

In this module we will talk about

- Proposing Explanations
- Framing Hypotheses
 - common mistakes in hypothesis writing
 - intervening variables
- Making Comparisons
 - cross-tabulations
 - mean comparisons
- Graphing Relationships and Describing Patterns

Goals of Social Science Analysis

- The first goal is to define and measure concepts.
 - clearly define the concept to be measured
 - determine how to measure the concept accurately
 - select variables that measure the concept precisely

Goals of Social Science Analysis

- The second goal is to propose and test explanations for political phenomena.
- to answer “Why?” questions
 - Why do some people attend religious services weekly, whereas others never attend?
 - Why do some students prefer to sit in the back of the class, whereas others prefer the front?
 - Why do some people favor abortion rights, while others are opposed?
 - Why do some people vote, whereas others do not?

“Why?” Questions: 2 Elements

- “Why?” questions cite a variable
 - attend / not attend religious services
 - sit in back / sit in front of class
 - favor / oppose abortion rights
 - voted / did not vote
- “Why?” questions seek a causal explanation
 - Each can be recast into the form, “What causes differences between individuals on this variable?”

Dependent and Independent Variables

- In the context of a causal explanation, the **dependent variable** represents the effect and the **independent variable** represents the cause.
 - Example: If I think that educational attainment causes people to vote, then education is the independent variable and voting turnout is the dependent variable.

An Acceptable Explanation

- describes a connection between the dependent variable and an independent (causal) variable
- asserts the direction or tendency of this connection
- is testable
 - A good explanation does not have to be correct. It needs to be *testable* to find out if it is correct.

Partisanship and Gun Control Opinions

When people enter early adulthood, they have only very basic orientations toward politics. Partisanship is one of these orientations. In much the same way that children adopt the religious denomination of their parents, children tend to adopt the party loyalties of their parents. A person who is raised in a Democratic household is likely to identify with the Democrats, whereas a person raised in a Republican household is likely to identify with Republicans. These partisan orientations may be basic, but they become useful later in life when people are deciding their positions on important political issues. Democrats will look at the issue positions of Democratic opinion leaders—Democratic members of Congress, for example—and adopt those issue positions themselves. Republicans will look to Republican opinion leaders. Gun control is a good case in point. Gun control is one issue that divides Democratic and Republican opinion leaders. Democratic opinion leaders, from the presidential and congressional levels to state and local governments, have advocated stricter measures. Republicans have opposed new gun control measures. The opinions of ordinary citizens have followed this lead. Therefore, Democrats will be more likely than Republicans to favor gun control.

What makes this a good explanation?

1. It describes a connection between the dependent variable, gun control opinions, and an independent variable, partisanship.
 - Differences in gun control opinions depend on differences in partisanship.
2. It asserts the direction or tendency of this difference.
 - Democrats will be more likely than Republicans to favor the regulation of gun ownership.
3. It is testable.
 - If we find that Democrats and Republicans do not differ in their gun opinions, then we can seriously question or discard the explanation.

Framing Hypotheses

- A hypothesis is a testable comparison.
 - divide units of analysis on the basis of the independent variable, and then compare values of the dependent variable
 - Example: In a comparison of *individuals*, those who are *Democrats* will be *more likely to favor* gun control than will those who are *Republicans*.

Template for Framing Hypothesis

- In a comparison of units of analysis, those having one value on the independent variable will be more likely to have one value on the dependent variable than will those having a different value on the independent variable.

Examples

- In a comparison of countries, those having PR electoral systems will be more likely to have higher voter turnout than will those having plurality electoral systems.
- In a comparison of individuals, those who are women will be more likely to be Democrats than those who are men.

Syntax-Friendliness is OK

- *Formally correct*: In a comparison of individuals, those who are women will be more likely to be Democrats than those who are men.
- *Syntax-friendly*: In a comparison of individuals, women are more likely than men to be Democrats.

Mistake: Describing one variable

- In a comparison of individuals, some people are more likely to donate money to political candidates than other people.
 - If donating money is the dependent variable, what is the independent variable?
 - If donating money is the independent variable, what is the dependent variable?

Mistake: Not making an explicit comparison

- Highly religious people vote at high rates.
 - The key comparison, that less religious people vote at lower rates, is implicit.
- Correct: In a comparison of individuals, those who have high levels of religiosity will be more likely to vote than will those who have low levels of religiosity.

Mistake: Not stating direction or tendency

- In a comparison of individuals, gender and abortion attitudes are related.
 - How, exactly, are the two variables related?
 - Are women more likely to be pro-choice than are men?
 - Or are men more likely to be pro-choice than are women?

Mistake: Being vague

- Because of sociocultural changes associated with the growth in social media, contemporary political conflicts revolve around postmaterialist values.
 - What is meant by “sociocultural changes,” “social media,” and “postmaterialist values”?

Example

- In a comparison of voters, those who think the economy has gotten better will be more likely to have favorable opinions about the incumbent's handling of the economy than will voters who think the economy has gotten worse.
 - opinion about the incumbent is the dependent variable
- In a comparison of voters, those who have favorable opinions about the incumbent's handling of the economy will be more likely to vote for the incumbent-party candidate than will those who have unfavorable opinions.
 - opinion about the incumbent is the independent variable

Making Comparisons

- A hypothesis suggests that if we separate units of analysis according to their values on the independent variable and compare their values on the dependent variable, we should find a difference.
- When the dependent and independent variables are measured at the nominal or ordinal level, we test the hypothesis using **cross-tabulation analysis**.
- When the independent variable is nominal or ordinal and the dependent variable is interval level, we test the hypothesis using **mean comparison analysis**.

Cross-Tabulation Analysis

- A cross-tabulation shows the distribution of cases across values of the dependent variable *at each value of the independent variable*.
- Recall the hypothesis: In a comparison of individuals, Democrats will be more likely than Republicans to favor gun control.

Testing the Hypothesis

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

Opinion on gun control	Party identification			Total
	<i>Democrat</i>	<i>Independent</i>	<i>Republican</i>	
More difficult	64.4% (1,316)	45.0% (1,007)	24.9% (396)	46.3% (2,719)
Same/easier	35.6% (727)	55.0% (1,233)	75.1% (1,197)	53.7% (3,157)
Total	100.0% (2,043)	100.0% (2,240)	100.0% (1,593)	100.0% (5,876)

Source: 2012 American National Election Study.

Note: Question: “Do you think the federal government should make it more difficult for people to buy a gun than it is now, make it easier for people to buy a gun, or keep these rules about the same as they are now?”
(Based on 2012 ANES variable, gun_control.)

Three Rules

- **Rule One:** Set up a cross-tabulation so that the categories of the independent variable define the columns of the table, and the values of the dependent variable define the rows.
 - The independent variable, partisanship, goes on the columns.
 - The dependent variable, gun control opinions, goes on the rows.

Three Rules

- **Rule Two:** *Always* calculate percentages of categories of the independent variable. *Never* calculate percentages of categories of the dependent variable.
 - Visual cue: Percentages must sum to 100 percent at the bottom of each column.

Three Rules

- **Rule Three:** Interpret a cross-tabulation by comparing percentages across columns at the same value of the dependent variable.
 - We could compare the percentage of Democrats in the “more difficult” value of the dependent variable with the percentages of Independents and Republicans in this value.
 - Alternatively, we could compare the partisan groups across the other category of the dependent variable, “same/easier.”
 - we could not mix and match

Does the partisanship hypothesis appear to be correct?

- Focus on the percentage of each partisan group favoring stronger restrictions and read across the columns, starting with the Democrats.
 - Democrats are most in favor (64.4%)
 - Independents show weaker support (45.0%)
 - Republicans are least likely to favor (24.9%).
- The pattern is systematic and consistent with the hypothesis.
- Each time we change the independent variable, from Democrat to Independent to Republican, the distribution of the dependent variable changes in the hypothesized way.

Age and support for same-sex marriage

- In a comparison of individuals, young people will be more likely to support same-sex marriage than older people.

Test the Hypothesis

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

Same-sex marriage opinion	Age group					Total
	18–30	31–40	41–50	51–60	61 and older	
Allowed	53.3% (653)	49.1% (433)	40.9% (402)	36.0% (409)	30.6% (479)	41.0% (2,376)
Not allowed	46.7% (571)	50.9% (449)	59.1% (580)	64.0% (728)	69.4% (1,087)	59.0% (3,415)
Total	100.0% (1,224)	100.0% (882)	100.0% (982)	100.0% (1,137)	100.0% (1,566)	100.0% (5,791)

Source: 2012 American National Election Study.

Is the age hypothesis supported?

- Focus on the percentages in the “Allowed” row.
- What do you conclude...
 - Hypothesis supported?
 - Hypothesis not supported?

Mean Comparison Analysis

- The same logic of comparison applies when the independent variable is nominal or ordinal and the dependent variable is interval.
- Instead of comparing percentages across values of the independent variable, we compare means.

Economic Development and Political Rights and Freedoms

- In a comparison of countries, those having lower per capita GDP will have fewer political rights and freedoms than will countries having higher per capita GDP.

Independent and Dependent Variables

- Independent variable is a 4-category ordinal.
 - Low GDP per capita, medium-low GDP per capita, medium-high GDP per capita, and high GDP per capita.
- Dependent variable is an interval scale.
 - Countries can range from 0 (few rights and freedoms) to 12 (many rights and freedoms).

Test the Hypothesis

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

Country per capita GDP	Mean score ^a
Low	4.8 (46)
Medium-low	7.0 (46)
Medium-high	7.9 (46)
High	10.0 (47)
Total	7.5 (185)

Source: Per capita GDP based on data from the World Bank, World Development Indicators (2013). Political rights and freedoms score based on data from Freedom House, www.freedomhouse.org.

^aScore calculated by summing the Freedom House 7-point political rights index and the 7-point civil liberties index. The combined index was rescaled to range from 0 (fewest rights and freedoms) to 12 (most rights and freedoms). Data are for 2014.

Mean Comparison Table

- The means of the dependent variable, along with the number of cases, appear in a single column, next to the values of the independent variable.
- Read down the column from low to high values of the independent variable.

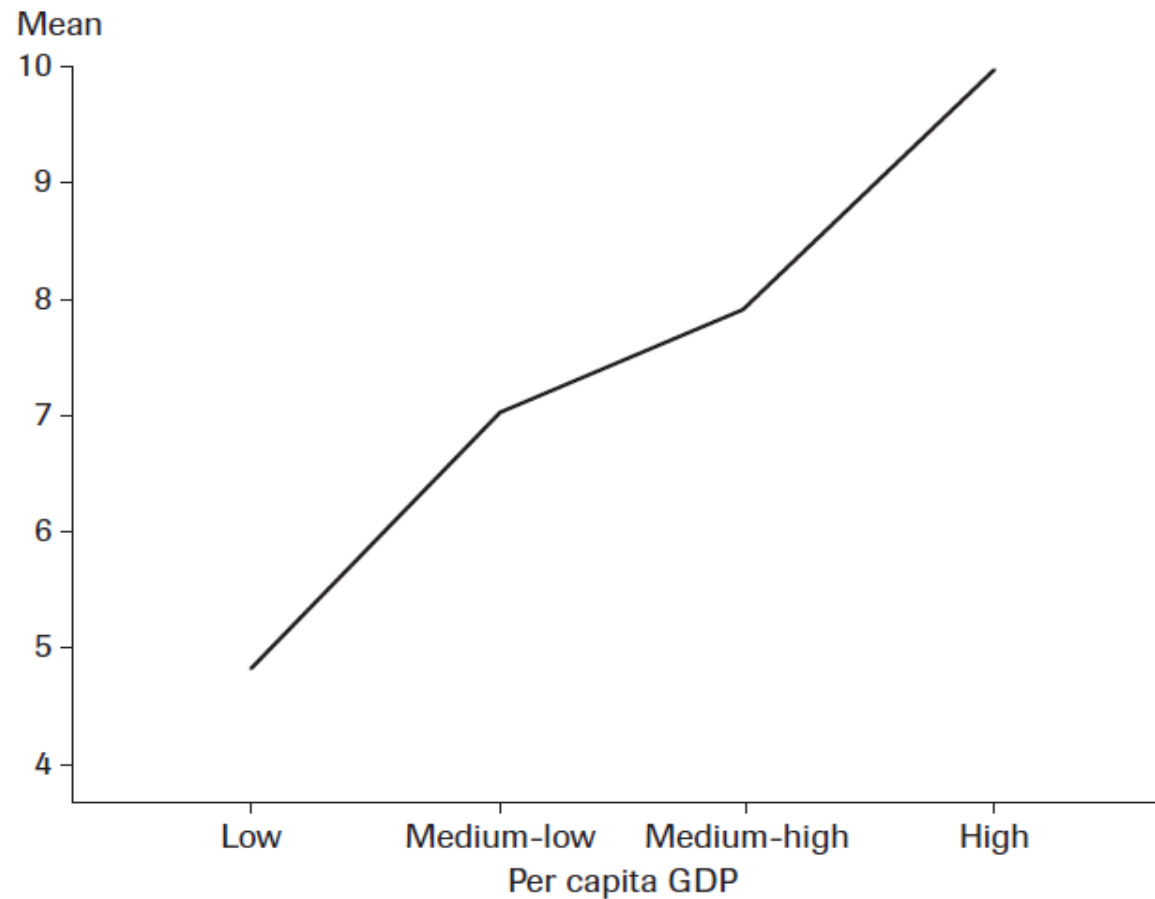
Is the hypothesis supported?

- As we proceed from low values of the to high values of the independent variable, what happens to mean values of the dependent variable?
- Mean values of the dependent variable increase, from 4.8 to 10.0.
- Yes, the hypothesis is supported.

Graphing Relationships and Describing Patterns

- The GDP–political rights and freedoms relationship is a **direct relationship**, a relationship that runs in a positive direction.
 - An increase in the independent variable, per capita GDP, is associated with an increase in the dependent variable, political rights and freedoms.

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

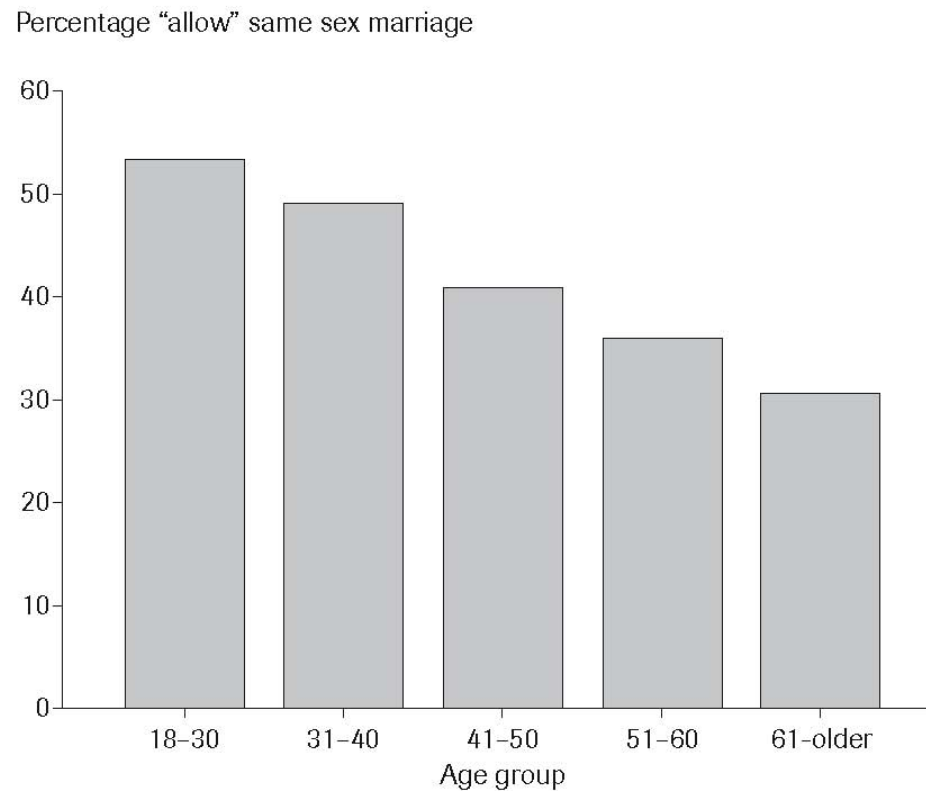


Source: Per capita GDP based on data from the World Bank, World Development Indicators (2013). Political rights and freedoms score based on data from Freedom House, www.freedomhouse.org.

Graphing Relationships and Describing Patterns

- The relationship between age and support for same-sex marriage is an **inverse relationship**, a relationship that runs in a negative direction.
 - An increase in the independent variable, age, is associated with a decrease in the dependent variable, the likelihood of supporting same-sex marriage.

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



Source: 2012 American National Election Study.

Note: Question: “Which comes closest to your view? (1) Gay and lesbian couples should be allowed to legally marry. (2) Gay and lesbian couples should be allowed to form civil unions but not legally marry. (3) There should be no legal recognition of a gay or lesbian couple’s relationship.” In Figure 3-1, “not allowed” combines respondents who chose option 2 or option 3. (Based on 2012 ANES variable, gayrt_marry.)

Graphing Relationships and Describing Patterns

- Both the age–same-sex marriage relationship and the GDP–political rights relationship are **linear**.
 - An increase in the independent variable is associated with a *consistent* increase or decrease in the dependent variable.

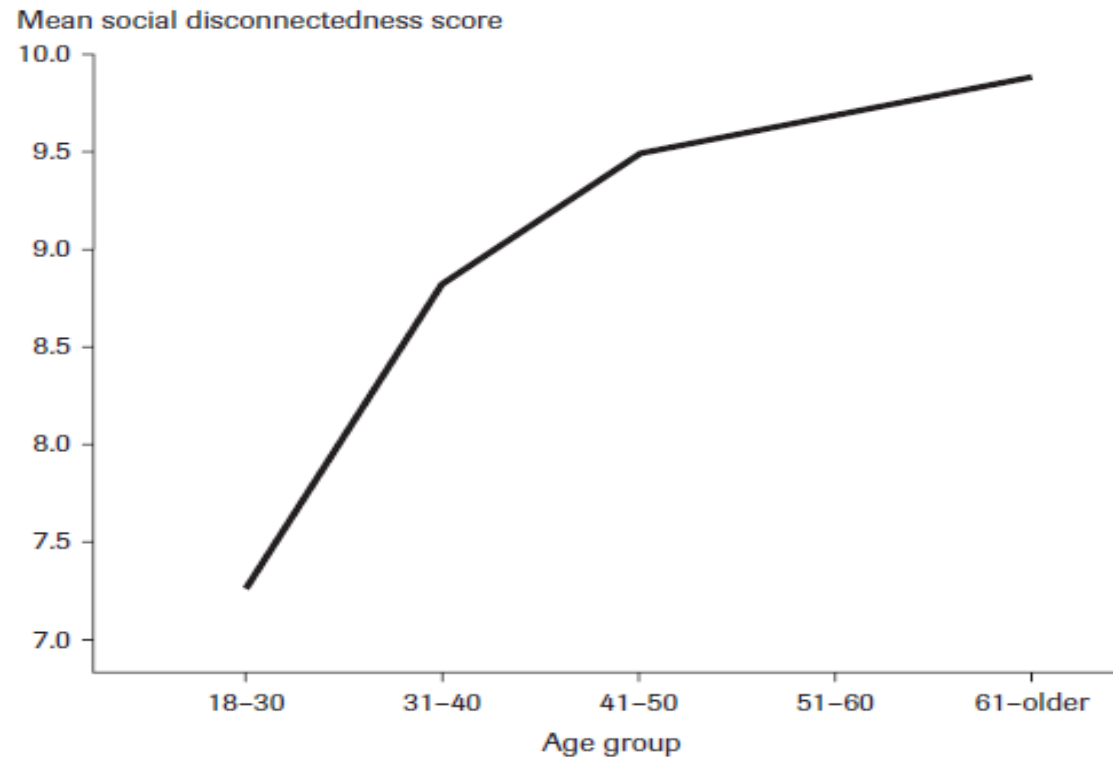
Graphing Relationships and Describing Patterns

- Many relationships are **nonlinear** or **curvilinear**.
 - The relationship between the independent variable and the dependent variable depends on which interval or range of the independent variable is being examined.

Graphing Relationships and Describing Patterns

- As one moves across the values of the independent variable, the relationship might remain positive (or negative) but change in strength or consistency, from strong to weak or from weak to strong.

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 (SOCFRIEND). Codes on SOCREL, SOCOMM, and SOCFRIEND 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); and ages 61 and older, 9.9 (270). Mean social disconnectedness for the entire sample of 1,328 respondents was 9.0.

Graphing Relationships and Describing Patterns

- As one moves across the values of the independent variable, the relationship may change direction, from positive to negative or from negative to positive.

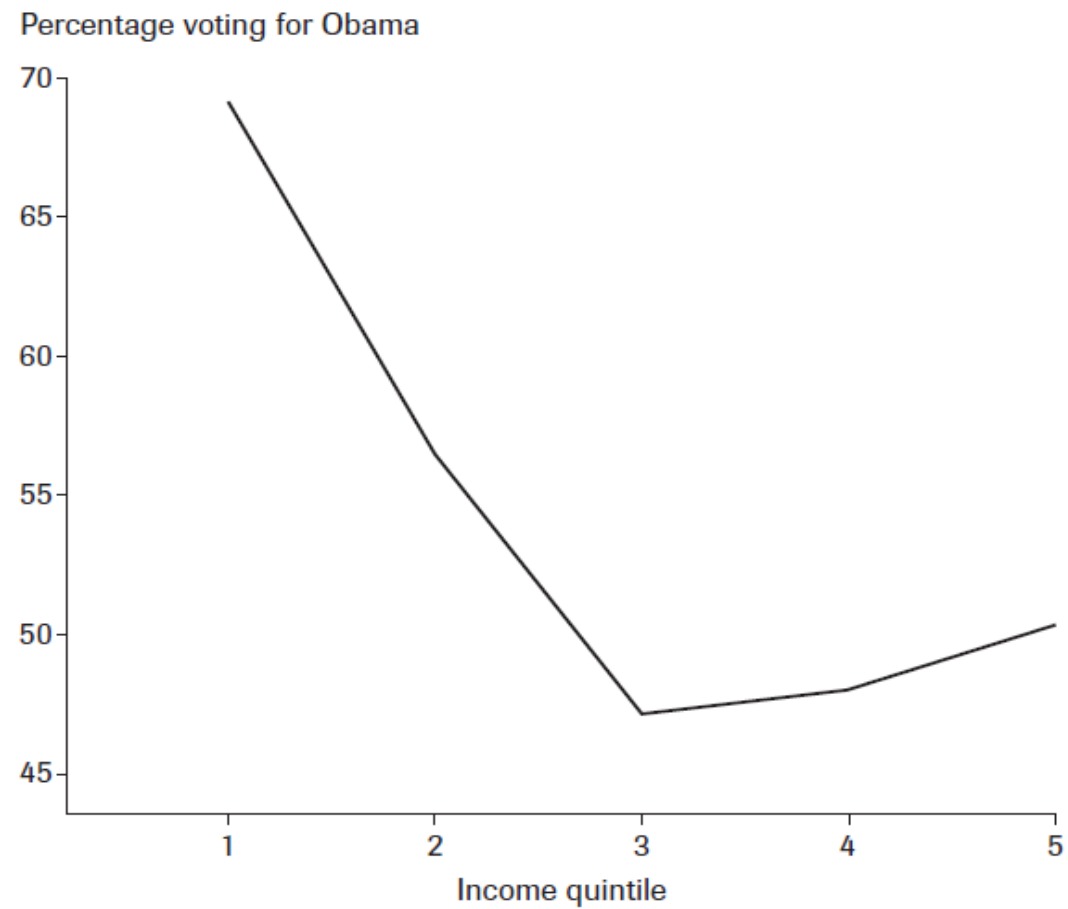
Table 3-4 Presidential Vote, by Income Quintile (2012)

Vote choice	Income quintile					Total
	1	2	3	4	5	
Barack Obama	69.2% (458)	56.5% (429)	47.1% (398)	48.1% (385)	50.3% (439)	53.6% (2,109)
Mitt Romney	30.8% (204)	43.5% (330)	52.9% (447)	51.9% (415)	49.7% (433)	46.4% (1,829)
Total	100.0% (662)	100.0% (759)	100.0% (845)	100.0% (800)	100.0% (872)	100.0% (3,938)

Source: 2012 American National Election Study.

Note: Based on ANES variables incgroup_prepost (respondent's income) and presvote2012_x (respondent's vote for president).

Figure 3-5 Relationship between Income and Presidential Vote (2012)



Source: 2012 American National Election Study.

Note: Based on ANES variables `incgroup_prepost` (respondent's income) and `presvote2012_x` (respondent's vote for president).