Hypothetical Thinking about Statistics

A Seven-Minute Teaching Activity

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School kids involved in bullying

1. *Almost all* students are involved in bullying

2. *Very few* students are involved in bullying

How could both claims be true?

Source: http://www.kare11.com/rss/article/922571/14/Study-Half-of-Minn-students-bullied-or-bullies

Stat Ed teachers aware of student feelings

1. *Almost all* Stat Ed teachers are aware of their students' feelings toward statistics.

2. *Very few* Stat Ed teachers are aware of their students' feelings toward statistics.

How could both claims be true?

Students and Smoking

1. *Almost all* students are smokers.

2. *Very few* students are smokers.

How could both claims be true?

Principles

1. Restricting group decreases number; enlarging group increases number. [Bullying, Stat Ed teachers]
2. Increasing time period for an event increases the number. [Smokers]
3. Changing the denominator can change the numerator and the ratio. [Students]

Conclusion on Hypothetical Thinking

1. Social statistics are readily influenced by the definitions of groups, conditions or measures.
2. Students don't appreciate how opposing statistics can each be true depending on the definition.
3. Seeing the influence of the definition on a statistic requires hypothetical thinking.
4. Hypothetical thinking about "where statistics come from" is an essential component of statistical literacy.

2011 USCOTS 7

Conclusion on this Activity

Activity investigates influences on statistics.

- Involves multiple right answers.
- Can be done with almost any age-level.
- Presumes no knowledge of statistics.

- Helps distinguish statistics from math.
- Helps teach the importance of context.

2011 USCOTS 8

References

Schield, M. (2007a). Teaching the Social Construction of Statistics. Midwest Sociological Society. www.statlit.org/pdf/2007SchieldMSS.pdf

Schield, M. (2007b). Statistical Literacy: Factual Assessment to Support Hypothetical Thinking. IASE. www.statlit.org/pdf/2007SchieldIASE.pdf.

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2011 USCOTS 9

Teacher Discussion

In introductory statistics:

What are reasons **for** and **against** teaching hypothetical thinking about how statistics could be defined?