

Diversity-Related Projects in an Introductory Statistics Course



Kirsten Doehler (Associate Professor of Statistics)
Laura Taylor (Associate Professor of Statistics)



ELON
UNIVERSITY

Outline



- Project History
- SNAP Data
- Project Goals and Details
 - ◆ Project 1
 - ◆ Project 2
 - ◆ Presentation
- Findings related to Diversity Inventory and Reflection Questions
- Conclusions

Project History



- First iteration of project came from a Diversity Infusion Project Grant in 2013
 - We tried to find numerous diversity-themed data sets
 - Challenges in finding non-categorical data
- We were asked to do a Phase II part of the project in 2015
 - Article on the “Food Stamp Challenge” motivated us to use publicly available SNAP data (all groups used same data set)
 - Two themes in SNAP data are socioeconomic status & race

Accessing SNAP Data

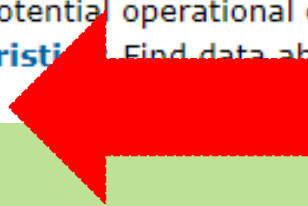


United States Department of Agriculture Food and Nutrition Service. (2017). Research.

<https://www.fns.usda.gov/ops/research-and-analysis>

Additional Resources

- **Study and Evaluation Plans:** Description of FNS's annual research agendas
- **Grant/Demonstration Projects:** Projects to examine special areas of program performance or participants needs or to test potential operational or policy improvements.
- **SNAP Community Characteristic Data:** Find data about your community and its SNAP households.
- **SNAP Quality Control Data**



Accessing SNAP Data



Supplemental Nutrition Assistance Program Quality Control Data

Public Use Files

2016 SNAP Data

[2016 SNAP QC Data \(SAS Format - Zipped\)](#)

[2016 SNAP QC Data \(SAS Transport Format - Zipped\)](#)

[2016 SNAP QC Data \(Stata Format - Zipped\)](#)

[2016 SNAP QC Data \(SPSS - Zipped\)](#)

[2016 SNAP QC Data \(CSV - Zipped\)](#)

[2016 SNAP QC Technical Documentation \(PDF format\)](#)

2015 SNAP Data

[2015 SNAP QC Data \(SAS Format - Zipped\)](#)

[2015 SNAP QC Data \(SAS Transport Format - Zipped\)](#)

[2015 SNAP QC Data \(Stata Format - Zipped\)](#)

[2015 SNAP QC Data \(SPSS - Zipped\)](#)

[2015 SNAP QC Data \(CSV - Zipped\)](#)

[2015 SNAP QC Technical Documentation \(PDF format\)](#)

Raw SNAP Data



EDUCATION LEVEL PERSON 1	EDUCATION LEVEL PERSON 2	EDUCATION LEVEL PERSON 3	EDUCATION LEVEL PERSON 4	EDUCATION LEVEL PERSON 5	EDUCATION LEVEL PERSON 6	EDUCATION LEVEL PERSON 7
12	13	12	9	6	4	3
12	.	.	.	.	.	.
11	.	.	.	.	.	.
B	.	.	.	.	.	.
13	2	0	0	.	.	.
13	.	.	.	.	.	.
10	13	0	0	0	0	.
13	0	.	.	.	.	.
12	.	.	.	.	.	.
12	.	.	.	.	.	.
13	.	.	.	.	.	.
14	.	.	.	.	.	.
12	11	12	0	.	.	.
12	4	.	.	.	.	.
12	.	.	.	.	.	.
14	0	.	.	.	.	.
12	.	.	.	.	.	.
12	12	7	6	3	6	3

Project SNAP Data




	A	B	C
1	race	age	sex
2	2	32	2
3	7	23	2
4	7	41	2
5	2	52	1

	A	B	C	D	E	F
1	STATUS	race	YRSED	EMPSTB	age	sex
2	2	2	12	4	55	2
3	1	7	12	1	51	2
4	1	7	14	1	39	2
5	2	2	12	4	33	2

Project SNAP Data




Contains all SNAP recipients (children and adults)



	A	B	C
1	race	age	sex
2	2	32	2
3	7	23	2
4	7	41	2
5	2	52	1

Contains head of household SNAP recipients



	A	B	C	D	E	F
1	STATUS	race	YRSED	EMPSTB	age	sex
2	2	2	12	4	55	2
3	1	7	12	1	51	2
4	1	7	14	1	39	2
5	2	2	12	4	32	2

Project Goals



Students will...	P1	P2	Pres.
... recognize and evaluate any preconceived notions on the race of SNAP recipients and connect the trends in the data to larger population trends.	✓		
... formulate their own question about real data that can be answered using methods learned in the course.		✓	
... gain experience working with real, large, raw data sets.	✓	✓	
... select an appropriate analysis method for quantitative or categorical data.	✓	✓	
... perform statistical analysis using statistical software.	✓	✓	
... communicate statistical results in writing to a general audience.	✓	✓	
... familiarize themselves with the basic provisions of SNAP benefits and develop a meal plan that meets budgetary restrictions.			✓
... communicate statistical results orally to a general audience.			✓

Project 1 Details



- Students work in teams using a SNAP data set with $n=500$ responses.
 - Data contains the variables: race, age, and sex
- The research question is to analyze the race variable for the SNAP data.
 - Students use confidence intervals for proportions
- Comparisons to population demographics are made.
- Project 1 results in a written report.

Project 1 Details



Some challenges:

- The variable race is coded 1-22 to represent 22 distinct race/ethnicity categories.
 - Students are asked to condense these categories into 6 broader race categories.
 - Students must use the code book to understand the data, e.g.,
 - 2 = Not found on application
 - 14 = (Hispanic or Latino) and Asian
 - 8 = (American Indian or Alaska Native) and white
- Some students incorrectly interpreted the data as percent of population with each race (as opposed to percent of SNAP recipients of that race).

Project 2 Details



- Students work in teams using a SNAP data set with $n=500$ responses.
 - Data contains the variables: status of benefits, race, years of education, employment status, age, and sex
- Students design their own research question.
 - Generally students could work with ANOVA, Chi-Squared Tests, Confidence Intervals for Proportion, or Regression
- Project 2 results in a written report.

Project 2 Details



Some challenges:

- Several variables are coded in the data and require referencing a code book.
- Students have similar interpretation issues as Project 1.
- Students struggle to determine what analysis methods to use for the questions they ask.

Presentation



- The presentation has two components:
 1. Present results of Project 2.
 2. Present a meal plan for their group (family unit) for one week under SNAP benefit requirements.
 - Must plan for a breakfast, lunch, and dinner each day.
 - For 2018, the average monthly benefit is about \$456 for a family of 4 (source: “A Quick Guide to SNAP Eligibility and Benefits” from the Center on Budget and Policy Priorities website)
- As part of the research study, students reflected on the meal plans they had made and general challenges for individuals on SNAP benefits.

Presentation



Some challenges:

- A few students saw the meal plan budget as a challenge to come under budget. This trivialized the challenges of providing meals for a family on a SNAP benefits budget.
- Students are unfamiliar with the cost of groceries.

Recommendations:

- Have students do research on SNAP eligibility
- Have students read articles on food insecurity and/or challenges of individuals living in poverty or lower-income households

Research Methods



- Pre/Post M-GUDS short form (M-GUDS = Miville-Guzman Universality-Diversity Short form)
- Example M-GUDS item: Knowing about the different experiences of other people helps me understand my own problems better.
- Example M-GUDS item: It's really hard for me to feel close to a person from another race.
- Reflection questions in post-test (after presentations were completed)

Research Study Demographics



- 48 students from the “Statistics in Application” course participated in the study and completed both the pre- and post-inventories
- 28 (58.3%) females and 20 (41.7%) males
- 40 (83.3%) identified as Caucasian, 3(6.3%) identified as African American, 1(2.1%) as Asian, 1(2.1%) as Hispanic or Latino (2.1%), and 2(4.2%) as Multiracial
- Most students were not statistics majors

Findings related to Diversity Inventory



M-GUDS short form

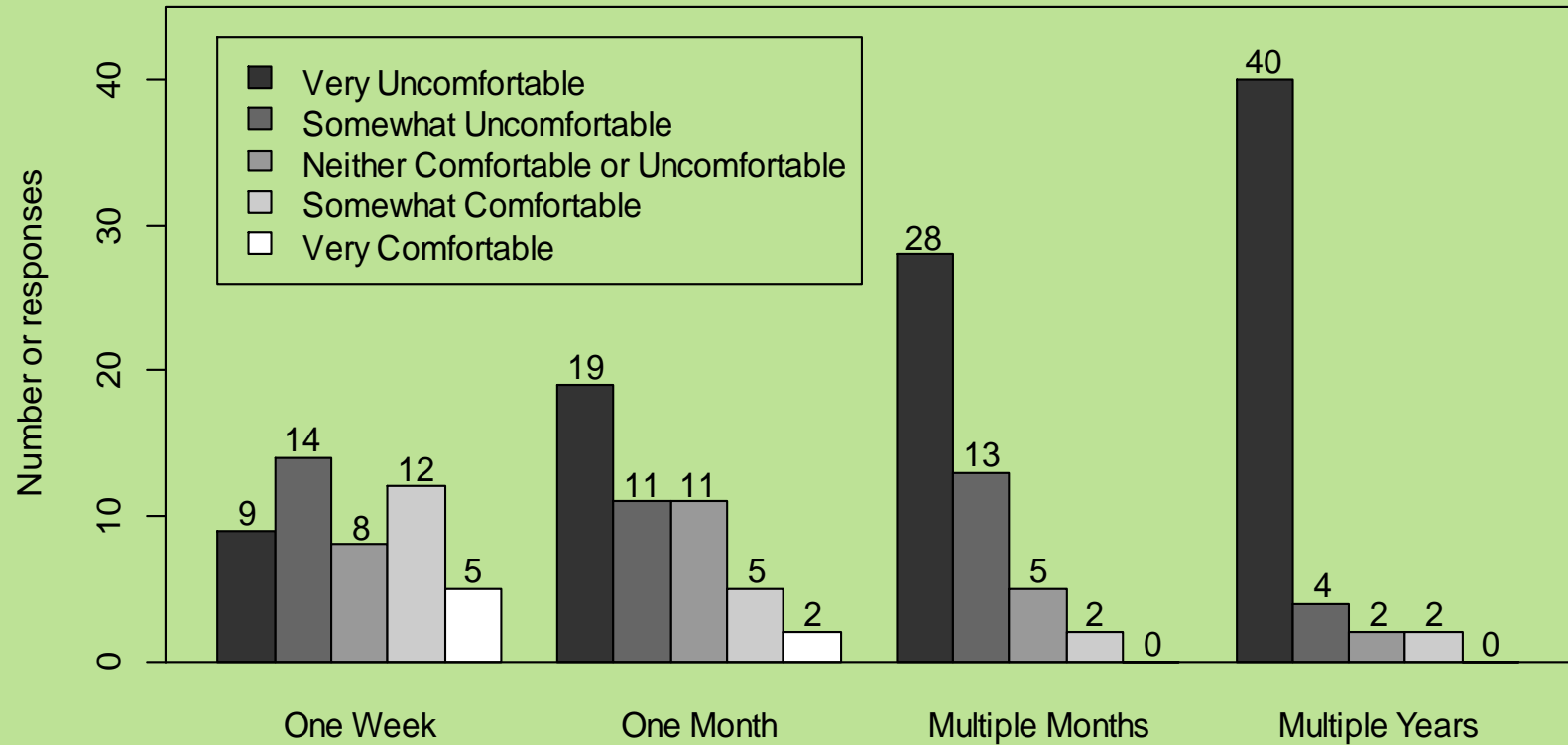
- There was not a significant difference in the overall scores between the pre and post inventories, regardless of whether a T-test ($p = 0.0771$) or a Signed-Rank test as utilized ($p = 0.1318$).
- 1 of the 3 subscales was significant based on a T-test p-value

Subscale	Average Difference (Post – Pre)	95% Conf. Interval (Post – Pre)	2-sided T-test p-value	2-sided Signed Rank Test p-value
Diversity of Contact	0.83	(0.02, 1.65)	0.0454	0.0669
Relativistic Appreciation	0.48	(-0.48, 1.39)	0.2940	0.4598
Comfort With Differences	0.19	(-0.62, 1.00)	0.6443	0.9458

Responses to Reflection Questions



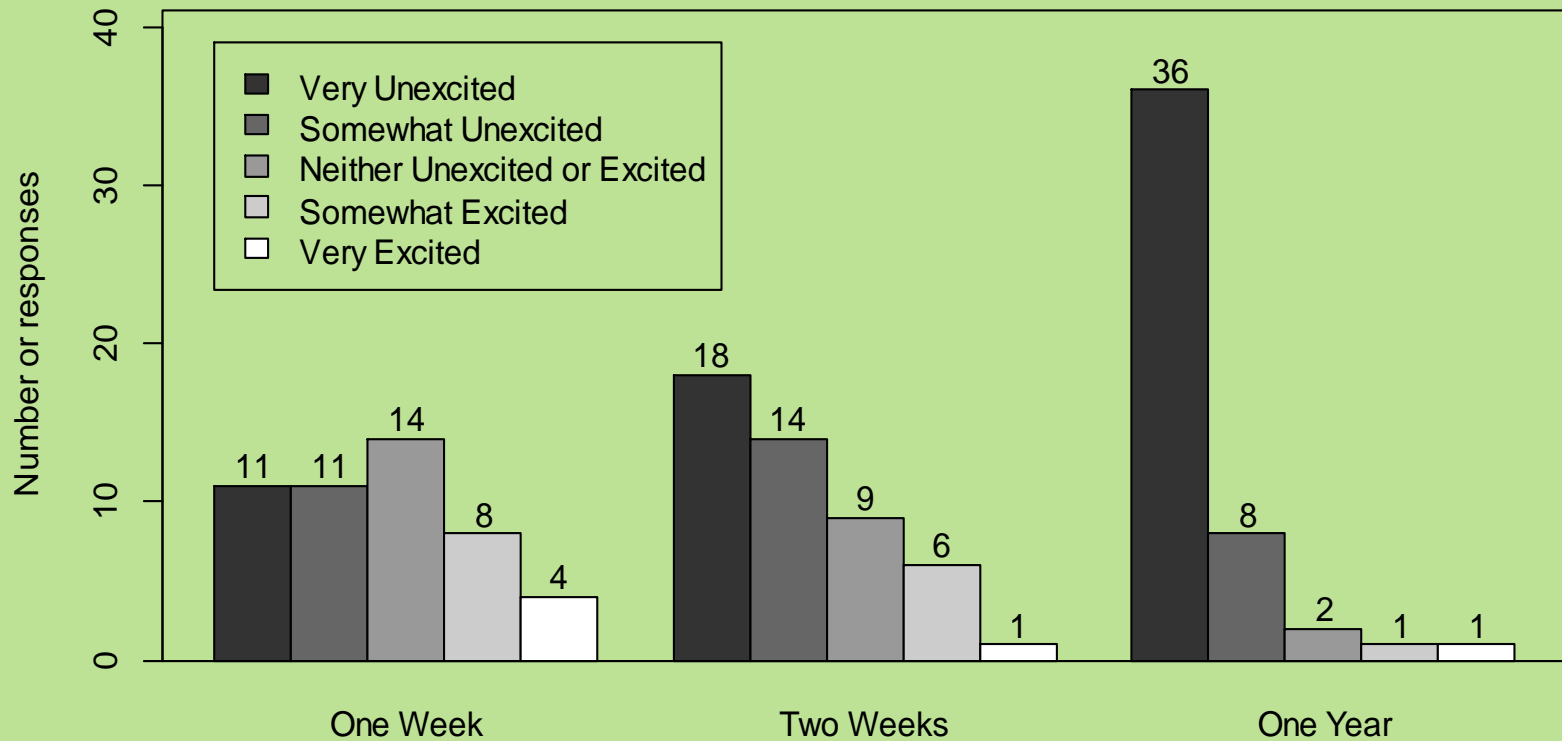
Comfort Level with giving children meals like this for ...



Responses to Reflection Questions



Excitement Level to eat this menu for ...



Responses to Reflection Questions



What reflections do you have on the challenges for individuals who receive SNAP benefits?”

	Empathy for or Challenges of People on SNAP benefits	Nutritional limitations of SNAP benefits	Limitations of SNAP benefits
Responses indicative of this sentiment	32 (66.7%)	17 (35.4%)	7 (14.6%)
Responses not indicative of this sentiment	16 (33.3%)	31 (64.6%)	41 (85.4%)
Total Responses	48	48	48

Example Responses



Student response	Theme(s)
It is so hard to imagine the struggles these people would face, given how challenging it was for our group of 6 college students to figure it out!	Empathy/Challenges
It made me realize how hard it is for people on SNAP benefits to eat healthy and to provide enough food for their family. And it really made me appreciate the money I have for food.	Empathy/Challenges, Nutritional Limitations
It's often hard to make ends meet and I have a newfound level of respect for people who have no other choice but to use SNAP benefits.	Empathy/Challenges
There was not enough money to feed us. Especially myself because I play <<a sport>> and need much more food than we had.	Limitations of SNAP

Conclusions



- Insignificant overall M-GUDS results.
- SNAP project provides an opportunity for students to work on a project which helps them gain statistical skills while simultaneously thinking critically about issues of diversity and social justice. Therefore, regardless of M-GUDS results, it's worth trying.
- Including additional written reflections throughout the project could be beneficial.

“It is better to know some of the questions than all of the answers.” – James Thurber

Questions?



Kirsten Doehler

Associate Professor of Statistics
Elon University
kdoehler@elon.edu



Laura Taylor

Associate Professor of Statistics
Elon University
ltaylor18@elon.edu

