Statistics for Social Research I

David D. Reedy

Omega Graduate School

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Professor

Dr. Sean Taladay

Assignment

### *Developmental Readings*

Review Assignment #3, the course essential elements, assigned readings, and recommended readings to identify selections of books and scholarly articles to identify and select developmental reading sources and entries.

* Refer to the “[Student Guide to Developmental Readings](https://drive.google.com/file/d/161V_FaYR2BnNGCSFUlWPjUSIQzcH04Hq/view?usp=share_link)” for updated information on sample comments, rubrics, and key definitions related to developmental readings.

**Source One:** Frost, J. (2020). *Introduction to statistics: An Intuitive guide for analyzing data and unlocking discoveries*. Statistics by Jim Publishing.

**Comment 1:**

**Quote/Paraphrase:**

“…descriptive statistics to summarize and graph the data for a group You choose. This process allows You to understand that specific of observations. Descriptive statistics describe a sample…descriptive statistics, there is little uncertainty because you are describing only the people or items that you actually measure. re not trying to infer ›properties about a larger population.” (Frost, 2020, p. 140) “Central tendency: Use the mean or the median to locate the center of the dataset. This measure tells you where most values fall.” (p. 140)

“Dispersion: How far out from the center do the data extend? You can use the range or standard deviation to measure the dispersion. Low dispersion indicates that values cluster more tightly around the center. Higher dispersion signifies that data points fall further away from center.” (p. 140)

“Skewness: The measure tells You whether the distribution of values is symmetric or skewed.” (p. 141)

“Correlation: The strength of the tendency for two variables to change together.” (p.141)

Inferential statistics takes data from a sample and makes inferences about the larger population from which the sample was drawn. The goal of inferential statistics is to take a sample and generalize properties to a population…we need to have confidence that our sample accurately reflects the population. This requirement affects process. At a broad level, we must do the following: Define the population we are studying. Draw a representative sample from that population. Use analyses that incorporate the sampling error. We do not get to pick a convenient group…need a sampling procedure that tends to produce a sample that accurately reflects the population from which you draw it. Random sampling is a procedure that allows us to have confidence that sample represents the population…critical characteristic of random samples is that they produce sample statistics that tend to be correct on average.” (p. 143)

**Essential Element:** This selected material covers the essential elements of descriptive statistics.

**Additive/Variant Analysis:** This material is additive to my understanding of descriptive statistics.

**Contextualization:**  This section is helpful in summarizing key information that is fundamental to the understanding and use of statistical methods. Descriptive statistics focus only on the observed group or phenomena and do not seek to extrapolate predictions that could refer to the population as do inferential statistics. The author could be clearer here though in describing some of the basic descriptive elements such as mean or median in that the use of central tendency and frequency distribution is also used in inferential statistics. But I understand his point that we can quantify data to assist in understanding the observations we are considering using these techniques. He is clear that the key aspect to central tendency is that using the mean or median helps to find where an observed characteristic is most likely to fall. Dispersion assists in this as results with a wide dispersion indicate more variety of the characteristic observed in the population or sample studied whereas a narrow dispersion would indicate much more consistency around a particular aspect of a characteristic observed.

 I understand correlation as looking at relationships or comparing if two or more variables are potentially related to one another. As the author states, we are looking to see if they change together. Here we would likely be looking at an independent variable and one or more dependent variables. This would fall more in the realm of inferential statistics since we would be manipulating the independent variable. But it seems that correlation could be used for descriptive and inferential approaches. If one were simply observing variables in a particular group and not manipulating any of these variables, nor seeking to extend the observations in a predictive way to the wider population, it seems correlation would still be useful to see if as one variable changes naturally and impacts one or more variables. The key here to remember is we are still primarily “describing” not inferring. We can potentially find that variables change together but this does not necessarily indicate what the causal factors are. But such data could be useful for pointing directions forward for additional research.

**Comment 2:**

**Quote/Paraphrase**

“Quantitative: The information is recorded as numbers and represents objective measurement or a count. Temperature, weight, and a count of transactions are all quantitative data. Analysts also refer to this type as numerical data.” (p. 19)

“Qualitative: The information represents characteristics that you do measure with numbers. Instead, observations fall within a count number of groups. This type of variable can capture information that is not easily measured and can be subjective. Taste, eye color, architectural style, and marital status are all types of qualitative variables.” (p. 19)

“Quantitative Data…continuousvariables can take on any numeric value, and the scale can meaningfully divided into smaller increments, including fractional decimal values. There are an infinite number of possible values between any two values. And differences between any two values are always meaningful. Typically, You measure continuous variables on a scale. For example, when You measure height, weight, and temperature you have continuous data.” (p. 19)

Statisticians divide continuous data into two types that You measure using the following scales: Interval scales: On interval scales, the interval, or distance, between two points is meaningful. For example, the 20-degree difference between 10 and 30 Celsius is equivalent to the difference between 50 and 70 degrees. However, these scales don’t have a zero measurement…” (p. 19) “Ratio scales: On ratio scales, intervals are still meaningful. Additionally, these scales have a zero measurement that represents a lack of property. For example, zero kilograms indicates a lack of weight.” (p. 20)

Discretequantitative data are a count of the presence of a characteristic, result, item, or activity. These counts are non-negative integers. that cannot be divided into smaller increments. For example, a single household can have 1 or 2 cars, but it cannot have 1.6. There are a finite number of possible values between any two values.” (p. 25)

“Qualitative Data…There are three types of qualitative variables-categorical, binary, and ordinal. With these data types, you’re often interested in the proportions of each category. Consequently, bar charts and pie charts are conventional methods for graphing qualitative variables because they are useful for displaying counts and relative percentages of each group.” (p. 25)

“Ordinal data have at least three categories, and the categories have a natural order…ordinal variables have a combination of qualitative and quantitative properties. On the one hand, these variables have a limited number of discrete values like categorical variables. On the other hand, the differences between values provide some information like quantitative variables. However, the difference between adjacent values might not be consistent…the numbers have limited usefulness because the differences between ranks might not be constant.” (p. 29-30)

**Essential Element:** This material focuses on the essential element levels of measurement.

**Additive/Variant Analysis:** This material is additive to my understanding of the basics of statistics and is helpful for cross relating to the other course on research design as it discusses levels of measurement in conjunction with the differences in qualitative and quantitative research.

**Contextualization:** This material helps to clarify the appropriate levels of measurement for a particular research approach. For example, if I were conducting a qualitative research project I would focus on nominal and ordinal levels of measurement as the focus would be understanding and interpreting the observations based on categories or patterns rather than on quantifying the variables for predictive purposes. For instance, I might be trying to categorize or summarize a particular set of observations which would be nominal data such as counting how many men or women I have in a study. I could further use such nominal data to break this down into a proportion. I might use ordinal data to rank how people feel about a particular issue which could also be helpful to describe how frequently people feel a certain way or the proportions of those who feel strongly one way compared to those who feel strongly another way. Interval/ordinal data might also be useful. For instance, asking if women care more about an issue than men would use nominal and ordinal data but if I further broke that down by age, I would be using interval data as the interval “…between the two points is meaningful.” (p. 19) If, however, I am seeking to make predictions from a sample to a larger population and are engaging in quantitative research to test a hypothesis I would likely need to also use interval and/or ratio levels of measurement. It is a bit confusing because with the example of age, it feels descriptive, but here the author helps to explain that categorial data, though counted or characterized is primarily non-numerical in that it deals with a category or quality, whereas a characteristic such as age is a numerical value and the categories or ranks to have numerical meaning, whereas a category may be ranked (ordinal) but the ranking doesn’t equate to numerical meaning.

The author here also gives a key to remembering the difference between interval and ratio data, in that ratio has meaningful intervals as interval data but can capture the absence of a characteristic whereas interval data always assumes the presence of a characteristic. Thus, I would argue that in a study utilizing age that age would be interval data as my subjects are alive and thus cannot lack age.

**Source Two:** Ngetich, A. (2024). *Introduction to statistics*. Toronto Academic Press. <https://ereader.perlego.com/1/book/4501051/1>

**Comment 3:**

**Quote/Paraphrase**

“A variable is any trait that differs from one specific member of the population to another, i.e., a feature that changes from one person or entity to another.” (p. 14)

“Discrete variables can be counted, such as the number of kids in a household, the number of accidents on a particular road on various days, or the number of students enrolled in a statistics program.” (p. 15)

“A variable is discrete if only a finite number of unique distinct values exist.” (p. 15) “In theory, it is possible to measure a quantity precisely…there is no separate unit…referred to as continuous, differs fundamentally from a discrete variable.” (p. 15) “Variables can be characterized by the scale on which they are specified and categorized as either qualitative or quantitative.” (p. 15)

“There may or may not be a natural ordering of the categories that a qualitative variable falls into. For instance, there is no inherent ordering among occupational groups. The term “nominal” refers to the concept that the groups are just names, and when the categories of a qualitative variable are unsorted, the qualitative variable is referred to as a nominal scale. An ordinal scale is one in which the divisions can be arranged in any order.” p. 16)

“Whether discrete or continuous, quantitative variables are specified on a ratio or interval scale. The quantitative variable is defined on an interval scale if one can effectively evaluate the variances between measures of the variable but not the ratio of the measures. On the contrary, if it is possible to effectively contrast both the ratio of the measurements and the discrepancies between measures of the variable, then the quantitative variable is described on the ratios scale (Kottke, 2000). A ratio scale is an interval scale with a significant absolute zero point. For the ratio of the measurements to be substantial, the variable must have a naturally important absolute zero point. For instance, a person’s height is a ratio variable, while the temperature measured using the Celsius system is an interval variable (Daszykowski et al., 2007).” (p. 16)

“The value of a qualitative or discrete quantitative variable that appears most frequently in a data set is known as the sample mode.” (p. 16)

The variable value in a data set that divides the set of observed values in half, with the observed values in one half being less than or equal to the median value and the experimental values in the other half being greater than or equal to the median value is known as the sample median for a quantitative variable. (p. 18)

“The sample range is determined by calculating the variable’s highest observed value and its lowest value within a data group.” (p. 19) “Moreover, much information is lost when employing the range because only the variable’s highest and lowest recorded values are considered.” (p. 19)

**Essential Element:** This material relates to the essential element measurement levels.

**Additive/Variant Analysis:** This material is additive to my understanding of the relationship between measurement levels and research methods.

**Contextualization:** This is a bit clearer in laying out the connection between levels of measurement and research methods than the previous author. Recognizing the nature of the variables being observed or tested not only helps to recognize if one is dealing with qualitative or quantitative data, but also helps to understand which level(s) of measurement are appropriate for the particular variable. It is helpful to remember qualitative variables (even though they may be counted or even ranked) focus on categories or qualities while quantitative variables represent an amount or quantity. It is important to note that qualitative variables can be measured using a nominal scale (such as counting how many there are) or an ordinal scale representing a meaningful order or ranking but where the intervals are not necessarily equal.

 This material also explains that the difference between ratio and interval is a bit more complicated than just ratio having the absence of an observed characteristic. Interval data may have equal distance or difference between values across a particular scale, but they can have negative value and zero is arbitrary on the scale such as in temperature. Zero degrees does not mean an absence of temperature. Ratio data not only contains a true zero, or absence of the characteristic, but can as the name implies enables making a meaningful ratio, for instance being able to say one value is twice as much as another. With temperature, one might be tempted to think that 40 degrees is half as hot as 80 degrees, but in the grand scheme of things this ratio does not hold up because there is never an absence of temperature. Because with a true zero you have a meaningful starting point, it would make sense to say a man six feet tall is twice as tall as a child who is three feet tall.

**Source Three:** Terrell, S. R. (2012). Statistics translated: A step-by-step guide to analyzing and interpreting data. Guilford Press.

**Comment 4:**

**Quote/Paraphrase**

“The first major part of the hypothesis is called the independent variable and is the ‘cause’ we want to investigate. In most instances, the independent variable will contain two or more levels…gender, …had two levels, male and female.” (p. 4)

“…interested in determining the effect of something that occurs naturally and does not require intervention by the researcher or statistician, they are called nonmanipulated independent variables (these are sometimes called quasi-independent variables). In cases where the researcher has to actively manipulate a variable by randomly setting up groups or assigning objects to a class, the independent variable is described as being manipulated or experimental.” (p. 34)

“…Theoretically, an independent variable can have an infinitive number of levels but, in reality, seeing an independent variable with more than four or five levels is unusual…we can also have more than one independent variable.” (p. 36)

to research or test a what “…will cause an event to occur they then have to determine what they will use to measure its effect.  The second part of the hypothesis is called the dependent variable.” (p. 5)

“…the dependent variable represents the “effect” we want to measure.” (p. 37)

**Essential Element:** This material relates to the essential elements of levels of measure and dependent and independent variable.

**Additive/Variant Analysis:** This comment is additive to my understanding of identifying the role of variables in research as well as how variables connect to various levels of measurement.

**Contextualization:**

Taking this information with what has been noted above, it is apparent that the variables identified will also have a connection to the levels of measurement employed in understanding those variables. It is clear that the dependent variable is the observed phenomena that has been influenced by changes in another variable (the independent variable). The independent variable is observed or manipulated to see if it affects the dependent variable. It makes sense to conclude based on variables and levels of measurement that the nominal level would focus on independent variables being described or measured in terms of categories or groups. For example if I were to test if Ibuprofen helped alleviate swelling in a sprained ankle using a standard dose, the independent variable would be the presence or absence of Ibuprofen (nominal – binary) and the depend variable would be impact on swelling which could be nominal (it helped, it didn’t help) or ordinal (measuring a satisfaction level such as worse, no change, some improvement, lots of improvement). If, however, I was conducting a test of the impact of Ibuprofen on fever the dependent variable would be the fever, and the level of measurement would be interval as we are now dealing with a quantity but one without a true zero point. (Though I confess here it is confusing because a living human being will not test out with a negative temperature, but supposing temperature in general is an interval measurement this sort of data would also be interval.)

It also seems to me that as a particular research project may employ more than one independent variable, it may also have more than one dependent variable. For example, providing Ibuprofen and examining the impact on both fever and pain. I can envision a scenario where the research might contain both multiple independent and dependent variables such as if I wanted to explore pastors teaching confirmation students using two or more methods and exploring two or more effects such as retention in church after confirmation, or reported student satisfaction, or parental satisfaction. Though we have not discussed complicated hypotheses and associated research techniques, it would be safe to conclude these are advanced statistical processes and that having a clear understanding of the variables, and the levels of measurement employed would be even more critical in a complex research project.

**Source 4**

Espinosa, G. (2023). Nones, no religious preference, no religion, and the misclassification of Latino religious identity. religions, 14(3), 420. https://doi.org/10.3390/rel14030420

**Comment 5:**

**Quote/Paraphrase**

“This article challenges the conventional wisdom about the reported decline of Christianity and Protestantism in the U.S. and the rise of the “nones” among Latinos. It does so by cross-examining the growth of the “nones” (those respondents reportedly having no religion and/or no religious preference) in the U.S. Latino community, which is slated to make up almost 28 percent of the U.S. population by 2060. In 2000, we stumbled, quite by accident, upon a remarkable discovery in the Latino community: that many of the so-called “nones” were, in fact, under cross examination against other religious identity questions, religious, spiritual, and/or believed in God or a higher power. In some cases, they were born-again Christians who rejected the label “religion” (and thus reported having “no religion”) as a descriptor of their faith. Many self-identified as and/or attended independent and non-denominational Evangelical and/or Pentecostal/Charismatic churches. To test these initial findings and to try to secure a more accurate reading of the “nones” respondents, our research team added a follow-up question for the “no religion” respondents to the screening questions section so they could explain what they actually meant in the Latino Religions and Politics (LRAP) national surveys in 2012 and 2020. We also cross-analyzed the “no religion” and “no religious preference” respondents against other religious identity questions, such as being born-again and church attendance, and was surprised to find that more than 60% of them reported believing in God or a higher power and/or being Christian, Catholic, or Protestant, religious, spiritual, or something other than having no religion. More surprising and counterintuitively, we found that more than 40% of those reporting “no religious preference” and 17% of those who reported having “no religion” also self-reported being born-again Christians. All of this problematizes the conventional wisdom about the identity and growth of the “nones” in the Latino community and could (though we do not claim or explore this here) problematize our understanding of the “nones” and the changing contours of religion and secularization in American society.” (Espinosa, 2023, p. 1)

**Essential Element:** This material relates to the essential elements levels of measurement and independent dependent variable.

**Additive/Variant Analysis:** This material is additive to my understanding of descriptive statistics and levels of measurement as it provides an opportunity to parse the study through the lens of statistical method.

**Contextualization:** The independent variable here is the self-reported classification of no religion or no religious practice. The study is seeking to understand if various studies have accurately captured this when examining specific observations related to religious identity (the dependent variables). The research is primarily qualitative because it is exploring how subjects actually perceive their spiritual lives. It deals primarily with categories which are a characteristic of descriptive statistics. The variables are examined at the nominal level. For instance, the category of “no religion” or “no religious preference” is nominal as it represents a group or category without any meaningful ranking or order. The religious identity questions identified in the abstract such as being “born-again” or “church attendance” are also nominal as they separate the subjects into groups but without ranking or order. This does not mean that the data cannot be quantified or represented with numbers. For example, the study finds that 60% of subjects who identified in previous studies within the categories of “no religion” or “no religious preference” actually reported some belief in God or a higher spiritual power. The study relies on descriptive statistics but does make inferences form their samples to the wider Latino population thus suggesting the use of some inferential statistics as well.

**Source 5** Inman, M. L., Johansen, D., & Sherman, D. (2023). Church affirmation moderates the relationship between weight-rejection-sensitivity and body dissatisfaction in young adults in the USA. *Journal of Religion and Health*, *62*(4), 2585–2608. <https://doi.org/10.1007/s10943-022-01688-1>

**Comment 6:**

**Quote/Paraphrase**

“Systematic research on the role of social affirmation from one’s religious community on body evaluations is absent. This study therefore explored the relationships among feeling affirmed-from-church, weight-rejection sensitivity, and body evaluations. Drawing from self-affirmation theory, we tested whether a social aspect of religiosity (i.e., feeling affirmed from one’s religious community) attenuated the relationship between weight-rejection anxiety and body dissatisfaction, controlling for body mass, affect, and church attendance. We also examined gender differences in religiosity, body image, and fat talk in secular and religious circles in a sample of young adults in the USA (187F, 84M; Mage = 18.59, SD = 0.83). As predicted, both men and women reported hearing less fat-talk at church than among friends, and women reported a positive relation between feeling affirmed-from-church and hearing body-acceptance talk at church. The moderation prediction was supported for women. Greater affirmation-from-church weakened the effect of women’s weight sensitivity on body satisfaction (but not weight esteem). For men, affirmation-from church strengthened the effect of their weight sensitivity on body dissatisfaction and low weight esteem. Feeling affirmed from church may facilitate women’s body satisfaction despite their weight-sensitivities. Theoretical and practical implications are discussed.” (Inman et al., 2023, p. 2585)

**Essential Element:** This material relates to the essential element descriptive statistics.

**Additive/Variant Analysis:** This material provides an opportunity to consider the study through the lens of descriptive statistics considering the meaning communicated by the mean and standard deviation reported.

**Contextualization:** The abstract indicates that the study consisted of 187 women and 84 men. It found that for women feeling affirmed at church was positively correlated to hearing body-acceptance talk. However, for men the same affirmation could exacerbate dissatisfaction with their body increasing sensitivity to their weight issue. Looking at the mean and standard deviation is helpful in contextualizing and understanding this result even though it is not discussed in the abstract. The average age of participants was 18.59. The subjects cluster fairly tightly around the mean with a standard deviation of .83 years. This suggests that a potential avenue for future research could focus on developmental stages as there is established evidence that males and females are at typically at different points of mature in this transitionary time of young adult hood both cognitively and experientially. Had the standard deviation demonstrated a higher dispersal across age groupings, one might take a different approach for future research perhaps asking if men and women hear in general interpret the same message around body image differently, for instance if women prefer to address an emotional issue and are assisted by affirmation whereas men prefer to ignore an emotional issue and are not assisted by affirmation as it forces confrontation with the emotion.

**Comment 7:**

**Quote/Paraphrase**

“Based on the above literature, we expected (a) gender differences such that women would report stronger weight-sensitivity, stronger religiosity, and body dissatisfaction (low body esteem) than men; (b) affirmation-from-church would weaken the negative relation between weight-sensitivity and body evaluations, controlling for other variables such as body mass, affect, church attendance, age, religion, and race; (c) affirmation-from-church would be positively related to hearing positive body-talk at church; and (d) more positive body-talk (and less fat-talk) would occur at church than among secular friends.” (Inman et al., 2023, p. 2590)

**Essential Element:** This material is related to the essential element independent dependent variable.

**Additive/Variant Analysis:** This material is additive to my understanding of the role of variables in a study and particularly to the importance of understanding the independent and dependent variables.

**Contextualization:** There are four identified hypotheses being tested in this study. The first hypothesis compares the independent variable gender (nominal) with the dependent variables of weight-sensitivity, religiosity, and body dissatisfaction expecting to see a stronger values for women than men. The second hypothesis compares the independent variable affirmation from church to the dependent variables weight sensitivity and body evaluations expecting a negative correlation in that as affirmation increased sensitivity would decrease. The third hypothesis also tests the independent variable affirmation from church against the dependent variable hearing positive body talk at church. This one is a bit more confusing to me in that it would seem that the variable that is being observed as changing is the presence of positive body talk and the effect is feeling affirmed at church. But I suppose the way the study is designed the factor focused on for its potential impact is affirmation because hearing positive body talk is being observed here as an outcome rather than a cause. But to me, it would make better research sense to reverse these variables. The fourth hypothesis examines the independent variable at church or in a secular environment (nominal-binary) with the dependent variables amount of positive body-talk vs. fat talk. This one is more straight forward with the expectation that the location will cause an effect in the type of conversation heard.

**Comment 8:**

**Quote/Paraphrase**

“Our third prediction that affirmation-from-church would be related to hearing more body acceptance talk at church was supported for women. As shown in Table 4, affirmation-from-church was positively related to hearing body-acceptance talk at church, for women, r(170) = .18, p = .020, and the correlation for men did not reach the standard level of significance, r(75) = .20, p = .083. Of note, for men, affirmation-from church was positively related to hearing fat-talk at church, r(75) = .26, p= .020.” (Inman et al., 2023, p. 2599)

**Essential Element:** This material relates to the essential element levels of measurement.

**Additive/Variant Analysis:** This material is additive to my understanding of using various levels of measurement to help understand variables.

**Contextualization:** Affirmation from church is an independent variable measured at the interval level. It reflects something that can be measured on a scale and examined in relationship to other variables. The same is true of the frequency for hearing body-acceptance talk at church and hearing fat-talk at church. There is “more” and “less” which indicate interval data. The variable of gender is nominal and is being used here to compare two different groups. It is possible that the first three are ordinal data where the differences in perception are yet consistent and meaningful but ordered by category such as “never, sometimes, often.” As we move further into the material in additional courses it would be interesting to learn which statistical tests and methods are used with ordinal data or interval data for correlation and how treating the data as ordinal or interval might color interpretations.

**Source 5** Pop, M. R., & Pop, C. M. (2024). Antecedents and perceived benefits of religious conversion—an exploratory study within a protestant congregation. *Religions*, *15*(2), 156. <https://doi.org/10.3390/rel15020156>

**Comment 9:**

**Quote/Paraphrase**

“In the current study, we have considered the following hypotheses: H1. A highly personalized and individualized experience positively impacts religious conversion. H2. The family can exert significant influence in religious conversion. H3. Friendships play a positive role in influencing the religious conversion process. H4. Pastors and preachers, by assuming roles as educators, guides, mentors, and leaders within their religious communities, have a positive influence on religious conversion.” (Pop and Pop, 2024, p. 5)

“H5. Perceived spiritual benefits are positively associated with the overall satisfaction of parishioners determined by religious conversion and church participation. (p. 5)

“H6. Perceived emotional benefits are positively associated with the overall satisfaction of parishioners determined by religious conversion and church participation.” (p. 6)

“H7. Perceived social benefits are positively associated with the overall satisfaction of parishioners determined by religious conversion and church participation.” (p. 7)

H8. Perceived cultural benefits are positively associated with the overall satisfaction of parishioners determined by religious conversion and church participation.” (p. 7)

“During the study, participants were allowed to elucidate the impact of response choices on their determination to engage in the religious community of the Seventh-day Adventist Church. Essentially, this encompassed their deliberations regarding membership in the aforementioned religious institution. This research examined the influences emanating from the self, their familial ties, social network (comprising friends), and the pastoral guidance received. Respondents were tasked with assessing and quantifying the relative strength of influence attributed to these four factors, employing a numerical scale ranging from 0 to 100.” (Pop and Pop, 2024, p. 7)

**Essential Element:** This material relates to the essential elements independent and dependent variables and levels of measurement.

**Additive/Variant Analysis:** This material is additive to my understanding of the relationship of independent and dependent variables within a study.

**Contextualization:**

For most of these hypotheses the dependent variable is the decision to convert to the Seventh-Day Adventist Church. Various independent variables are tested to examine if they influence this decision such as self-influence, family influence, friend’s influence, pastor’s influence. For the two remaining independent variables, perceived spiritual benefits and perceived emotional benefits it is noted that the dependent variable examined in relationship to the independent variable is overall satisfaction with “religious conversion and church participation” functioning as a moderating or control variable. This study provides a good example of how a multitiered set of hypotheses maybe formulated to understand a phenomenon with a particular variable of interest shifting roles in the observation/experiment.

 This study makes use of both ordinal and nominal levels of measurement. In these hypotheses the independent variable could have been ordinal as the participants are rating their experience on a scale. However, given the study specifically used a scale of 0-100 (which has a true zero point) this indicates the data is ratio. The decision to convert is nominal, specifically binary as it is either yes or no. While in the latter two hypotheses the material does not specify is perceived social benefits or cultural benefits was also rated on a scale of 0-100, it would likely be the researchers used a consistent method making this also ratio data, but if something more general was used to capture this information it could be ordinal. This demonstrates the flexibility in rating “influence” as one could have used a satisfaction scale with ordinal data but here researchers used a ratio scale enabling the measurement of a true zero point or a lack of influence.

**Source 6** Rowe, S. W., Arghode, V., & Bhattacharyya, S. S. (2024). A study on adaptive performance, work-related psychological health, and demographics in Episcopal Church bishops. *Journal of Work-Applied Management*, *16*(1), 31–47. <https://doi.org/10.1108/JWAM-02-2023-0015>

**Comment 10:**

**Quote/Paraphrase**

The purpose of this research study was to explore the relationship between adaptive performance and work-related indicators of psychological well-being among ‘The Episcopal Church bishops.’ Design/methodology/approach – Hierarchical regression models were used in this research study to explore the relationship between adaptive performance and work-related psychological health. (p. 31)

“H1. Age will be positively correlated with adaptive performance.

H2. Years of ordained ministry will be positively correlated with adaptive performance.” (Rowe et al., 2024, p. 34)

“H3. Years ordained as a bishop will be positively correlated with adaptive performance.” (p. 35)

“H4. The number of placements will be positively correlated with adaptive performance. (p. 35)

H5. The size of the parish served prior to ordination as a bishop will be positively correlated with adaptive performance.” (p. 35)

“In the first phase, descriptive statistics were computed to describe the population,” (p. 36)



(p. 37)

**Essential Element:** This material illuminates the essential elements of descriptive statistics and levels of measurement.

**Additive/Variant Analysis:** This material is additive to my understanding of the roles of central tendency as well as illustrating various ways of presenting data related to descriptive statistics.

**Contextualization:** Descriptive statistics are used to help the reader of the study understand the population considered. In the first table measures of central tendency and variability are provided. The mean and SD for years ordained suggest that most of the 117 bishops surveyed have between 20 and 40 years of ordained experience, which would indicate a fairly good population for considering the issue of adaptive performance and psychological well-being. As a minister this would communicate to me that these are individuals with enough experience to have settled into a steady pattern of behavior. The years ordained present a bit different picture. With a mean of 9.2 and a SD of 7.16, this would suggest a greater variety in years of experience as a bishop with most respondents falling between 2 to 16 years of experience. It would be reasonable to consider if newer bishops were more flexible in their role response than older bishops and to consider if the stress of learning a new job vs being in a settled position would have a bearing on reported psychological well-being. Based on the mean and SD, the number of positions held for most respondents falls within 3-7, which indicates some variety in experience based on location but variability which also as a minister raises some questions. For instance, how might the number of positions held correlate with the length of service since ordination? Clergy who bounce often from position to position could potentially be exhibiting less functionality in general based on potential emotional or social issues than those who have remained longer in fewer positions who would likely also be more emotionally stable and have better social skills as this may indicate a most positive relationship with the congregation. This is not the purpose of this study but reading this as a minister I would wonder if inherent psychological issues in some clergy may have an impact on trying to relate adaptability and psychological well-being. Ironically, the study found that as years ordained increased interpersonal adaptability decreased. (p. 40) The study found no other substantial relationships between demographic variables (independent variable) and adaptive performance (dependent variable). (pp. 38-42) However, the study did find increased adaptability correlated with increased work-related psychological health. (p. 31) It may very well be that the number of assignments compared to time served was fairly consistent across most of the population indicating few outliers with inherent mental health issues that could skew the data.

The ordinal data of age is presented in a frequency table with distributions and might have been more effectively communicated with a pie chart. Almost all are between the ages of 50 – 70 rather evenly spread around the age of 60. This communicates mature individuals as well as having experience, which is a correlation one would expect as both age and years of experience are measures across time. The study found no correlation between age and adaptability. (p. 38) This is interesting given the study did find a negative correlation between the number of years as a bishop and adaptive performance which could indicate something unique about the role of bishop compared to other clergy roles that came previously.

**Source 8** Upenieks, L. (2023). Spiritually Well, Mentally Well? Examining the Early Life Religious Antecedents of the Impact of Spiritual Well-Being on Mental Health Among United Methodist Clergy in North Carolina. *Journal of Religion and Health*, *62*(4), 2656–2685. <https://doi.org/10.1007/s10943-023-01822-7>

**Comment 11:**

**Quote/Paraphrase**

“Research has consistently shown that the seeds of religiosity are planted and begin to take form during early life socialization, but little attention have been given to these dynamics among clergy members. In this study, we consider whether early life religious exposure may amplify the beneficial effects of spiritual well-being (having a “thriving” spiritual life) for mental health and burnout for clergy. Drawing from a life course perspective, we use longitudinal data from the Clergy Health Initiative, which sampled United Methodist Clergy in North Carolina (n = 1330). Key results suggest that higher frequencies of childhood religious attendance were consistently associated with lower depressive symptoms and burnout. The beneficial associations between spiritual well-being and lower depressive symptoms and burnout were also stronger for clergy with greater church attendance in childhood. The accumulation of “religious capital” for clergy who were raised in religious households with regular service attendance appear to accentuate the positive effects of spiritual wellbeing, which encompass a greater sense of closeness to God in their own lives and in ministry. This study identifies the importance of researchers taking a “longer” view of the religious and spiritual lives of clergy.” (Upenieks, 2023, p. 2656)

“Hypothesis 1 Greater spiritual well-being (in everyday life) will be associated with lower depressive symptoms and lower burnout.

Hypothesis 2 Greater spiritual well-being (in ministry) will be associated with lower depressive symptoms and lower burnout.

Hypothesis 3 The association between greater spiritual well-being (in everyday life) and lower depressive symptoms/burnout will be stronger for clergy with higher childhood religious attendance.

Hypothesis 4 The association between greater spiritual well-being (in ministry) and lower depressive symptoms/burnout will be stronger for clergy with higher childhood religious attendance.” (p. 2663)

**Essential Element:** This material is related to the essential element independent and dependent variable.

**Additive/Variant Analysis:** This material is additive to my understanding of the identification of and utilization of variables in a study.

**Contextualization:** The author states, “In this study, we consider whether early life religious exposure may amplify the beneficial effects of spiritual well-being (having a “thriving” spiritual life) for mental health and burnout for clergy.” (p. 2656) This statement alone would suggest that the structure of the study would be identifying the variable of early life religious exposure (nominal, binary) as the independent variable with the subjects reporting on perceived well-being which suggests collecting quantifiable data on a scale, likely ordinal. However, reading further into the text we find the variables utilized differently.

“Dependent Variables:   Depressive symptoms We measured depressive symptoms using the validated Patient Health Questionnaire… Burnout We also included the Maslach Burnout Inventory as an outcome variable, which consists of three separate scales that measure different aspects of burnout (Maslach & Jackson, 1986).” (p. 2664) “Focal Independent Variables: We used the Clergy Spiritual Well-Being Scale to assess two kinds of spiritual well-being (SWB) developed in collaboration with Methodist ministers…”(p. 2664)

 This indicates that while childhood religious attendance is treated as an independent variable, spiritual well-being is not being examined as a dependent variable but also as an independent variable. The dependent variables are actually depressive symptoms and burnout. Spiritual well-being is being utilized to explain the outcomes of depressive symptoms and burnout. It is actually not being explained by other variables in the study.

 However, when we consider the hypotheses something else about research approach and identification of variables comes to light. “Hypothesis 3 The association between greater spiritual well-being (in everyday life) and lower depressive symptoms/burnout will be stronger for clergy with higher childhood religious attendance. Hypothesis 4 The association between greater spiritual well-being (in ministry) and lower depressive symptoms/burnout will be stronger for clergy with higher childhood religious attendance.” (p. 2663). This suggests a way to consider three variables, with spiritual well-being functioning as the independent variable and depression/burnout as the dependent variable and higher childhood religious attendance being assumed or as a controlled variable. This is a different approach to considering childhood attendance as an additional independent variable. This seems like a variation on an expected design. It seems to me that to be able to examine the relationship between childhood religious attendance and depression/burnout, the attendance factor would best be treated as an independent variable if one seeks to conclude increased attendance is correlated with less depression and burnout.

 The author states, “A second noteworthy finding observed in the current study, and one more central to the life course perspective, was that higher frequencies of childhood religious attendance were also consistently associated with lower depressive symptoms and burnout among United Methodist clergy.”

(p. 2679) “While there were sporadic moderation patterns for lower frequencies of childhood attendance (e.g., once or twice a year, once a month), the most consistent moderation patterns were observed for attendance at the higher frequencies, nearly every week or more.” (p. 2680) By showing that higher frequencies of childhood religious attendance moderate the relationship between spiritual well-being and mental health outcomes, the study highlights that childhood religious attendance enhances the positive effects of spiritual well-being. This suggests that a strong foundation in religious practices during childhood contributes to better mental health in adulthood. This would suggest childhood attendance was treated as an independent variable in part of the study.

**Comment 12:**

**Quote/Paraphrase**

“Dependent Variables:   Depressive symptoms We measured depressive symptoms using the validated Patient Health Questionnaire-9 (PHQ-9. The PHQ-9 is a nine-item scale with a total range of 0–27. On this scale, scores of 1–4 indicate minimal depression, 5–9 mild depression, 10–14 moderate depression, 15–19 moderately severe depression, and 20–27 severe depression (Kroenke et al., 2001). Burnout We also included the Maslach Burnout Inventory as an outcome variable, which consists of three separate scales that measure different aspects of burnout (Maslach & Jackson, 1986). The scales are (1) emotional exhaustion (i.e., feeling emotionally taxed by one’s work, nine items), (2) depersonalization (i.e., having an impersonal response to people in one’s care, five items), for which high scores indicate burnout, and (3) personal accomplishment (i.e., feeling competent and successful, eight items), for which low scores indicate burnout. The Maslach Burnout Inventory has been studied with populations including social workers and community service workers (Mitchell & Hastings, 2001), as well as clergy (Evers & Tomic, 2003; Miner, 2007; Rodgerson & Piedmont, 1998). The validity of the three-factor structure model has been supported across seven occupational groups, including clergy (Langballe et al., 2006).” (Upenieks, 2023, p. 2664)

“Focal Independent Variables: We used the Clergy Spiritual Well-Being Scale to assess two kinds of spiritual well-being (SWB) developed in collaboration with Methodist ministers: experiencing the presence of God in everyday life (Cronbach’s alpha = 0.91) and experiencing the presence of God in ministry (Cronbach’s alpha = 0.90) (Proeschold-Bell et al., 2014). For each item, the possible range of scores was 0–4 with higher scores indicating higher spiritual well-being, for a possible scale range of 0–24 for each component. Spiritual Well-Being Everyday Life (SWB-EL) The spiritual well-being scale in the everyday (SWB-Everyday) scale began by asking: “During the past 6 months, how often have you...?” The participants then answered these personal items: “experienced the presence and power of God in the ordinary?; observed the presence and power of God in your closest relationships?; consciously practiced discerning the presence and power of God?; felt God’s grace and God’s love for you as you are, apart from any accomplishments or good works?; felt that events were unfolding according to God’s intent?; felt that you have a vital relationship with God?” Response options were as follows: 1 = “Never/Sometimes” (combined to achieve adequate cell size), 2 = “Often,” 3 = “Frequently,” and 4 = “Always”. Spiritual Well-Being Ministry (SWB-M) The spiritual well-being in ministry scale began by asking, “During the past 6 months, how often have you felt the presence and power of God...?” The participants then answered these vocational items: “in planning and leading worship?; when conducting pastoral visitations?; when participating in church-related events (e.g. Bible Study, fellowship time, etc.)?; when sharing in crisis intervention and counseling?; when sharing in the sacraments…Here again, responses were coded as follows: 1 = “Never/Sometimes” (combined to achieve adequate cell size), 2 = “Often,” 3 = “Frequently,” and 4 = “Always”. Childhood Religious Attendance Clergy were asked, “When you were a child, before age 16, how often did you attend religious services?” We included the full range of response options for this variable, which were classified according to the following coding scheme: 1 = “Never,” 2= “Less than once a year,” 3= “About once or twice a year,” 4 = “Several times a year,” 5= About once a month,” 6= “2–3 times a month,” 7 = “Nearly every week,” 8= “Every week,” and 9= “Several times a week.” CovariatesFollowing Milstein and colleagues’ work on spiritual well-being and health, (2020), we control for age (years), race (white = 1, all else= 0), sex, education (master’s degree or higher versus fewer years of education), marital status (not married = 1, married = 0), and the number of children the respondent had. We also control for number of hours worked per weeks, as this could impact depressive symptoms or burnout. We adjusted for income (in dollars) and whether the clergy member lived in a rural area (reference = urban). Clergy were considered to be working in rural areas of they indicated that their current appointment was located either “in a town or a village with less than 10,000 people” or in “rural or open country.” We also controlled for congregation size. In this study, the size of the congregation was measured by the congregant’s report of the number of people who attended weekly services in a typical week. For clergy who served multiple congregations, size was measured as the total attendance of all congregations served. We created a three-category measure of church size, with 1 = 0–99 people (reference), 2= 100–499 people, and 3 = 500 or more people (Table 1). For the sake of space, we do not show the regression coefficients for the covariates in Tables 2, 3, 4, 5, but they are available upon request. As noted in the footnotes of each table, all models adjust for all study covariates.” (pp. 2664-2665)

**Essential Element:** This material relates to the essential element levels of measurement.

**Additive/Variant Analysis:** This material is additive to my understanding of levels of measurement and how they may be utilized in a research study.

**Contextualization:** The study uses nominal data to explain aspects of the population including race, gender, marital status, and rural or urban setting. To evaluate childhood religious attendance and spiritual well-being ordinal data was collected with data on both variables being collected according to frequency intensity across a scale that is not necessarily equal in intervals. Evaluation of depression and burnout utilized intervals as the instruments utilized a scale without a true zero point, but the intervals between the scores were meaningful. Ratio data was also collected including income, number of children, number of hours worked per week and congregational size as these are measures that have a potential zero point and the intervals are meaningful in a way that enables the creation of ratios. This highlights the importance of not only being aware of what variables one is considering and in what role they are functioning (independent, dependent, moderating) but also that it is important to consider what level of measurement the data collected regarding the variables falls within so that appropriate statistical methods are employed. This study illustrates that a research topic can require careful identification of both variables and levels of measurement that incorporate complex variables and utilize all levels of measurement.

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