# Measurement and Data Analysis Focusing on Attitudes About Abortion

# Edward Nelson

# California State University, Fresno

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# Preface

The data set used in this exercise is the 2018 General Social Survey. The name of the data set is GSS18ABORTION.SAV which is a subset of the full data set. Some of the variables in the GSS have been recoded to make them easier to use and some new variables have been created.  The data have been weighted according to the instructions from the National Opinion Research Center.  These exercises use SPSS to analyze the data but you could also easily use PSPP.  A good reference for using SPSS is [*SPSS Statistics (Version 26): A Basic Tutorial*](http://www.ssric.org/node/696)by Edward Nelson and John Korey.

The focus of these exercises is on conceptualization, measurement, causality, and data analysis. They develop a measure of how people feel about abortion and discuss how to assess the reliability of the measure. The sections on data analysis use crosstabulation with two and three-variable tables.

The exercises do not explain how to use SPSS. For that you could use the [SPSS tutorial](http://www.ssric.org/node/696) referred to throughout the exercises. I have added to the data set the variables that students are asked to create. The names of these variables all start with ZZ. That means you could skip some of the SPSS procedures by referring students to these variables in the data set. I have also included in the data set some variables not used in the exercises so you could develop your own exercises around these variables.

You have permission to use these exercises and to revise them to fit your needs which would include adding materials of your own or deleting parts of the exercises that you don't want to use.

# Exercise 1 – Exploring Measurement and Reliability for a Measure of Attitudes Toward Abortion

## **Goal of Exercise**

The goal of this exercise is to create a measure of how respondents feel about abortion (i.e., whether they think abortion should be legal or not).  In the next exercise we'll focus on the interrelationships of attitudes toward abortion, religion, and politics.  This exercise also gives you practice in using several SPSS commands – COMPUTE to create new variables, FREQUENCIES to explore how respondents answered the abortion questions, and Cronbach’s Alpha to estimate the internal consistency or reliability of the variables that make up the abortion measure.

## **Part I—Questions Used to Measure Attitudes towards Abortion**

We’re going to use the General Social Survey (GSS) for this exercise.  The GSS is a national probability sample of adults in the United States conducted by the National Opinion Research Center.  The GSS started in 1972 and has been an annual or biannual survey ever since.  For this exercise we’re going to use a subset of the 2018 GSS. Your instructor will tell you how to access this data set which is called GSS18REL.SAV. You can download the data set by clicking on this [link](http://ssric.org/node/476).

The GSS has a series of seven variables that we can use to measure how respondents feel about abortion.  All seven questions start with “please tell me whether or not you think it should be possible for a pregnant woman to obtain a legal abortion if …” There are seven scenarios presented.  The variable name in the data set is in parentheses.

* “If the woman wants it for any reason?” (ABANY)
* “If there is a strong chance of serious defect in the baby?” (ABDEFECT)
* “If the woman's own health is seriously endangered by the pregnancy?” (ABHLTH)
* “If she is married and does not want any more children?” (ABNOMORE)
* “If the family has a very low income and cannot afford any more children?” (ABPOOR)
* “If she is not married and does not want to marry the man?” (ABSINGLE)
* “If she became pregnant as a result of rape?” (ABRAPE)

Let’s start by running FREQUENCIES in SPSS for each of these seven variables.  (See Chapter 4, Frequencies in the [online SPSS tutorial.)](http://ssric.org/node/696)Write a paragraph describing how respondents answered these questions.  Are respondents more likely to think that abortion ought to be legal in some of the scenarios than in others?

## **Part II—Internal Consistency or Reliability of the Variables**

We don’t want to deal with each of these seven variables separately.  Rather we want to develop a composite measure that combines these variables.  We need to determine if these seven variables are internally consistent.  This is basically a question of reliability.  Are they consistent in the sense that a person who thinks that abortion should be legal in one of these scenarios is more likely to think that abortion should be legal in the other scenarios as well?

A commonly used measure of internal consistency is Cronbach’s Alpha.  This statistic varies from 0 to 1.  Low values indicate low consistency and high values indicate high consistency.  Alpha increases as the number of items increases and as the correlation between items increases.  One rule of thumb that is often used is that an Alpha of .70 or higher is necessary to indicate reliability although some feel that a higher value is required.

Let’s have SPSS compute Cronbach’s Alpha for the seven questions about abortion.  Remember that the variable names are ABANY, ABDEFECT, ABHLTH, ABNOMORE, ABPOOR, ABSINGLE, and ABRAPE.  Open the data set in SPSS and click on ANALYZE in the menu.  Then point your mouse at SCALE and click on RELIABILITY ANALYSIS.  Click on each of the seven variables in the box on the left and move them over to the ITEMS box on the right until you have selected all seven variables.  Click on the STATISTICS button in the upper right.  This will open the Statistics box. Then click on SCALE IF ITEM DELETED in the upper left and CORRELATIONS in the upper right.  Click on CONTINUE and this will take you back to the original box where you selected the variables.  Finally click on OK and SPSS will carry out the calculations you requested.  There is an excellent YouTube video in two parts on Cronbach’s Alpha — ([**Part 1**](https://www.youtube.com/watch?v=2gHvHm2SE5s) and [**Part 2**](https://www.youtube.com/watch?v=9rS49o1rdnk)). My instructions only ask for some of the calculations suggested in this video.

In your output there are three important pieces of information:

* the value of Cronbach’s Alpha,
* the inter-item correlation matrix showing the correlations between each pair of variables, and
* the value of Cronbach’s Alpha if an item (i.e., variable) is deleted.

You want to get a Cronbach’s Alpha of .70 or higher.  The correlations between variables should be consistently high.  Generally the higher the inter-item correlations, the higher the value of Alpha.  It’s also helpful to look at the effect of deleting a variable on Alpha. This will tell you if you ought to consider deleting that variable.

Follow these instructions to compute Alpha for the seven abortion variables.  Based on your analysis, do you think the composite measure is internally consistent or reliable?  Explain why.

## **Part III—Constructing the Composite Variable**

Construct the composite variable using COMPUTE in SPSS to create it.  (See Chapter 3, Creating New Variables Using Compute, in the online SPSS tutorial.)  If any cases have missing information for any of the seven variables, the composite measure will automatically be given a system missing value.  Call your new variable ABORTION.

It’s easy to make a mistake so I have created a variable that shows you what the frequency distribution for your variable ought to look like.  The variable I created is named ABORTIONR.  Notice the R at the end of the variable name.  That distinguishes your variable from my variable.  Run FREQUENCIES for your variable (ABORTION) and the variable I created (ABORTIONR).  Your variable and my variable ought to have identical frequency distributions.  If they don’t, you made a mistake and you’ll need to redo your work in SPSS.

Think of the composite variable as a continuum from high support for the legality of abortion to low support.  Each of the seven variables that makes up the composite measure has two values – 1 for those who think abortion should be legal and 2 for those who think it should not be legal.  When you sum the seven variables you end up with a new variable that ranges from seven (i.e., those who think that abortion should always be legal) to fourteen (i.e., those who think that abortion should never be legal).  One way to interpret the composite variable is to compare the highest level of support (i.e., those who score seven) to the lowest level of support (i.e., those who score fourteen).  Another way would be to combine seven and eight and compare that to those who scored thirteen or fourteen.  Write a paragraph comparing support for the legality of abortion with opposition using both of the methods described above.

## **Part IV -- Summary**

In this exercise we created a composite measure of how people feel about abortion. We checked on the reliability of this measure using Cronbach's Alpha.

In Exercise 2 we’re going to use the abortion measure you created (ABORTION) to discover whether attitudes toward abortion is related to religion and politics.

## **Exercise 2 – Exploring the Relationship of Attitudes Toward Abortion and Religiosity and Politics**

## **Goal of Exercise**

The goal of this exercise is to explore the relationship between religiosity and politics on the one hand and attitudes about abortion on the other hand.  We’ll look at the relationship between religiosity and abortion first and then look at the relationship between politics and abortion.  Finally we’ll explore the joint relationship of both religiosity and politics with attitudes toward abortion. The exercise also gives you practice in using several SPSS commands – RECODE to combine categories of variables, FREQUENCIES to see how people answered the questions, and CROSSTABS to explore relationships between and among variables.

## **Part I—** Religiosity **and Abortion**

We’re going to use the General Social Survey (GSS) for this exercise.  The GSS is a national probability sample of adults in the United States conducted by the National Opinion Research Center.  The GSS started in 1972 and has been an annual or biannual survey ever since.  For this exercise we’re going to use a subset of the 2018 GSS. Your instructor will tell you how to access this data set which is called GSS18ABORTION.SAV. You can download the data file by clicking on this [link](http://ssric.org/node/482).

The GSS has a series of seven variables that we can use to measure how respondents feel about abortion.  All seven questions start with “please tell me whether or not you think it should be possible for a pregnant woman to obtain a legal abortion if …” There are seven scenarios presented.  The variable name in the data set is in parentheses.

* “If the woman wants it for any reason?” (ABANY)
* “If there is a strong chance of serious defect in the baby?” (ABDEFECT)
* “If the woman's own health is seriously endangered by the pregnancy?” (ABHLTH)
* “If she is married and does not want any more children?” (ABNOMORE)
* “If the family has a very low income and cannot afford any more children?” (ABPOOR)
* “If she is not married and does not want to marry the man?” (ABSINGLE)
* “If she became pregnant as a result of rape?” (ABRAPE)

In Exercise 1 we created a composite measure of attitudes toward abortion (ABORTION).  Let’s start by running FREQUENCIES in SPSS for the variable ABORTION.  (See Chapter 4, Frequencies in the [online SPSS tutorial](http://ssric.org/node/696).)

Let's start by recoding this variable into a smaller number of categories.  The variable ABORTION has a range from seven to fourteen.  Low values indicate support for the legality of abortion while high values indicate opposition to abortion.  When you look at the frequency distribution, you’ll notice that it’s heavily weighted toward the low end of the continuum.  In other words, many more people think that abortion ought to be legal in all seven scenarios (41.2%) than think that abortion should be illegal in all seven scenarios (8.3%).  We’re going to divide this variable into three categories.  At the low end we’ll keep the value 7 as a separate category since so many feel that abortion ought to always be legal.  At the upper end we’re going to combine 12, 13, and 14 into its own category.  Everything in the middle (8 through 11) will be another category.  So our recoding will look like this:

* 7 will be recoded as 1 and given the value label of highest support,
* 8 through 11 will be recoded as 2 and given the value label of in-between, and
* 12 through 14 will be recoded as 3 and given the value label of lowest support.

When you use RECODE in SPSS, you can recode in two different ways—into the same variable or into different variables.  If you recode into the same variable, be careful.  It’s easier, but if you make a mistake, you will not be able to go back and recode it again.  You will have to close SPSS without saving the data set and then reopen the data set to get a fresh, clean copy of the data. So for this exercise recode into different variables.

You’ll have to give your recoded variable a new name.  Give your recoded variable the name ABORTION1.  (See Chapter 3, Recoding into Different Variables in the online SPSS tutorial.)  To make your output more readable, add the value labels for this variable that we discussed above.

Run FREQUENCIES for both the unrecoded variable (ABORTION) and the recoded variable (ABORTION1).  Compare the two distributions to make sure you recoded correctly.  If you made a mistake, you’ll have to recode again.

Now that we have recoded the abortion variable, we’re almost ready to begin exploring the relationship between religiosity and attitudes toward abortion.  There are a number of possible measures of religiosity in the GSS.  We’re going to look at two such measures.

* ATTEND refers to how often respondents go to church.  The question is “how often do you attend religious services?” and the response categories are never, less than once a year, once a year, several times a year, once a month, two to three times a month, nearly every week, every week, and more than once a week.
* RELPERSN refers to whether respondents consider themselves a religious person.  The question is “To what extent do you consider yourself a religious person?” The categories are very religious, moderately religious, slightly religious, and not religious.

We’re going to recode ATTEND to reduce the number of categories.  Let’s call the recoded variable ATTEND1.  We'll combine every week (7) and more than once a week (8) into one category and give this category a value of 1.  Combine once a month (4), two to three times a month (5), and nearly every week (6) into another category and give this a value of 2.  Finally, combine never (0), less than once a year (1), once a year (2), and several times a year (3) into another category and give this a value of 3.  Now we have three categories--often (1), sometimes (2), and infrequently (3).  To make your output more readable, add value labels for this variable.  Make sure you recoded correctly by running FREQUENCIES for both the unrecoded variable (ATTEND) and the recoded variable (ATTEND1).  If you made a mistake, you’ll need to redo the recoding.

Before we look at the relationship between religiosity and attitudes toward abortion, we need to talk about independent and dependent variables.  The dependent variable is whatever you are trying to explain.  In our case, that would be how people feel about abortion.  The independent variable is some variable that you think might help you explain why some people think abortion should be legal and others think it shouldn’t be legal.  In our case, that would be our two measures of religiosity.  Normally we put the dependent variable in the row and the independent variable in the column and ask for the column percents.

Run CROSSTABS to produce two tables.  (See Chapter 5, Crosstabs in the online SPSS tutorial.)  One will be for the relationship between ATTEND1 and ABORTION1.  The other will be for RELPERSN and ABORTION1.  Be sure to get the correct percents, Chi Square, and an appropriate measure of association.

What does the table tell you about these two relationships?  Use the percents, Chi Square, and a measure of association to help you interpret the tables.  Write a paragraph describing these relationships.

## **Part II—Politics and Attitudes toward Abortion**

Now we’re almost ready to begin exploring the relationship between politics and attitudes toward abortion.  We’re going to focus on the political party with which respondents identify and their political views (i.e., liberal, moderate, conservative).

* PARTYID refers to which political party the respondent identifies with.  The question is “Generally speaking, do you usually think of yourself as a Republican, Democrat, Independent, or what?”  The categories are strong Democrat, not strong Democrat, Independent near Democrat, Independent, Independent near Republican, not strong Republican, strong Republican, and other party.
* POLVIEWS refers to the respondent’s political views (i.e., liberal, moderate, or conservative).  The question is “We hear a lot of talk these days about liberals and conservatives. I'm going to show you a seven-point scale on which the political views that people might hold are arranged from extremely liberal--point 1--to extremely conservative-- point 7. Where would you place yourself on this scale?”  The categories are extremely liberal, liberal, slightly liberal, moderate, slightly conservative, conservative, and extremely conservative.

We’re going to recode both of these variables to reduce the number of categories.  We’ll start with PARTYID.  Let’s recode strong Democrat (0) and not strong Democrat (1) and give it a value of 1 which will have the value label Democrat.  Recode Independent near Democrat (2), Independent (3), and Independent near Republican (4) and give it a value of 2 which will have the label Independent.  And we’ll recode not strong Republican (5) and strong Republican (6) and give it a value of 3 which will refer to Republicans.  But what are we going to do with those who belong to another party (7)?  You’ll notice that this has already been defined as a missing value so it won’t show up in your frequency distribution.  Call this variable PARTYID1.  Be sure to assign value labels to make your output more readable.  Run FREQUENCIES for the unrecoded and recoded variables to make sure you didn’t make a mistake.

Not let’s recode POLVIEWS.  Combine extremely liberal (1), liberal (2) and slightly liberal (3) into one category and give it a value of 1.  This will refer to those who are liberal.  Recode moderate (4) and give it a value of 2.  Then combine slightly conservative (5), conservative (6) and extremely conservative (7) into a third category and give it a value of 3.  This will refer to conservatives.  Call this variable POLVIEWS1.  Be sure to assign value labels.  Run FREQUENCIES for the unrecoded and recoded variables to make sure you didn’t make a mistake.

Now we’re ready to explore the relationship between politics and attitudes toward abortion.  Run CROSSTABS to produce two tables.  One will be for the relationship between PARTYID1 and ABORTION1.  The other will be for POLVIEWS1 and ABORTION1.  Be sure to get the correct percents, Chi Square, and an appropriate measure of association.

What does the table tell you about these two relationships?  Use the percents, Chi Square, and the measure of association to help you interpret the tables.  Write one or two paragraphs describing these relationships.

## **Part III—Religiosity, Politics, and Attitudes toward Abortion**

We know that religion and politics are related to each other.  To see that for yourself, run the crosstabulation of RELPERSN and PARTYID1.  Put political party in the column and whether respondents consider themselves religious in the row.  Get the column percents, Chi Square, and an appropriate measure of association.  You’ll see that Republicans are more likely to see themselves as very religious and Democrats more likely to be not religious.

What we want to find out is whether each of these variables (i.e., religiosity and political party) has a relationship with attitudes toward abortion when the other variable is controlled (or held constant).  In other words, do we still see a relationship between religiosity and abortion when we have controlled for party and do we still see a relationship between party and abortion when we have controlled for religiosity?

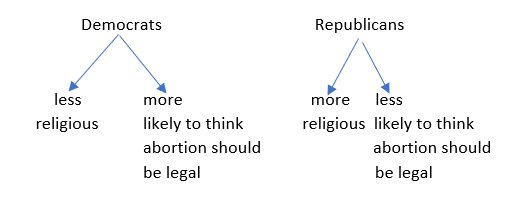
We can find that out by running a three-variable crosstabulation.  Run the table with PARTYID1 in the column, ABORTION1 in the row, and RELPERSN as the control variable.  Use the percents, Chi Square, and an appropriate measure of association to decide whether political party still has a relationship with attitudes toward abortion after controlling for religiosity.

Now run the table with RELPERSN in the column, ABORTION1 in the row, and PARTYID1 as the control variable.  Use the percents, Chi Square, and an appropriate measure of association to decide whether religiosity still has a relationship with attitudes toward abortion after controlling for political party.

## Part IV – Causality

It's time to talk about causality. Is religiosity a cause of how people feel about abortion? Here's another way to ask this question, does religiosity influence the way people feel about abortion. What do we have to show in order to demonstrate that one variable causes or influences another variable?

* We have to show that religiosity and how people feel about abortion are statistically related. We did that in Part 1.
* We have to be able to show that it is religiosity that influences how people feel about abortion and not that feelings about abortion influence religiosity. We might be tempted to say that's obvious. How could one's opinion about abortion influence how religious people are? But that's possible. Research has shown that some people seek out groups that are made up of like-minded individuals. If how people feel about abortion is sufficiently important to some individuals, then they might want to join churches made up of people who share their views and are highly religious. So we can't entirely rule this out.
* We have to be able to show that the relationship between religiosity and how people feel about abortion is not due to some other variable. How could that be? In Part 3 we discovered that Democrats are more favorable to the legalization of abortion than Republicans. Let's assume that Democrats also tend to be less religious than Republicans[[1]](#footnote-1) That might explain the relationship we found between religiosity and how people feel about abortion. We could diagram it like this.



How could we test this possibility? We could control for political party and see if holding party constant reduces or eliminates the relationship between religiosity and how people feel about abortion. Look back at Part 3; this is what we did. We looked at the relationship between religiosity and how people feel about abortion for each category of political party – Democrats, Independents, Republicans – and found that the relationship did not go away when we held political party constant. In other words, the relationship was not due to political party. If it had been, then we would have said that the relationship was spurious. So, it wasn't spurious due to political party. However, that doesn't mean that it might not be spurious when we controlled for another variable such as age or gender,

## **Part V—Summary**

What have you learned about the relationship between religiosity and attitudes toward abortion and the relationship between politics and abortion?  What have you learned about the joint relationship among all three variables?  Try to summarize your findings in several clearly written paragraphs.

# Exercise 3 -- **Exploring the Relationship of Attitudes Toward Abortion and Other Social Issues**

## Goal of Exercise

The goal of this exercise is to explore the relationship between how people feel about abortion and various other social issues – legalization of marijuana, gun control, and prayer in public schools. This raises questions about causal ordering. When we consider how people feel about various social issues the causal ordering of the variables is typically unclear. The exercise also gives you practice in using several SPSS commands – RECODE to combine categories of variables, FREQUENCIES to see how people answered the questions, and CROSSTABS to explore relationships between and among variables. It also introduces Spearman's Rho which is a statistical measure of correlation appropriate for ordinal level variables.

## Part 1 – Measure of Attitudes Toward Abortion

We’re going to use the General Social Survey (GSS) for this exercise.  The GSS is a national probability sample of adults in the United States conducted by the National Opinion Research Center.  The GSS started in 1972 and has been an annual or biannual survey ever since.  For this exercise we’re going to use a subset of the 2018 GSS. Your instructor will tell you how to access this data set which is called GSS18ABORTION.SAV. You can download the data file by clicking on this [link](http://ssric.org/node/482).

The GSS has a series of seven variables that we can use to measure how respondents feel about abortion.  All seven questions start with “please tell me whether or not you think it should be possible for a pregnant woman to obtain a legal abortion if …” There are seven scenarios presented.  The variable name in the data set is in parentheses.

* “If the woman wants it for any reason?” (ABANY)
* “If there is a strong chance of serious defect in the baby?” (ABDEFECT)
* “If the woman's own health is seriously endangered by the pregnancy?” (ABHLTH)
* “If she is married and does not want any more children?” (ABNOMORE)
* “If the family has a very low income and cannot afford any more children?” (ABPOOR)
* “If she is not married and does not want to marry the man?” (ABSINGLE)
* “If she became pregnant as a result of rape?” (ABRAPE)

In Exercise 1 we created a composite measure of attitudes toward abortion (ABORTION) and in Exercise 2 we recoded it into three categories to make it easier to use in our analysis. The recoded variable is called ABORTION1. Let’s start by running FREQUENCIES in SPSS for these two variables – ABORTION and ABORTION1.  (See Chapter 4, Frequencies in the [online SPSS tutorial](http://ssric.org/node/696).)

## Part II – Measures of How People Feel About Other Social Issues

Our data set includes questions about other social issues that we could correlate with how people feel about abortion. These include the following:

* legalization of marijuana (GRASS),
* gun control (GUNLAW), and
* school prayer (PRAYER).

Here's the wording of each of the questions in the GSS.

* "Do you think the use of marijuana should be made legal or not?"
* "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?"
* "The United States Supreme Court has ruled that no state or local government may require the reading of the Lord's Prayer or Bible verses in public schools. What are your views on this--do you approve or disapprove of the court ruling?"

Run frequency distributions for all three variables and write a paragraph summarizing what they tell you about how people feel about these social issues.

## Part III – Correlating People's Feelings About Abortion with Other Social Issues

Crosstabulate each of these three variables with ABORTION1. (See Chapter 5, Crosstabulation in the online SPSS tutorial.) For the moment, put ABORTION1 in the column and the other variables in the rows. We'll have more to say about this in the next section of this exercise. Be sure to ask for the column percents. Click on STATISTICS and check the box for Chi Square.

Chi Square is a test of the null hypothesis that the two variables in your crosstabulation are unrelated to each other.[[2]](#footnote-2) In statistical terms, we often say that the two variables are independent of each other. If we can reject the null hypothesis, then we have evidence to support our research hypothesis that the variables are related. If we can’t reject the null hypothesis, then we don’t have any evidence in support of the research hypothesis.

Here are our two hypotheses.

* research hypothesis – our two variables are related to each other.
* null hypothesis – the two variables are unrelated to each other; in other words, they are independent of each other.

SPSS gives you three important pieces of information about the Chi Square test.

* Chi Square value – we're not going to discuss how this is calculated. For more information on Chi Square, here's a good statistics book to consult – *Social Statistics for a Diverse Society* by Anna Leon-Guerrero and Chava Frankfort-Nachmias.
* Degrees of freedom – again we're not going to discuss degrees of freedom but it will be covered in the statistics text.
* Significance value – this is what we need to focus on. The significance value is a probability that tells you how likely it is that you would be wrong if you rejected the null hypothesis.  A common rule is to reject the null hypothesis if the significance value is less than .05 or less than five out of one hundred.  As we said earlier, if you can reject the null hypothesis, then you have evidence to support your research hypothesis that the variables are related. If you can’t reject the null hypothesis, then you don’t have any evidence in support of the research hypothesis.

What do the Chi Square tests tell you about the relationship of ABORTION1 with each of these other variables?

## Part III – Correlation

Chi Square is a test of significance that helps you decide if there is **any** relationship between pairs of variables. But it doesn't tell you how strong that relationship is. For that, we need a measure of association or a correlation coefficient.

We're going to use two measures of association or correlation. Our four measures are what we would call ordinal level measures. That means that the categories are ordered from low to high (or from high to low) but we don't necessarily have equal units of measurement. Take ABORTION1 for example. The difference between categories 1 and 2 is probably not the same as the difference between categories 2 and 3 in terms of support for the legalization of abortion. So we need a measure of association that is appropriate for ordinal level measures.

One such measure is Kendall's tau-c. This measure varies from 0 to 1 and can be positive or negative. The closer it is to 0, the weaker the relationship and the closer it is to 1, the stronger the relationship. The sign indicates whether the relationship is positive or negative. Positive means that as one variable increases, the other variable tends to increase. Negative means that as one variable increases, the other tends to decrease. However, this can be misleading because it depends on how the categories are ordered. If one measure is coded from high to low and the other measure from low to high, then the sign will be misleading. So it's best to ignore the sign of tau-c and look at the percents to decide if the relationship is positive or negative.

Another correlation measure that we could use is Spearman's Rho. Rho is also an appropriate measure for ordinal variables. It also varies between 0 and 1 and can be positive or negative. We would interpret Rho much the same way we interpret tau-c.

To tell SPSS to compute tau-c, click on the STATISTICS button in CROSSTABS and then check the box for tau-c. To get Rho, click on ANALYZE in the menu bar and select CORRELATE and then click on BIVARIATE. Move your four variables into the VARIABLES box and then check the box for SPEARMAN.

What do tau-c and Rho tell you about these relationships? Are some stronger that others? Do tau-b and Rho give you the same picture of the strength of these relationships?

## Part III – Causal Ordering

Let's review what we need to be able to show to prove that one variable, X, causes another variable, Y.

* We have to show that X and Y are statistically related.
* We have to show that X is the causally prior variable. In other words, we have to show that X is a cause of Y and not Y as a cause of X.
* We have to show that the XY relationship is not due to some other variable. In other words, we have to be able to show that it's not a spurious relationship.

In this section, we're going to focus on causal ordering. How can we demonstrate causal ordering? Sometimes one of the variables precedes the other in time. For example, we could look at the relationship between the size of the community in which one grew up and how people felt about abortion. If we found that people who grew up in less densely settled areas were more opposed to the legalization of abortion, then we would know that where they grew up was the causally prior variable. What happened in the past could influence how one felt about abortion today but the reverse wouldn't be possible. The causal ordering is clear.

Other times one of the variables is the more fixed or permanent variable. Consider the relationship between age and how one felt about abortion. Age is the more fixed variable. Age could influence how one felt about abortion but how one felt about abortion couldn't influence age. The causal ordering is clear.

But what about the relationship between how one felt about abortion and whether one favored the legalization of marijuana. We wouldn't know which attitude came first in time and neither variable is more fixed. Either attitude could influence the other attitude. In this instance, we can't say anything about one variable causing the other variable. But we can still consider whether the two attitudes tend to go together. In order words, are those who are more supportive of the legalization of abortion also more supportive or less supportive of the legalization of marijuana. We just can't assert causality.

Write a couple of paragraphs describing how these four attitudinal variables are related to each other. Use the percents, Chi Square, tau-c, and Spearman's Rho to help you interpret the relationships. Be sure to discuss the question of causality and what we can or can't say about causality.

## Part IV – Summary

In this exercise we explored the relationship between how people felt about abortion and three other social issues – legalization of marijuana, gun control, and prayer in public schools. We considered these relationships in terms of what they said or didn't say about causality.

# **Appendix**

# **Codebook for the Subset of the 2018 General Social Survey**

The General Social Survey (GSS) is a large, national probability sample of adults in the United States. It began in 1972 and continued on an almost yearly basis until 1996. In 1996, the GSS became a biannual survey and the sample size increased. Many questions are asked on each survey, while other questions are rotated from survey to survey. This subset from the 2018 GSS includes all the cases (2,348) and 80 variables. This data set has already been weighted using the weight variable supplied by the GSS (WTSS). Some of the original GSS variables were recoded and a few new variables created. Some of the new variables have names similar to those in the original GSS data set. The data set was created to accompany these exercises and is named GSS18ABORTION.SAV.

**Variable** **Description of Variable**

ABANY Abortion if woman wants for any reason

ABDEFECT Abortion if strong chance of serious defect

ABHLTH Abortion if woman's health seriously endangered

ABNOMORE Abortion if married and wants no more children

ABPOOR Abortion if low income and can't afford more children

ABRAPE Abortion if pregnant as result of rape

ABSINGLE Abortion if not married

ABORTIONR Composite variable – attitude toward abortion (for comparison purposes)

AGE Age of respondent

AGED Should aged live with their children?

ATTEND How often respondent attends religious services

BIBLE Feelings about the bible

CAPPUN Favor or oppose death penalty for murder

CHILDS Number of children

CLASS Subjective class identification

COLATH Allow anti‑religionist to teach

COLCOM Allow communist to teach

COLHOMO Allow homosexual to teach

COLMIL Allow militarist to teach

COLMSLM Allow anti-American Muslim Clergyman to teach in college

COLRAC Allow racist to teach

DEGREE Respondent's highest degree

DENOM Specific Protestant denomination

EDUC Highest year of school completed

ETHNICITY Respondent’s race/ethnicity[[3]](#footnote-3)

FAIR People fair or try to take advantage

FEAR Afraid to walk at night in neighborhood

FINRELA Opinion of family income

FUND Fundamentalism of respondent’s religion

GRASS Should marijuana be made legal?

GUNLAW Favor or oppose gun permits

HAPMAR Happiness of marriage

HAPPY General happiness

HEALTH Condition of health

ID Respondent’s identification (id) number

INCOME16 Total family income (2017)

LIBATH Allow anti‑religious book in library

LIBCOM Allow communist's book in library

LIBHOMO Allow homosexual's book in library

LIBMIL Allow militarist's book in library

LIBMSLM Allow anti-American Muslim clergyman's book in library

LIBRAC Allow racist's book in library

MADEG Mother's highest degree

MAEDUC Highest year school completed, mother

MARITAL Marital status

PADEG Father's highest degree

PAEDUC Highest year school completed, father

PARTYID Political Party Affiliation

POLVIEWS Think of self as liberal or conservative

PORNLAW Feelings about pornography laws

POSTLIFE Belief in life after death

PRAY How often does respondent pray?

PRAYER Support Supreme Court Decision on prayer in public schools

PRES12 Vote for Romney or Obama in 2012

PRES16 Vote for Clinton or Trump in 2016

RACE Race of respondent

REGION Region of interview

RELIG Respondent's religious preference

RELIG1 More detailed breakdown of religious preference

RELITEN Strength of religious affiliation

RELPERSN Respondent considers self a religious person

SATFIN Satisfaction with financial situation

SEX Respondent's sex

SIZE Size of place respondent lives in thousands

SPDEG Spouse's highest degree

SPEDUC Highest year school completed, spouse

SPKATH Allow anti‑religionist to speak

SPKCOM Allow communist to speak

SPKHOMO Allow homosexual to speak

SPKMIL Allow militarist to speak

SPKMSLM Allow anti-American Muslim clergyman to speak

SPKRAC Allow racist to speak

TRUST Can people be trusted?

WTSS Weight variable for GSS18 (data subset already weighted by the variable WTSS)

YEAR Year of survey (2018 for all respondents)

ZODIAC Respondent's astrological sign

ZZATTEND1 Recoded attendance at religious services

ZZABORTION1 Recoded attitude toward abortion  
ZZPARTYID1 Recoded political party affiliation  
ZZPOLVIEWS1 Recoded think of self as liberal or conservative

1. You can check this assumption with our data. Crosstab RELPERSN and PARTYID1 and see if this assumption is correct. [↑](#footnote-ref-1)
2. The null hypothesis is often called the hypothesis of no difference.  We’re saying that there is no relationship between these two variables.  In other words, there’s nothing there. [↑](#footnote-ref-2)
3. This variable was created by combining responses to a question asking the respondent’s race (coded as White, Black, and Other), and another question asking whether the respondent is Hispanic. Any respondent identifying as Hispanic was so classified, regardless of race. [↑](#footnote-ref-3)