Unit 1: Introduction to data

4. Review of Unit 1

Sta 101 - Fall 2015

Duke University, Department of Statistical Science

Dr. Çetinkaya-Rundel

Slides posted at *http://bit.ly/sta101_f15*

Outline

1. Housekeeping

2. Be aware of Simpson's paradox

3. Application exercises

Announcements

- TBA

Outline

1. Housekeeping

2. Be aware of Simpson's paradox

3. Application exercises

Race and death-penalty sentences in Florida murder cases

A 1991 study by Radelet and Pierce on race and death-penalty (DP) sentences gives the following table:

Defendant's race	DP	No DP	Total	% DP
Caucasian	53	430	483	
African American	15	176	191	
Total	68	606	674	

Adapted from Subsection 2.3.2 of A. Agresti (2002), Categorical Data Analysis, 2nd ed., and

http://math.stackexchange.com/questions/83756/examples-of-simpsons-paradox.

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Defendant's race	DP	No DP	Total	% DP
Caucasian	53	430	483	*11%*
African American	15	176	191	*7.9%*
Total	68	606	674	

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Who is more likely to get the death penalty?

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Same data, taking into consideration victim's race:

Victim's race	Defendant's race	DP	No DP	Total	% DP
Caucasian	Caucasian	53	414	467	
Caucasian	African American	11	37	48	
African American	Caucasian	0	16	16	
African American	African American	4	139	143	
Total		68	606	674	

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Victim's race	Defendant's race	DP	No DP	Total	% DP
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Caucasian	African American	11	37	48	*22.9%*
African American	Caucasian	0	16	16	*0%*
African American	African American	4	139	143	*2.8%*
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Who is more likely to get the death penalty?

- People of one race are more likely to murder others of the same race, murdering a Caucasian is more likely to result in the death penalty, and there are more Caucasian defendants than African American defendants in the sample.

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- People of one race are more likely to murder others of the same race, murdering a Caucasian is more likely to result in the death penalty, and there are more Caucasian defendants than African American defendants in the sample.
- Controlling for the victim's race reveals more insights into the data, and changes the direction of the relationship between race and death penalty.
- This phenomenon is called *Simpson's Paradox*: An association, or a comparison, that holds when we compare two groups can disappear or even be reversed when the original groups are broken down into smaller groups according to some other feature (a confounding/lurking variable).

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Application exercise: 1.2 Scientific studies in the press

See the course website for instructions.

Application exercise: 1.3 Histogram to boxplot

See the course website for instructions.

Application exercise: 1.4 Randomization testing

See the course website for instructions.