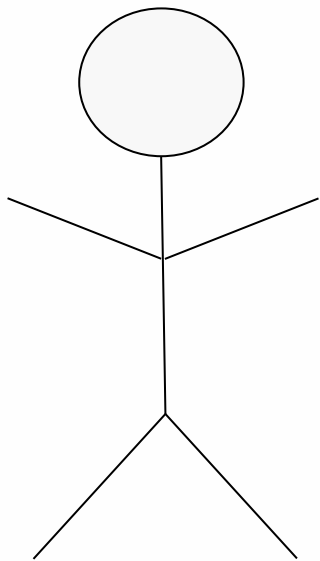# Looking at Associations with Multivariate Categorical Data

Julie Deeke and Tim NeCamp
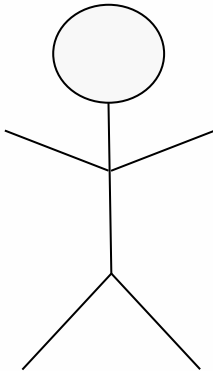
Gathering Multivariate Categorical Data

What is your **gender**?
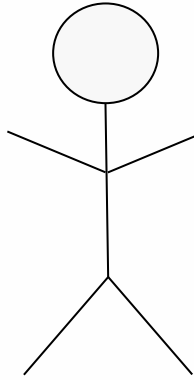
What is your **marital status**?

What is your highest **education level**?

What is your **age grouping**?

Recording Multivariate Categorical Data

Gender	Education	Partner_Status	Age
Male	HS grad or GED	Never	18to29
Female	Some college or AA	Current	30to44
Male	HS grad or GED	Never	18to29
Female	HS grad or GED	Never	30to44
Male	College grad	Current	60plus
Female	College grad	Current	30to44
Male	HS grad or GED	Current	45to59
Male	HS grad or GED	Past	60plus
Male	College grad	Current	45to59
Male	College grad	Current	30to44
Male	College grad	Current	60plus
Male	HS grad or GED	Never	18to29
Female	Some college or AA	Current	30to44
Male	HS grad or GED	Past	60plus
Male	Some college or AA	Current	30to44

Univariate Categorical Data Table

Highest Education Level Attained	Less than HS degree	1331
	HS degree or GED	1166
	Some college or AA	1656
	College degree or above	1396

Research Question: What factors influence the highest education level attained?

Two-way Table of Education and Gender

		Female	Male
Highest Education Level Attained	Less than HS degree	644	687
	HS degree or GED	552	614
	Some college or AA	894	762
	College degree or above	724	672

Two-way Table of Education and Gender

		Female	Male	Total
Highest Education Level Attained	Less than HS degree	644	687	1331
	HS degree or GED	552	614	1166
	Some college or AA	894	762	1656
	College degree or above	724	672	1396
	Total	2814	2735	5549

Two-way Table of Education and Gender

		Female	Male	Total
Highest Education Level Attained	Less than HS degree	644	687	1331
	HS degree or GED	552	614	1166
	Some college or AA	894	762	1656
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	College degree or above	724	672	1396
	Total	2814	2735	5549

Two-way Table of Education and Gender

		Female	Male	Total
Highest Education Level Attained	Less than HS degree	644 (11.6%)	687	1331
	HS degree or GED	552	614	1166
	Some college or AA	894	762	1656
	College degree or above	724	672	1396
	Total	2814	2735	5549

Two-way Table of Education and Gender

		Female	Male	Total
Highest Education Level Attained	Less than HS degree	644 (11.6%)	687 (12.4%)	1331
	HS degree or GED	552 (9.9%)	614 (11.1%)	1166
	Some college or AA	894 (16.1%)	762 (13.7%)	1656
	College degree or above	724 (13.0%)	672 (12.1%)	1396
	Total	2814	2735	5549 (100%)

Marginal Distribution of Education Level

		Female	Male	Total
Highest Education Level Attained	Less than HS degree	644	687	1331 (24.0%)
	HS degree or GED	552	614	1166 (21.0%)
	Some college or AA	894	762	1656 (29.8%)
	College degree or above	724	672	1396 (25.2%)
	Total	2814	2735	5549 (100%)

Univariate Bar Chart
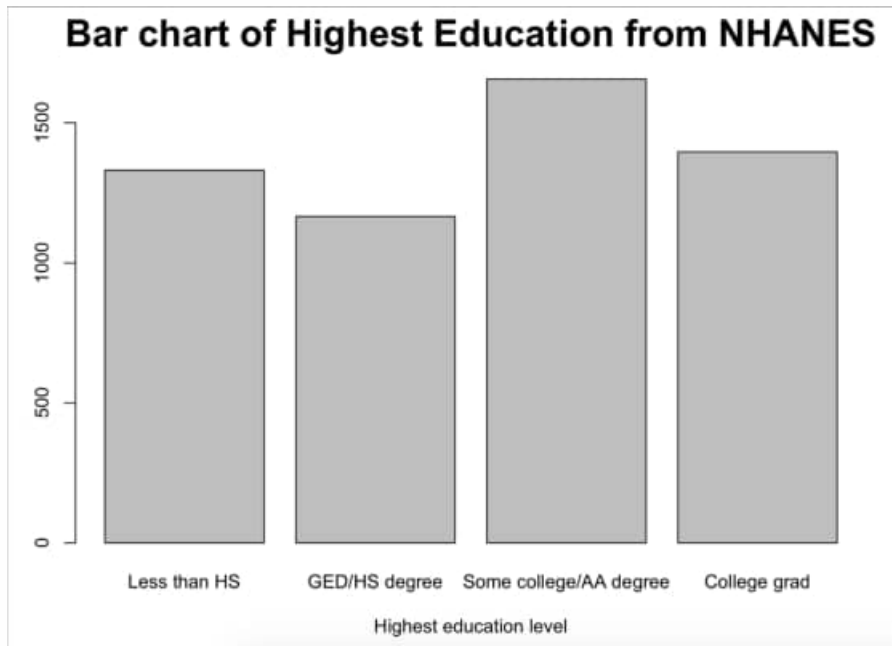
Conditional Distributions of Education Level

		Female	Male	Total
Highest Education Level Attained	Less than HS degree	644	687	1331
	HS degree or GED	552	614	1166
	Some college or AA	894	762	1656
	College degree or above	724	672	1396
	Total	2814	2735	5549

Two Univariate Bar Charts
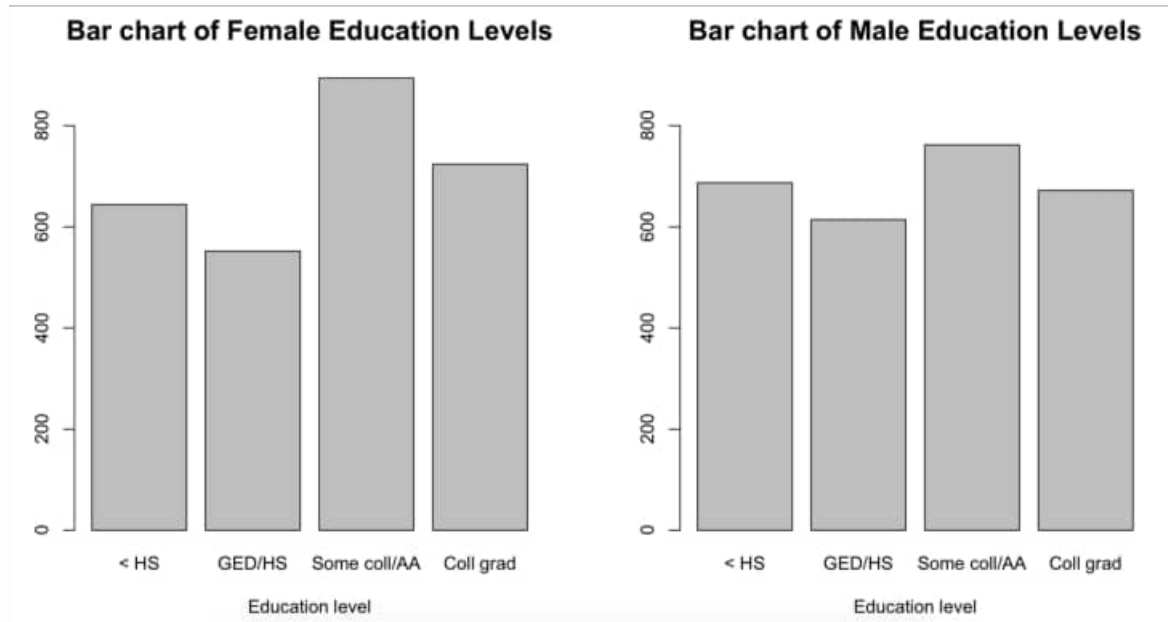
Conditional Distributions of Education Level

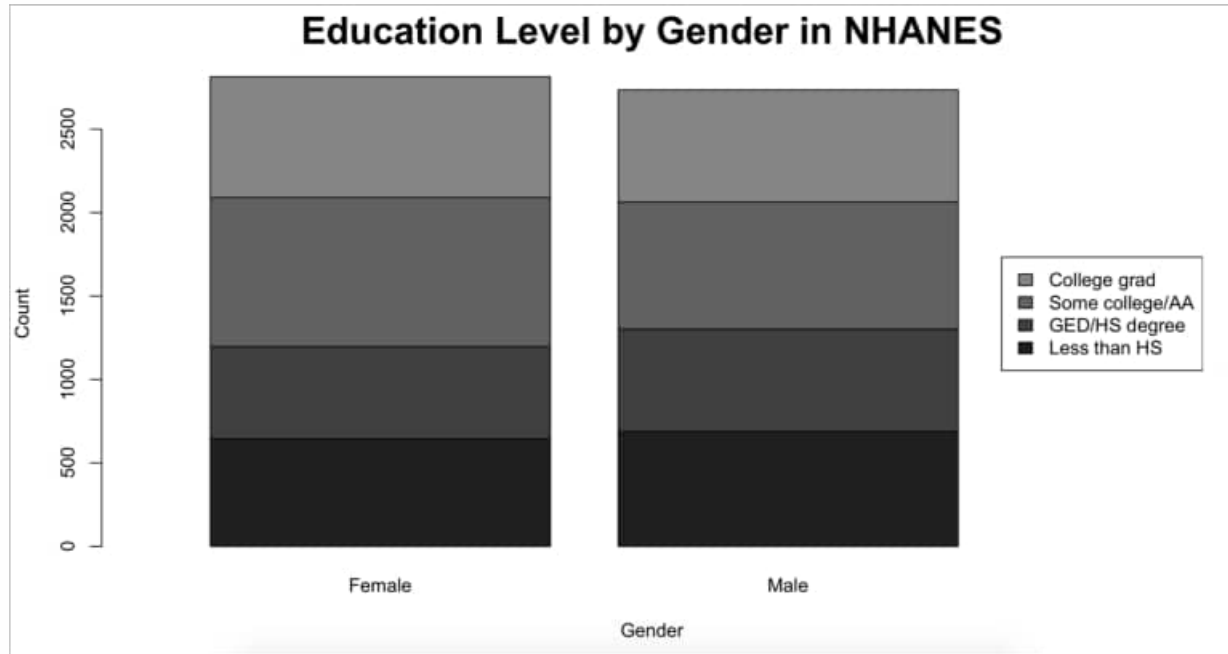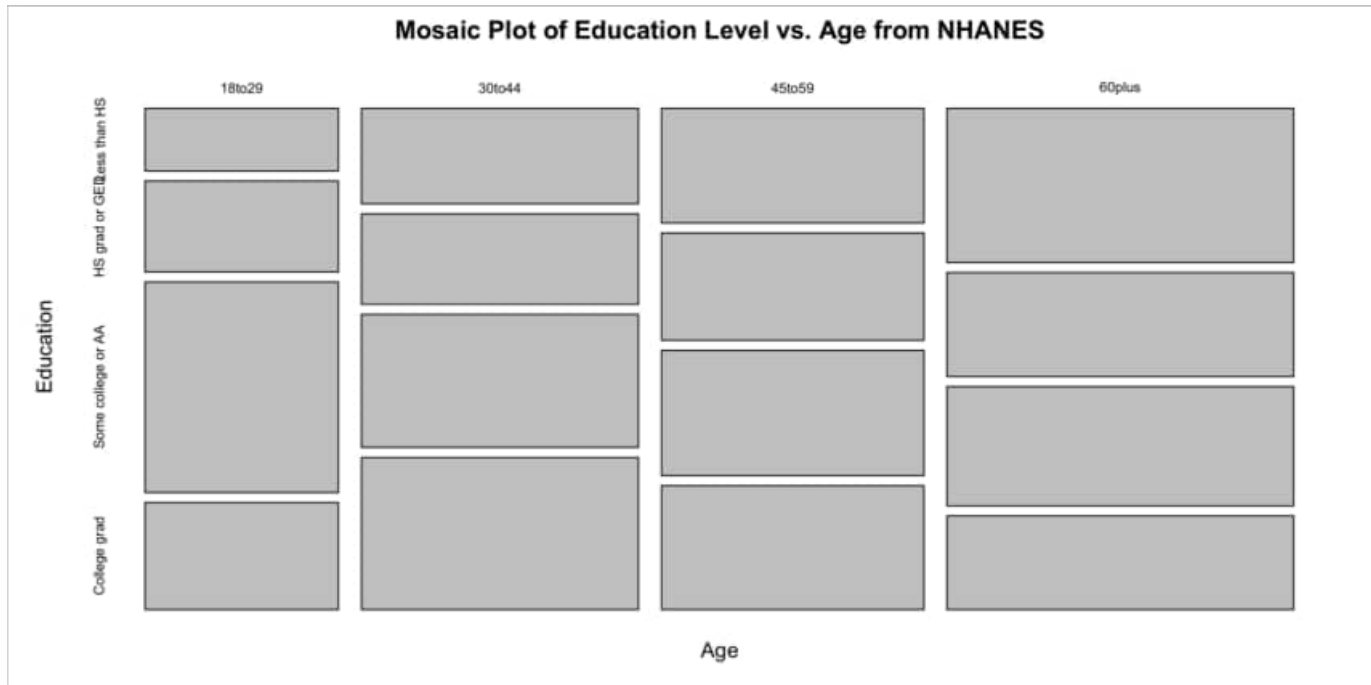|		Female	Male	Total
Highest Education Level Attained	Less than HS degree	644 (22.9%)	687 (25.1%)	1331
	HS degree or GED	552 (19.6%)	614 (22.4%)	1166
	Some college or AA	894 (31.8%)	762 (27.9%)	1656
	College degree or above	724 (25.7%)	672 (24.6%)	1396
	Total	2814 (100%)	2735 (100%)	5549

Side-by-side Bar Chart of Education Level
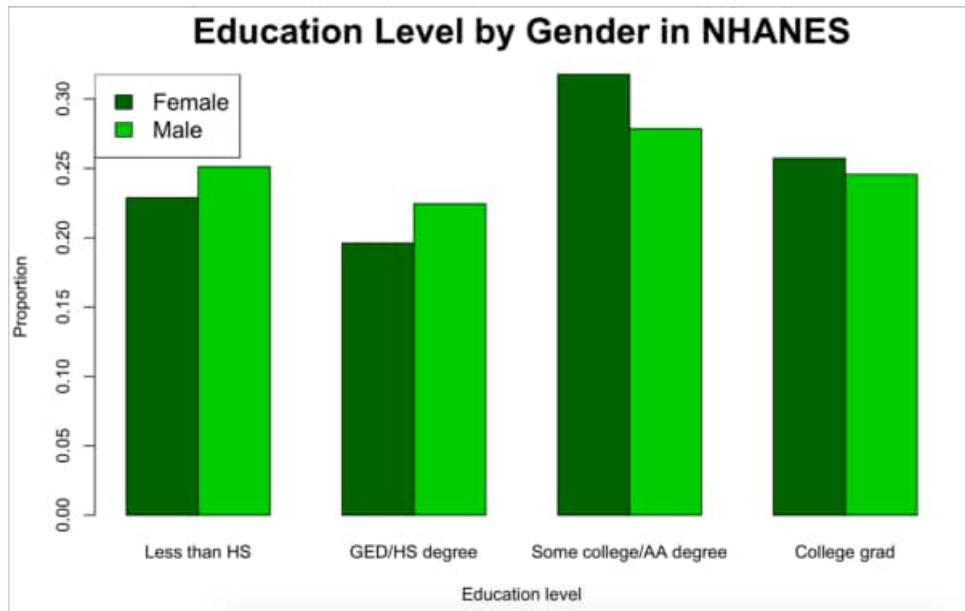
Stacked Bar Chart of Education Level

Mosaic Plot of Education Level and Age

Mosaic Plot of Education Level, Age, and Gender

Summary

- Multivariate Categorical Data
- Two-way or Contingency Tables
- Marginal and Conditional Distributions
- Graphs: Bar Charts, Side-by-side Bar Charts, Stacked Bar Charts, and Mosaic Plots