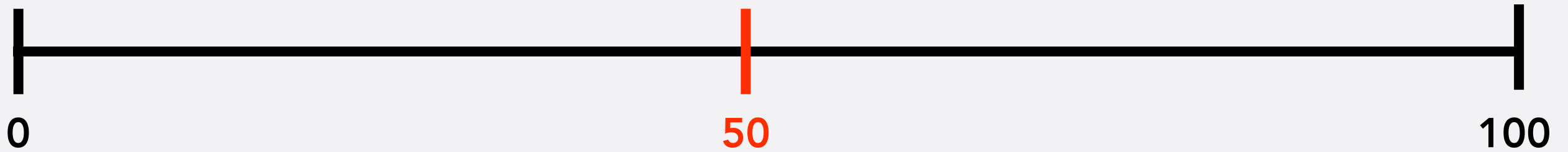
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- What central tendencies can we compute?

MEDIAN

- Cannabis should be legalized



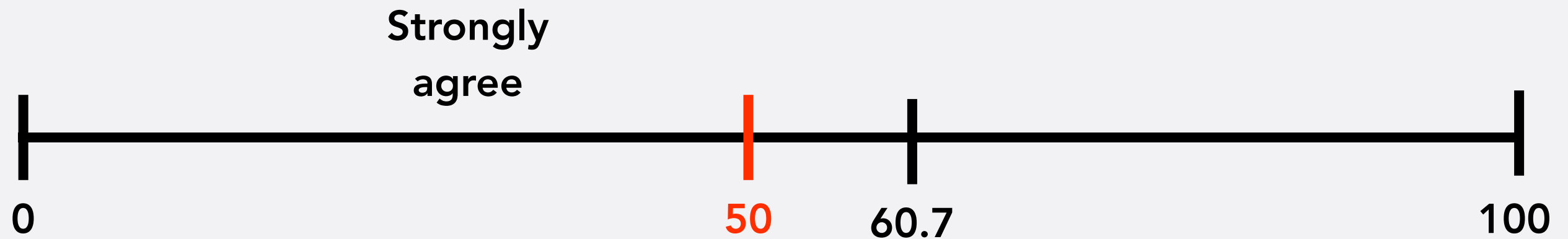
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- What central tendencies can we compute?

MEDIAN

- Cannabis should be legalized



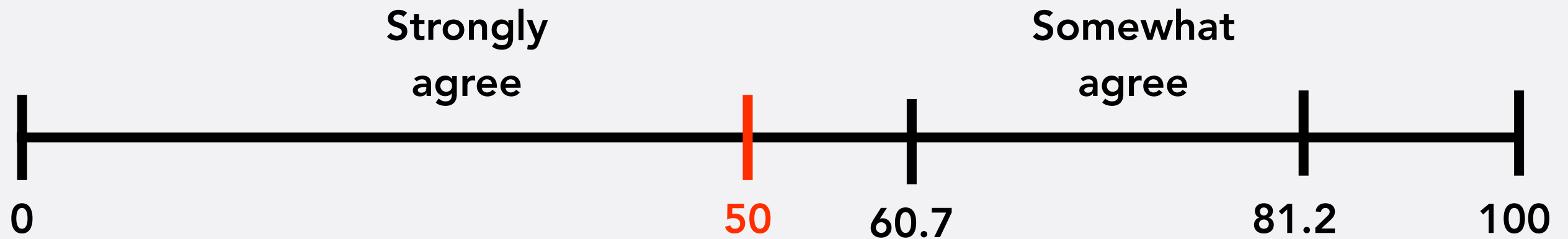
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- What central tendencies can we compute?

MEDIAN

- Cannabis should be legalized



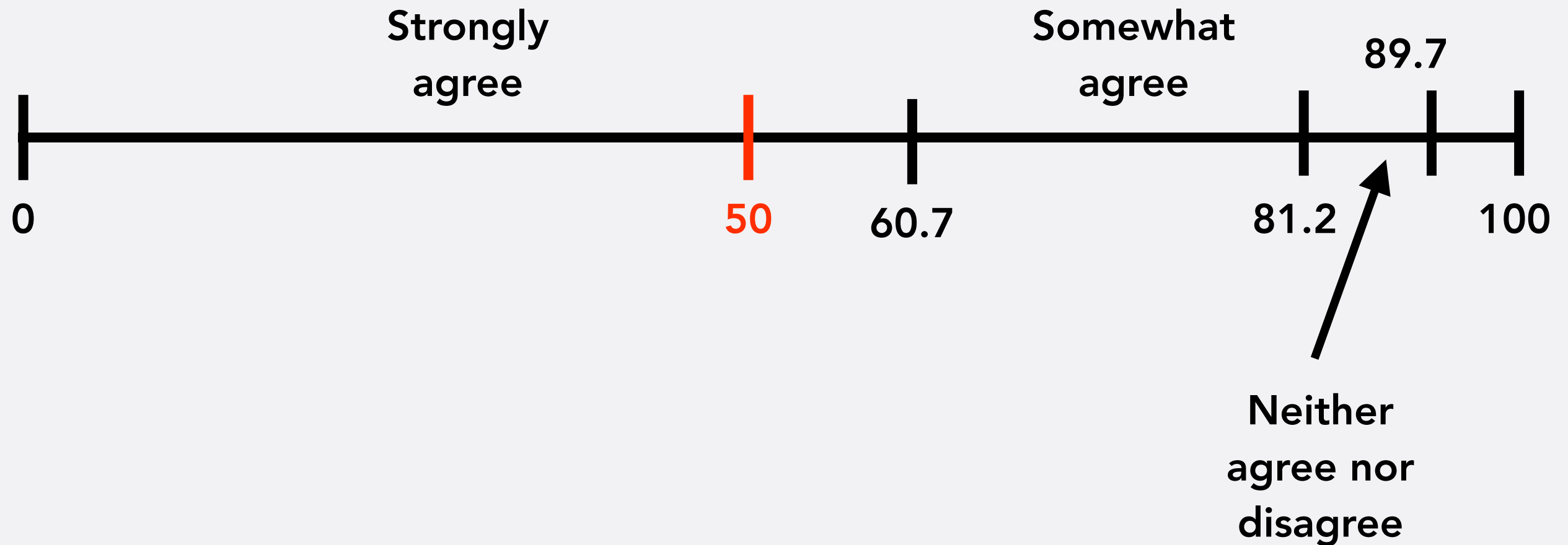
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- What central tendencies can we compute?

MEDIAN

- Cannabis should be legalized



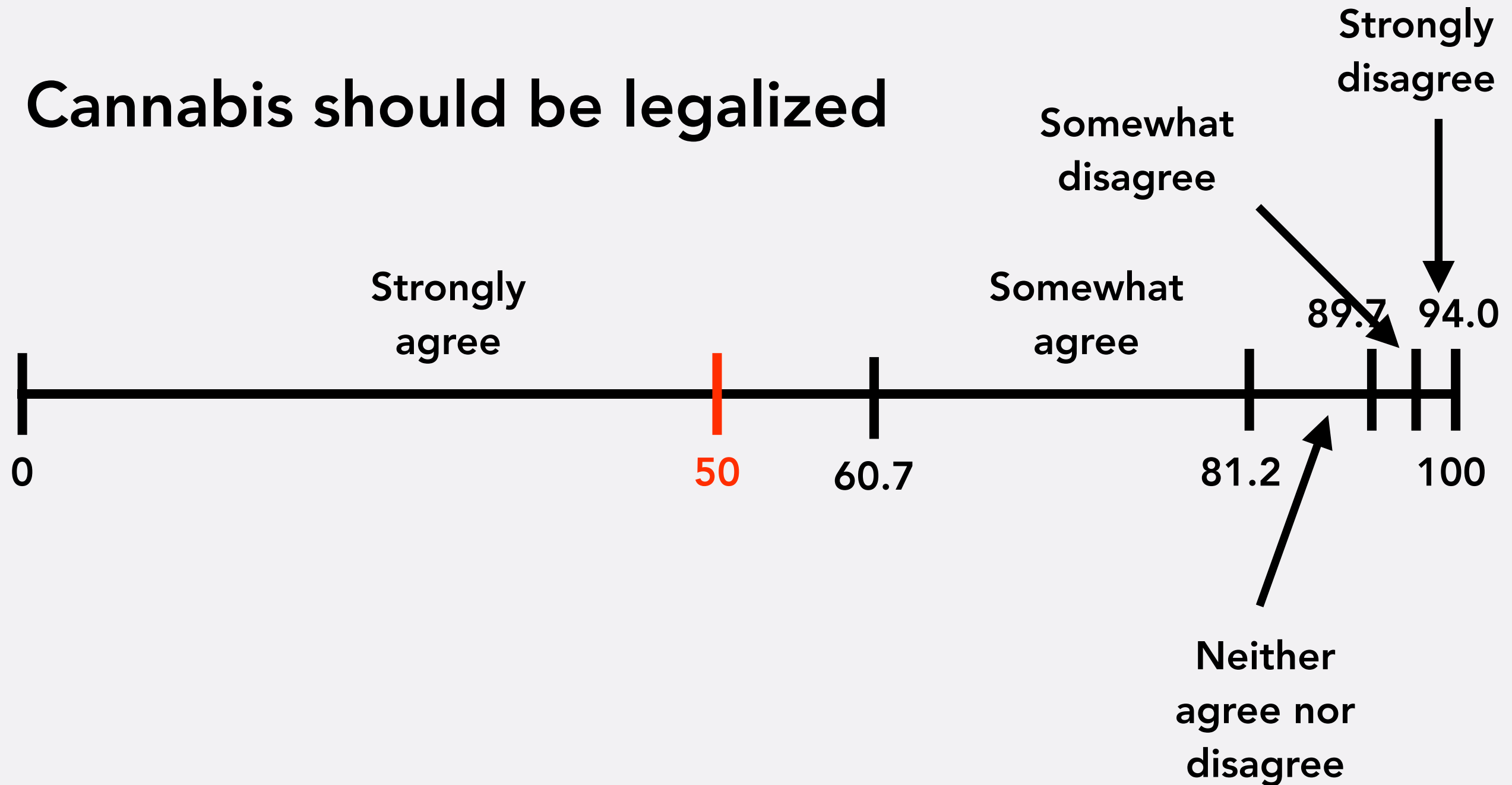
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- What central tendencies can we compute?

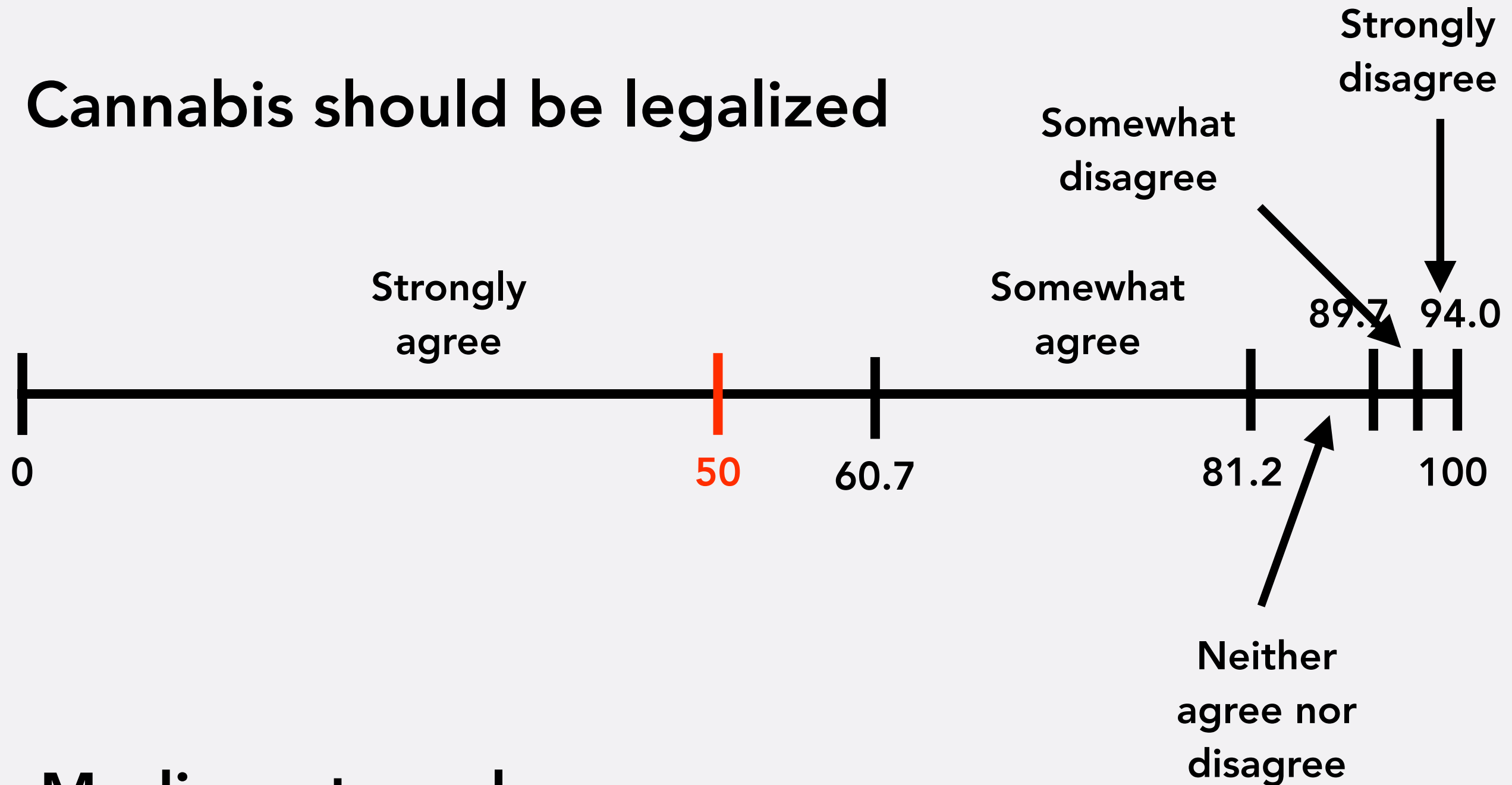
MEDIAN

- Cannabis should be legalized



MEDIAN

- Cannabis should be legalized



- Median: strongly agree

FREQUENCY TABLE

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- **Median:** Category whose cumulative percentage includes 50%

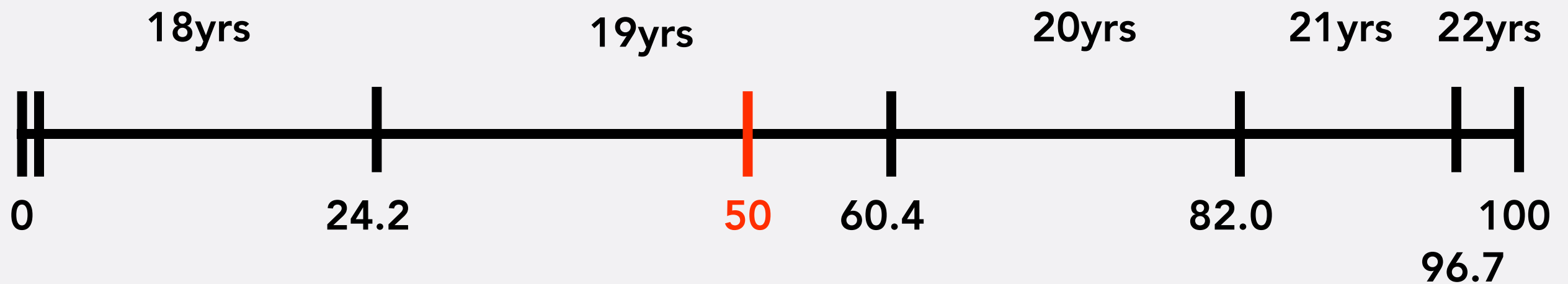
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20	25	21.6	82.0
21	17	14.7	96.7
22	4	3.4	100.1

- What central tendencies can we compute?

MEDIAN

- Age



- Median: ?

FREQUENCY TABLE

Age	Number	Percentage	Cumulative Percentage
17	1	0.9	0.9
18	27	23.3	24.2
19	42	36.2	60.4
20	25	21.6	82.0
21	17	14.7	96.7
22	4	3.4	100.1

Median

- Mode: 19

FREQUENCY TABLE

Age	Number	Percentage	Cumulative Percentage
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20	25	21.6	82.0
21	17	14.7	96.7
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- Mean: ?

FREQUENCY TABLE

Age	Number	Percentage	Cumulative Percentage
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20	25	21.6	82.0
21	17	14.7	96.7
22	4	3.4	100.1

- Mean: 1×17

FREQUENCY TABLE

Age	Number	Percentage	Cumulative Percentage
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18	27	23.3	24.2
19	42	36.2	60.4
20	25	21.6	82.0
21	17	14.7	96.7
22	4	3.4	100.1

- Mean: $1 \cdot 17 + 27 \cdot 18$

FREQUENCY TABLE

Age	Number	Percentage	Cumulative Percentage
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18	27	23.3	24.2
19	42	36.2	60.4
20	25	21.6	82.0
21	17	14.7	96.7
22	4	3.4	100.1

- Mean: $1 \cdot 17 + 27 \cdot 18 + 42 \cdot 19$

FREQUENCY TABLE

Age	Number	Percentage	Cumulative Percentage
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19	42	36.2	60.4
20	25	21.6	82.0
21	17	14.7	96.7
22	4	3.4	100.1

- Mean: $1 \cdot 17 + 27 \cdot 18 + 42 \cdot 19 + 25 \cdot 20$

FREQUENCY TABLE

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- Mean: $1 \cdot 17 + 27 \cdot 18 + 42 \cdot 19 + 25 \cdot 20 + 17 \cdot 21$

FREQUENCY TABLE

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- Mean: $1 \cdot 17 + 27 \cdot 18 + 42 \cdot 19 + 25 \cdot 20 + 17 \cdot 21 + 4 \cdot 22$

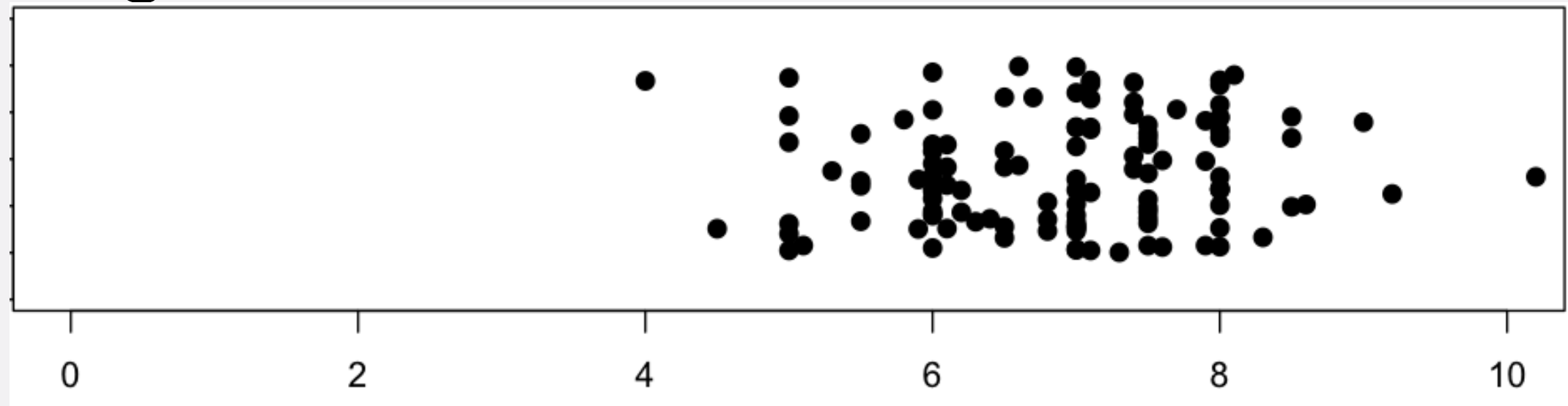
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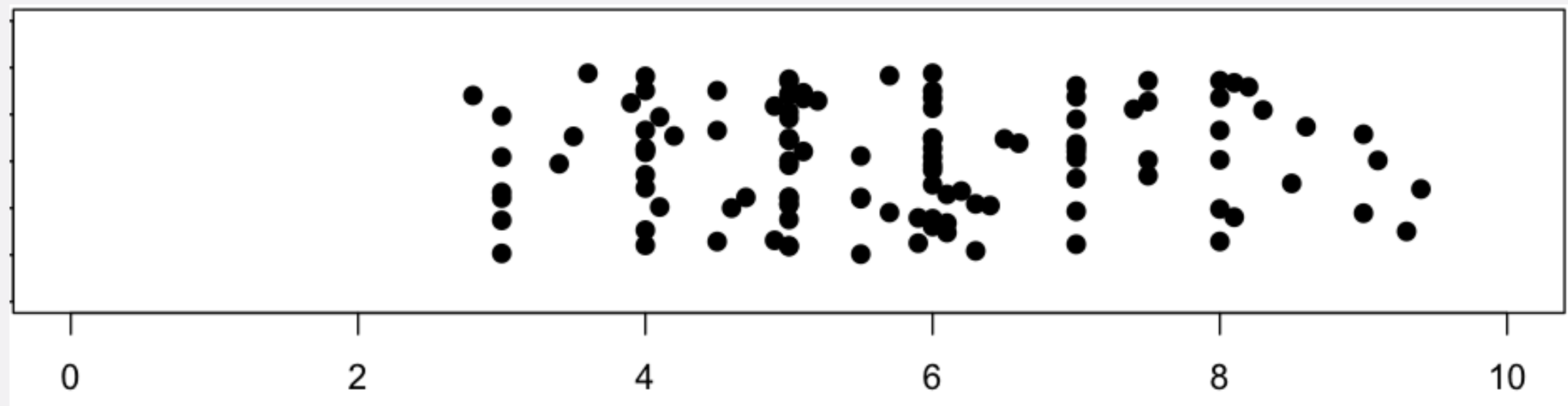
- Mean: $(1 \cdot 17 + 27 \cdot 18 + 42 \cdot 19 + 25 \cdot 20 + 17 \cdot 21 + 4 \cdot 22) / 116 = 19.4$

SLEEP

- How many hours to you sleep at night?
- Regular week:

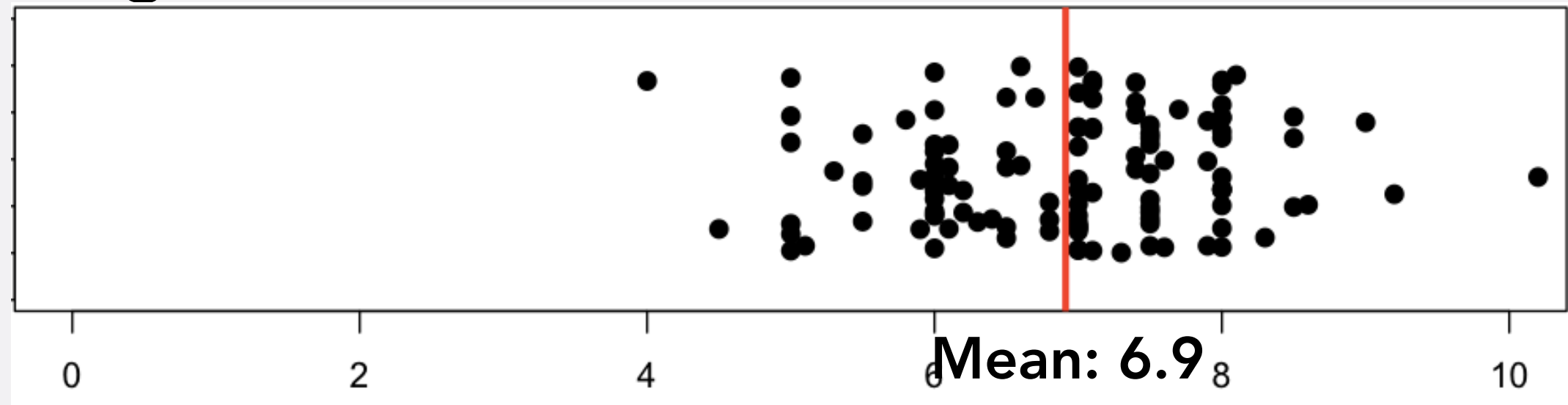


- Finals week:

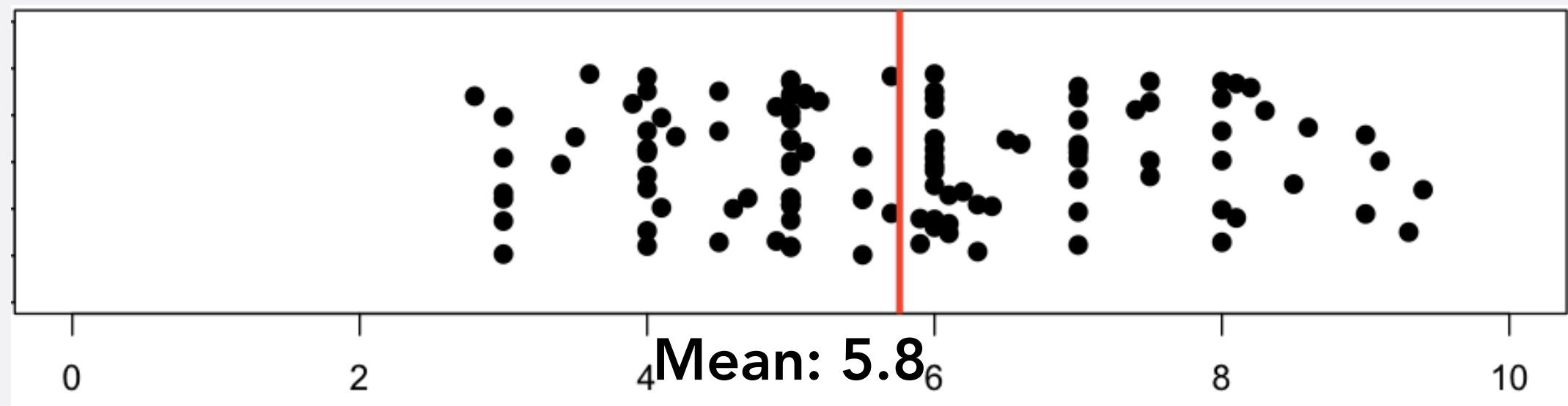


SLEEP

- How many hours to you sleep at night?
- Regular week:

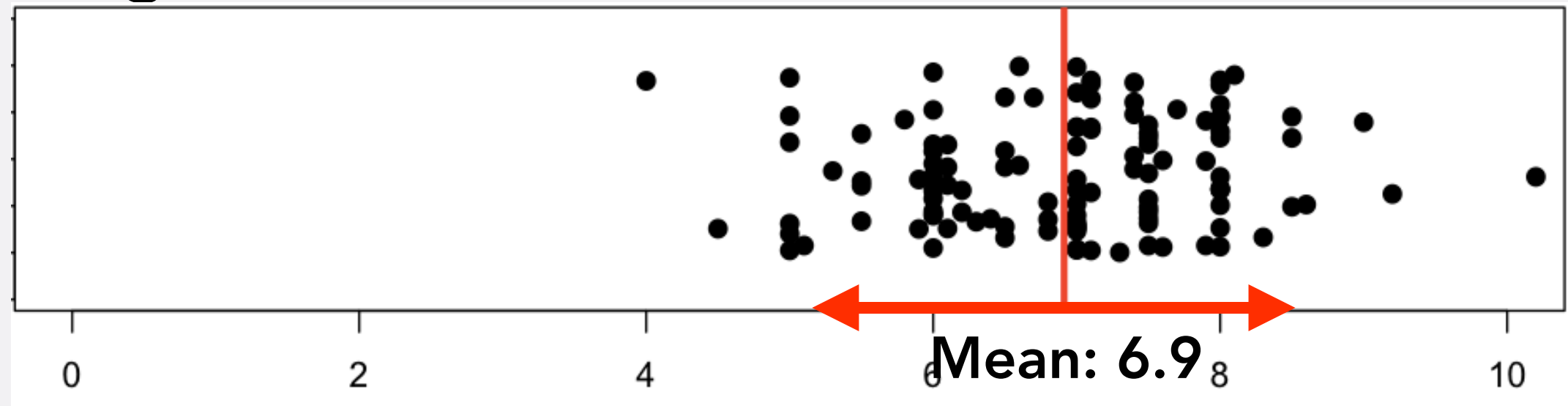


- Finals week:



DISPERSION

- How many hours to you sleep at night?
- Regular week:



- Finals week:

