Making Comparisons

POSC 3410 – Quantitative Methods in Political Science

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Goal for Today

Introduce students to basic making of comparisons between an independent variable and dependent variable.

Theories and Hypotheses

We previously discussed the importance of theory-writing.

- Theories are conceptual, representing your ideas and arguments.
    - It's the hardest part of political science, but the most important.

Some general things to consider:

- "Keep it Kosher"
- Speak conceptually. Test operationally.
- Don't fit theory to data.

We also discussed proper construction of hypotheses (i.e. testable statements).

Making Comparisons

This lecture will instruct on how to make comparisons among your independent variable and dependent variable.

- Consider this a kind of "first cut" of inferential statistics.
- A lot of peer-reviewed scholarship begins with the following tools.

We will begin to see if there is a preliminary association between our independent variable and dependent variable.

Cross-tabulation

A **cross-tabulation** has three rules in its presentation.

1. Independent variable is the column. Dependent variable is the row.
2. *Always* calculate percentages for the *independent* variable.
3. Interpret a cross-tab by comparing columns across the *same* value of the dependent variable.

Gun Control Opinions, by Partisanship

Table 3-1 Gun Control Opinions, by Partisanship (cross-tabulation)

Opinion on gun permits	Party identification			Total
	Democrat	*Independent*	*Republican*	
Favor	87.0%	79.1%	68.8%	79.1%
	(407)	(382)	(243)	(1,032)
Oppose	13.0%	20.9%	31.2%	20.9%
	(61)	(101)	(110)	(272)
Total	100.0%	100.0%	100.0%	100.0%
	(468)	(483)	(353)	(1,304)

Source: 2008 General Social Survey.

Note: Question: "Would you favor or oppose a law which would require a person to obtain a police permit before he or she could buy a gun?"

Support for Gay Marriage, by Age.

Table 3-2 Support for Gay Marriage, by Age (cross-tabulation)

	Age group					
Gay marriage allowed?	*18–30*	*31–40*	*41–50*	*51–60*	*61–older*	Total
Allowed	60.3%	49.1%	35.2%	28.7%	20.2%	39.2%
	(325)	(182)	(154)	(114)	(98)	(873)
Not allowed	39.7%	50.9%	64.8%	71.3%	79.8%	60.8%
	(214)	(189)	(283)	(283)	(387)	(1,356)
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
	(539)	(371)	(437)	(397)	(485)	(2,229)

Source: 2008 American National Election Study.

Note: Question: "Should same-sex couples be allowed to marry, or do you think they should not be allowed to marry?" In Table 3-2, "not allowed" combines respondents who chose "should not be allowed" with respondents who volunteered the response that gays "should not be allowed to marry but should be allowed to legally form a civil union." (Based on variable V083214.)

Mean Comparisons

When our dependent variable is interval, we can use a **mean comparison table**.

- It shows the mean of a dependent variable for different values of the independent variable.

Political Rights and Freedoms, by Country per Capita GDP

Table 3-3 Political Rights and Freedoms, by Country Per Capita GDP

Country per capita GDP	Mean score[a]
Low	5.4
	(42)
Medium-low	6.4
	(43)
Medium-high	8.1
	(44)
High	10.1
	(43)
Total	7.5
	(172)

Source: Per capita GDP based on data from the World Bank, World Development Indicators (2008). Political rights and freedoms score based on data from Freedom House, www.freedomhouse.org. All variables were compiled by Pippa Norris, John F. Kennedy School of Government, Harvard University, and made available on her Web site, pippanorris.com.

[a] Score calculated by summing the Freedom House 7-point political rights index and the 7-point civil liberties index. Combined index was rescaled to range from 0 (fewest rights and freedoms) to 12 (most rights and freedoms). Data are for 2008.

Bar Charts and Line Charts

Graphically displaying data will help us make comparisons.

- Both communicate percentages or means of a dependent variable, for each value of an independent variable.
- Differ in representation (bars or markers connected by lines).

In each case, the independent variable is the x-axis. Dependent variable is the y-axis.

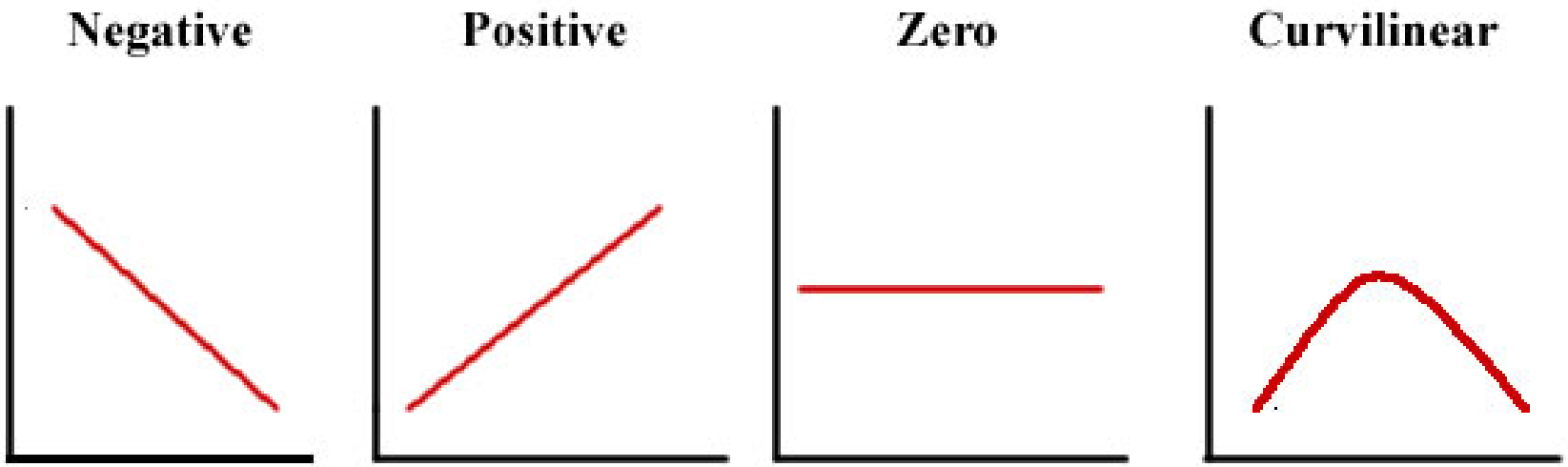
Types of Relationships

There are four types of relationships

1. Positive
2. Negative
3. Curvilinear
4. Zero

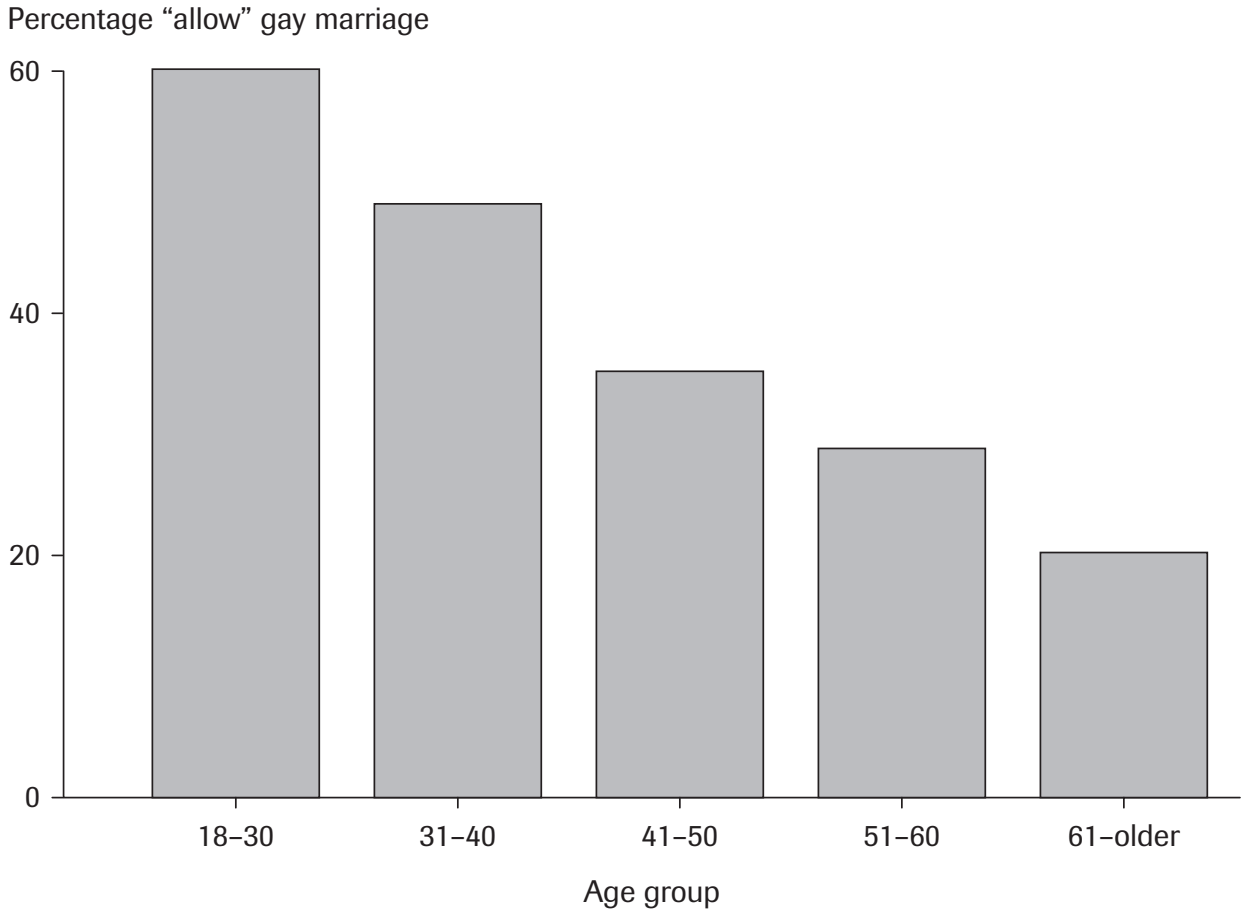
Types of Relationships

Note: curvilinear may also be a "normal-U"



Support for Gay Marriage, by Age

Figure 3-1 Support for Gay Marriage, by Age (bar chart)

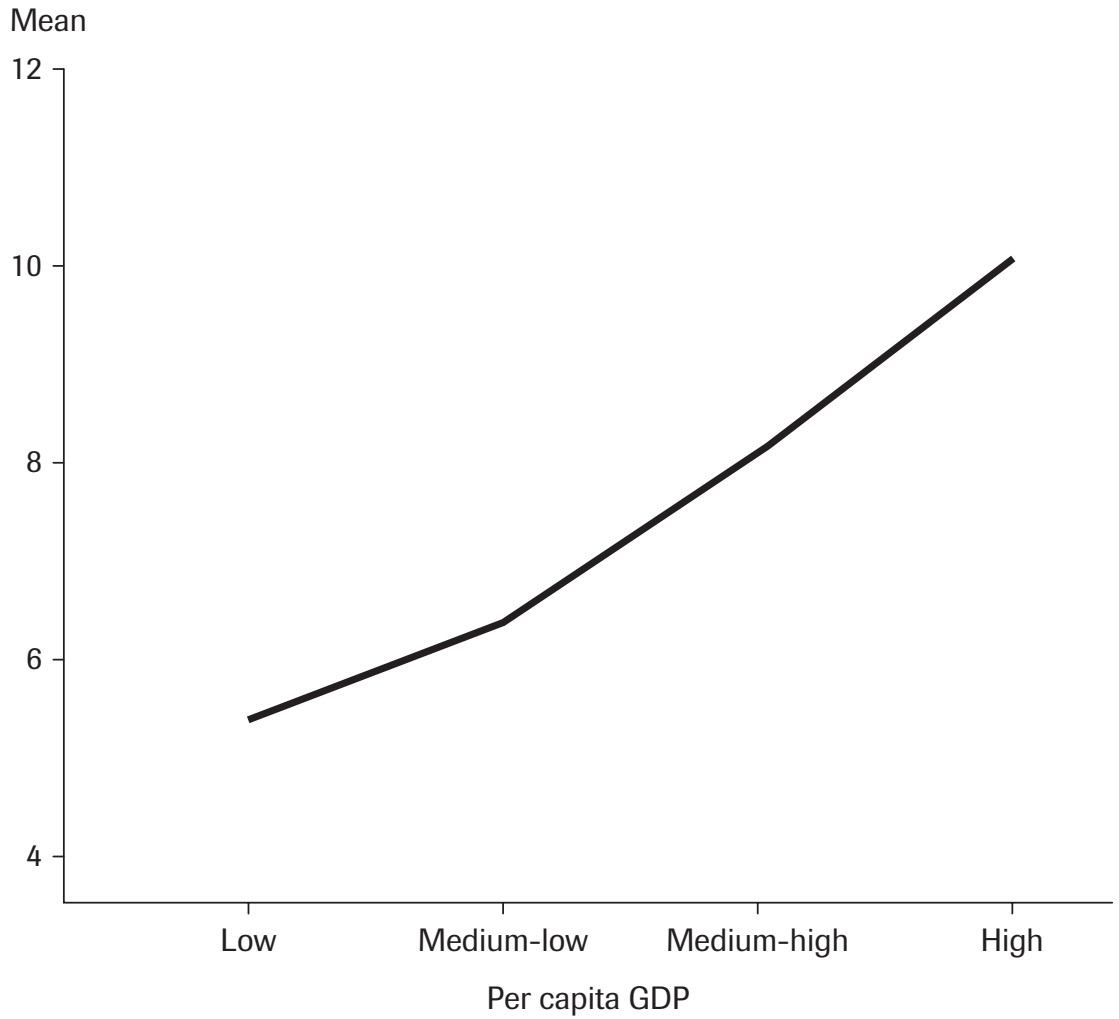


Source: 2008 American National Election Study.

Note: Question: "Should same-sex couples be allowed to marry, or do you think they should not be allowed to marry?"

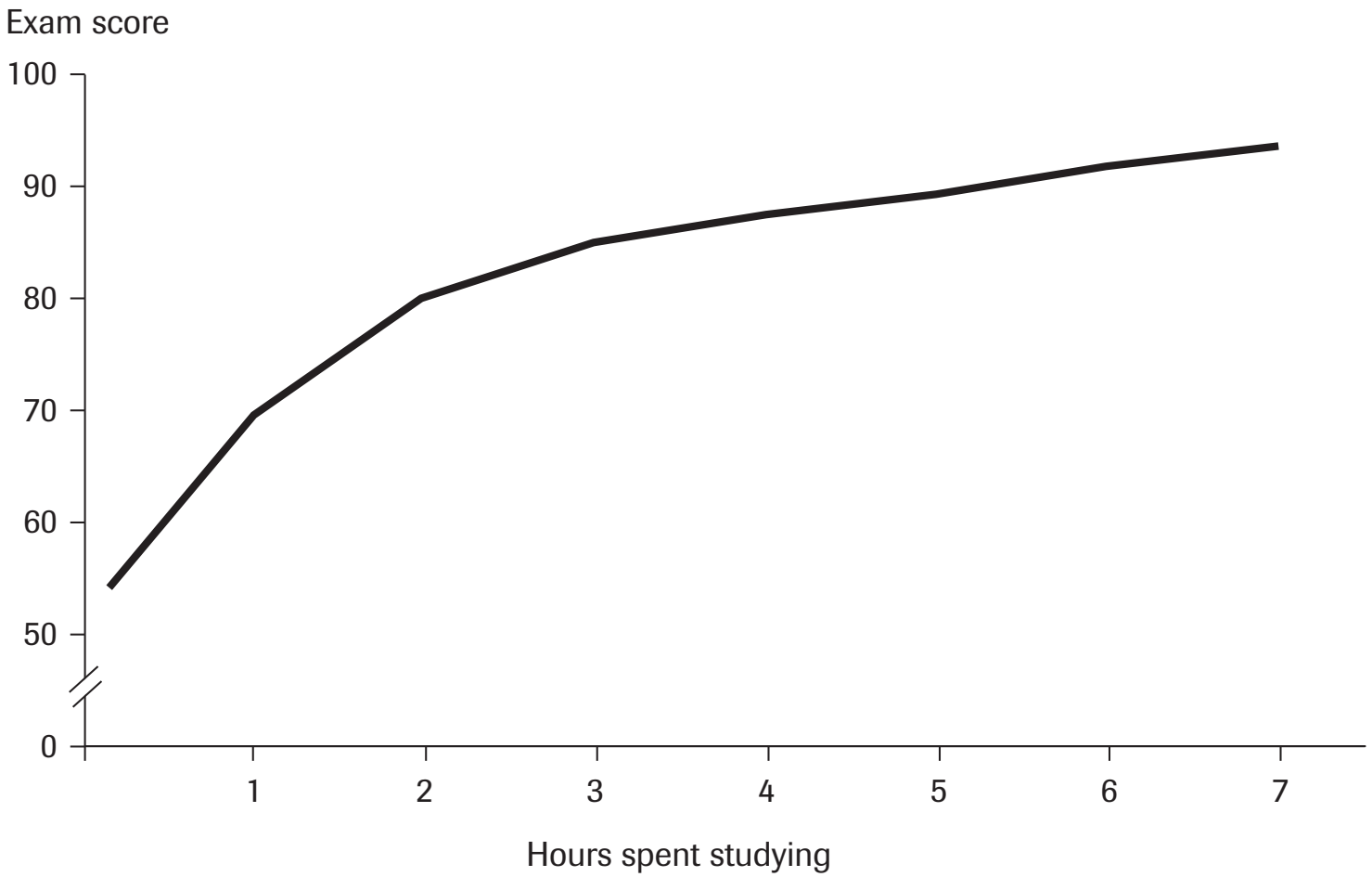
Political Rights and Freedoms, by Country per Capita GDP

Figure 3-2 Political Rights and Freedoms, by Country Per Capita GDP (line chart)



Exam Score and Hours Spent Studying

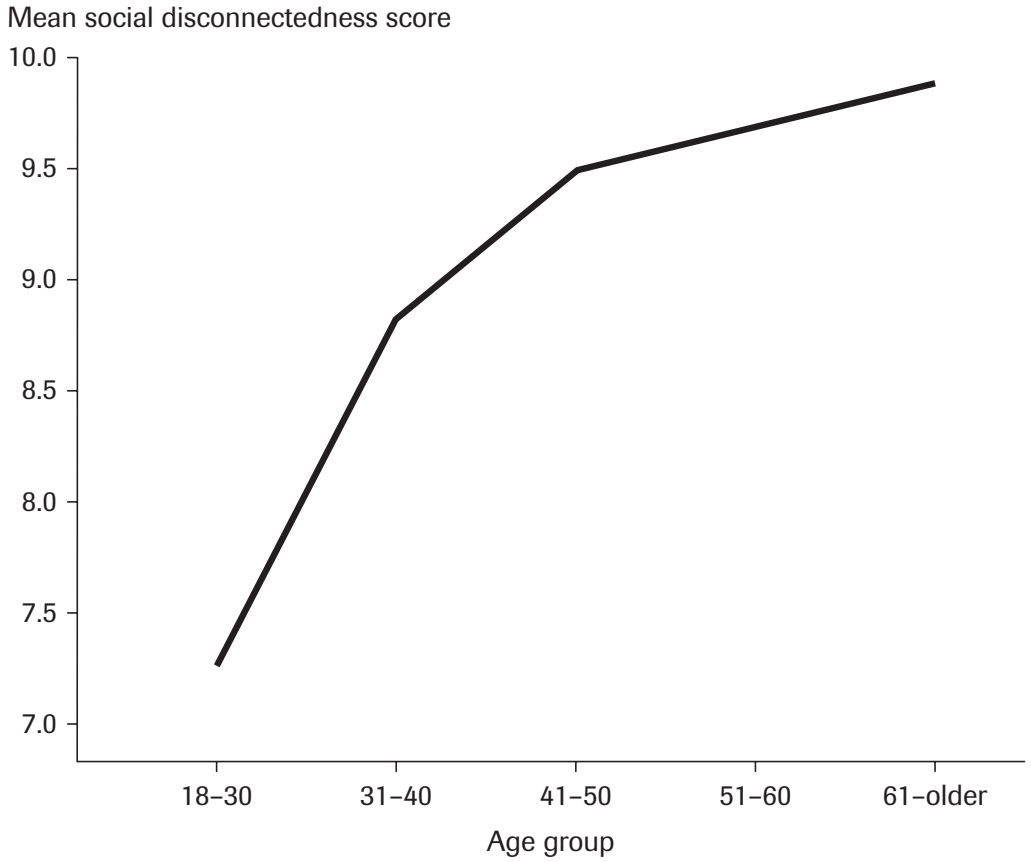
Figure 3-3 Relationship between Exam Score and Hours Spent Studying



Note: Hypothetical data.

Social Disconnectedness and Age

Figure 3-4 Relationship between Social Disconnectedness and Age

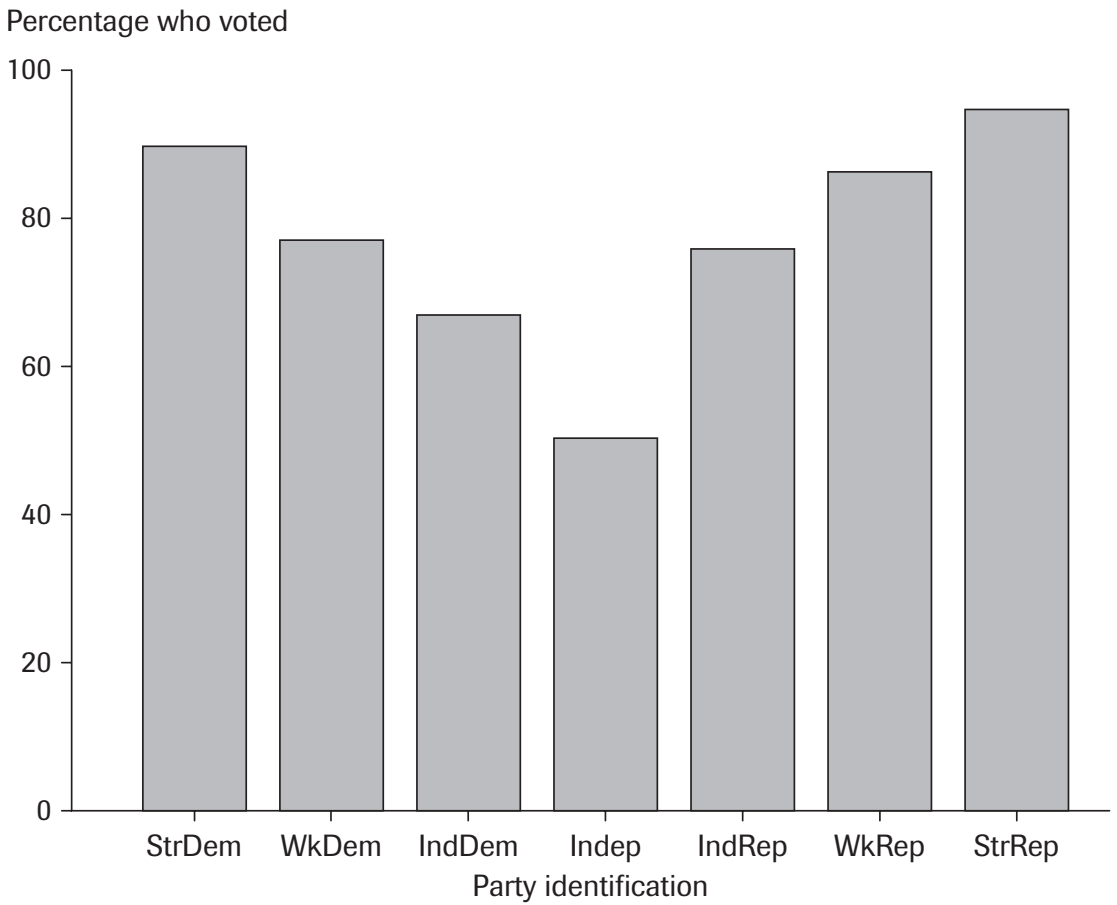


Source: 2008 General Social Survey.

Note: The social disconnected scale, which ranges from 3 (low disconnectedness) to 21 (high disconnectedness), was created by summing three 7-point scales measuring the extent to which the respondent spends time with relatives (GSS variable, SOCREL), neighbors (SOCOMM), and friends (SOCFREND). Codes on SOCREL, SOCOMM, and SOCFREND range from "almost daily" (code 1) to "never" (code 7). Based on the following means (numbers of cases): ages 18–30, 7.3 (289); ages 31–40, 8.8 (251); ages 41–50, 9.5 (285); ages 51–60, 9.7 (233); ages 61–older, 9.9 (270). Mean social disconnectedness for the entire sample of 1,328 respondents was 9.0.

Turnout and Partisanship

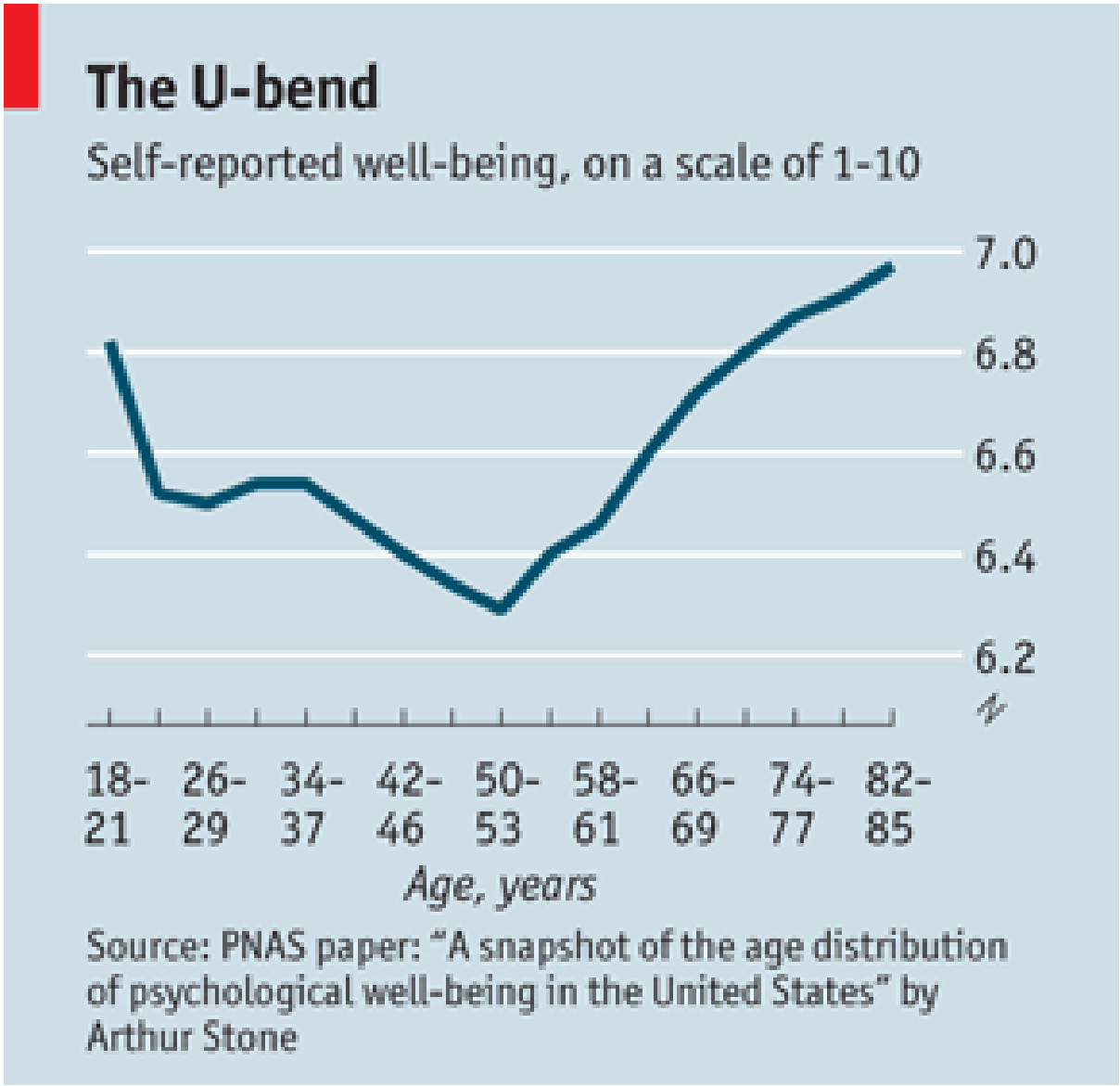
Figure 3-5 Relationship between Turnout and Partisanship



Source: 2008 American National Election Study.

Note: Based on the following percentages (and number of cases): Strong Democrat, 88.8 (391); Weak Democrat, 77.0 (322); Independent-leaning Democrat, 67.0 (345); Independent, 50.2 (237); Independent-leaning Republican, 75.9 (249); Weak Republican, 86.2 (276); Strong Republican, 94.5 (272). Reported turnout for the entire sample of 2,092 respondents was 78.1.

Age and Life Satisfaction



Union Membership and Income

Table 3-4 Relationship between Union Membership and Income (mean comparison)

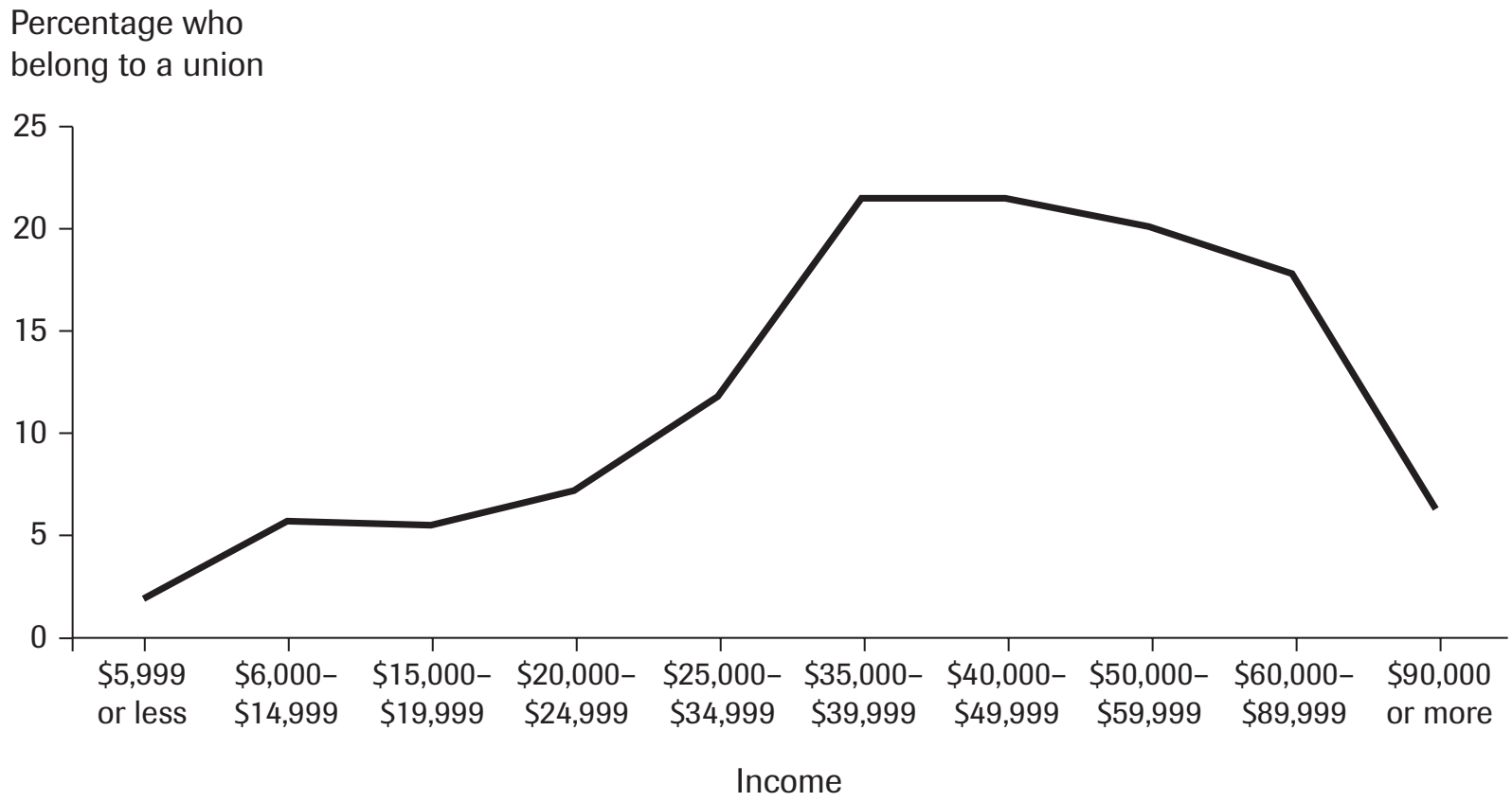
Respondent income	Mean percent union members
$5,999 or less	1.9
	(209)
$6,000–$14,999	5.7
	(279)
$15,000–$19,999	5.5
	(183)
$20,000–$24,999	7.2
	(195)
$25,000–$34,999	11.8
	(323)
$35,000–$39,999	21.5
	(135)
$40,000–$49,999	21.5
	(233)
$50,000–$59,999	20.1
	(154)
$60,000–$89,999	17.8
	(214)
$90,000 or more	6.3
	(158)
Total	11.5
	(2,083)

Source: 2006 General Social Survey.

Note: Income based on GSS variable RINCOME06 (respondent income), collapsed into 10 categories. Union membership based on GSS variable UNION (code 1, R belongs).

Union Membership and Income

Figure 3-6 Relationship between Union Membership and Income (line chart)



Source: Table 3-4.

Note: Displayed data are from 2006.

Conclusion

We have several tools to make a preliminary association between dependent variable and independent variable.

- e.g. cross-tabs, mean comparison table, bar chart, line chart.

Use them!

- Our inferential statistical tools tend to assume linearity.
- Look carefully if there is a non-linear trend between your variables.

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