

4-1-2023

## Metrics and Measurements in Church-Based Research

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### Recommended Citation

Dunaetz, D. R. (2023). Metrics and Measurements in Church-Based Research. *Great Commission Research Journal*, 15(1), 5-18. Retrieved from <https://place.asburyseminary.edu/gcrj/vol15/iss1/20>

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# **Metrics and Measurements in Church-Based Research**

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## **Abstract**

*To better understand the characteristics of specific churches and phenomena that occur across churches, various metrics and measurements can be used to describe them. Measurements must be meaningful and appropriate. Quantities involving people, finances, objects, or events are most frequently counted, but other measures may include behaviors, traits, skills, knowledge, and abilities of individuals. Measuring phenomena is necessary to understand how phenomena are related to each other. Measuring attitudes and beliefs are especially important because many ministries in churches are designed to influence these (e.g., preaching and teaching). However, from a Christian perspective, our motivation behind our measuring is important. We are morally obliged to ensure that measurements made are motivated by a desire to serve others and the Lord, not for boasting in our own accomplishments.*

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## **Metrics and Measurements in Church-Based Research**

Although God's principles to guide human behavior may be universally true, how they interact with cultural and specific situations may vary. For example, will commitment to Christ spill over and manifest itself as

commitment to a local church? Or will our commitment to Christ sometimes cause us to leave one local church and join another? We can philosophize on the conditions under which each should happen, but we can also measure the thoughts, feelings, and behaviors of Christians to better understand when each actually happens. Such insights can help us better develop a theology of local church commitment, providing insights that are both biblically informed and data-informed that can help Christians understand the complexities involved in making wise decisions.

### **What do We Mean by Measurement?**

To make such conclusions, we must collect data which often includes measurements of the phenomena that we want to better understand. Whereas data such as people's stories and their interpretation of the events can be insightful and lead to valid and important conclusions, such qualitative data is subject to the biases of both the person telling about and interpreting the events and the person recording what it is said interpreting it further. Moreover, the limited number of cases that we hear might not be typical of what happens with the broader population; humans and their experiences are so diverse that anecdotal evidence from a small number of informants may blind us to the diversity and variety of experiences that actually occur.

A common approach to limiting the role that our biases bring to data collecting is to seek measurements that are as unbiased as possible, that is, observations that do not depend on the mental state or biases of the researcher, typically by objectively assigning a number to an observation made by the person providing the information. Measurement can be defined as assigning numbers to observations concerning people, objects, or events according to specific rules (Stevens, 1951). These rules should be specific enough so that two different researchers making the same measurement should arrive at the same value, or at least agree on the difference between their observations. For example, two people could count the number of people who enter a church auditorium on a Sunday morning. One might count 181 people and the other 183. This would be considered an objective measurement, but one with error. By averaging the two results, we would likely reduce the error and have a more accurate measurement.

Several concepts associated with measurement can help us determine what we can and should measure.

### **Types of Variables and Their Measurement**

Variables in church-based research include anything that can differ

between people (e.g., the frequency of church attendance, extraversion, marital status, or age of conversion) or between churches (e.g., church age, humility of the lead pastor, or average attendance). There are virtually an unlimited number of variables that can be measured, but some are more useful than others. For this reason, we often make hypotheses (Dunaetz, 2021) that we can test by seeing how well they conform to relevant data. Hypotheses are statements that typically describe relationships between important phenomena (e.g., church attendance and commitment to the Lord) or differences between groups that interest us (perceptions of a sermon's value by Millennials and by Boomers). We can test hypotheses by measuring the specific phenomena or characteristics which are specified in the hypothesis using a sufficiently large and appropriate sample of people and calculating statistics to determine if the hypotheses are supported by these measurements, that is, the data we collect.

### ***Discreet versus Continuous Variables***

A discreet variable is a variable that can only take on whole numbers. For example, attendance at a specific small group Bible study can only take on discreet values (e.g., 6 people or 7 people; not 6.64 people). Any time we count people (contacts, attendees, members, leaders, staff, etc.), activities (programs, small groups, worship services, worship sites, etc.), or things (seats, classrooms, parking spaces, or buildings), we are measuring discreet variables because we use whole numbers (no decimals or fractions). In contrast, continuous variables may take on values along a continuum (Salkind, 2017). These may be temporal-physical measures (square footage, height of a building, duration of a worship service, time since conversion, pastoral tenure, etc.) but also psychological measures such as personality traits (extraversion, conscientiousness, humility, etc.), abilities (including specific skills and cognitive abilities), and attitudes (church commitment, Christ-centeredness, beliefs about the pastor's humility, etc.). However, whenever we start calculating averages, probabilities, or frequencies of discreet variables, we obtain continuous variables (e.g., church members may attend worship services 62% of the time, or the average attendance at a church's Spanish service is 137.7 people). In general, things that are easily counted are discreet variables whereas more nuanced phenomena are measured with continuous variables.

### ***Types of Scales***

Whenever we measure something, we need to follow some type of rule to obtain the measurement. Typically, some scale is used as a rule (e.g., a ruler for measuring lengths). A four-fold classification of scales developed

by Stevens (1951) is useful for understanding the variety of measurements that we make, roughly based on the level of precision that we make when measuring (Salkind, 2017). These four types of scales (nominal, ordinal, interval, and ratio) do not precisely describe all scales, but they provide a framework for thinking about scales that we use or would like to develop (Gaito, 1980; Harpe, 2015; Norman, 2010).

**Nominal Scales.** When we classify what we are measuring into categories, we are using a nominal scale. Sex is usually measured by two categories, male and female, so it is a nominal variable. If we classify churches as small, medium, or large, we are using a nominal scale. Classifying churches by denomination would also be a nominal scale (e.g., 1 = Baptist, 2 = Methodist, 3 = Christian and Missionary Alliance, etc.). Such measurements may not be very precise, but often the information necessary to make the classification is easy to obtain. When we assign numbers to the classification, the numbers are essentially arbitrary; they have no innate meaning, and the order does not matter. For example, if we assign values to sex, we can let male = 1 and female = 0, or we can just as well choose to let male = 0 and female = 1. If there are only two values possible for a nominal variable, then we can easily do simple, meaningful statistical calculations with them (e.g., the correlation between sex and frequency of attending church, which would indicate whether there is a difference between men and women in frequency of church attendance). However, if there are more than two possible values, then statistical calculations become more complex.

**Ordinal Scales.** When we rank churches in a denomination by size, creating a list with the largest churches at the top, we are placing them on an ordinal scale. In looking at the top five churches on such a list, we cannot tell what the difference in attendance is between the first and second largest; we can only tell that the largest church is larger than the second largest. Similarly, we cannot tell if the difference between the second and third largest churches is larger or smaller than the difference between the fourth and fifth churches. Ordinal scales only provide the order (or rank) of whatever is being measured.

Ordinal scales are very useful when measuring internal subjective experiences of individuals such as beliefs, values, or attitudes. We cannot measure directly how strongly people want Jesus to be the Lord of every aspect of their life. However, we can ask them “On a 1 to 10 scale, how much do you want Jesus Christ to control every aspect of your life? 1 = not at all, 10 = completely.” Similarly, we could measure the same concept by asking them how much they agree with the statement “I want to obey the Lord Jesus Christ in every aspect of my life” and giving them the choices

of Strongly Disagree, Disagree, Neither Agree nor Disagree, Agree, and Strongly Agree which could be assigned numeric values of 1 to 5. Both of these would be examples of ordinal scales.

**Interval Scales.** The third type of scale, which is not often used directly in church-based research is an interval scale. With interval scales, the interval between each point on the scale is equal, but a value of 0, if it exists, does not mean there is none of whatever is being measured. Temperature (“What temperature is it during the worship service?”) and dates (“In what year did you first make a decision to follow Jesus Christ?”) would be the most common interval scales that directly measure a church-related variable. However, when several ordinal scales are used to measure a concept (e.g., “Indicate your agreement with the following statements: 1) Jesus is Lord of all aspects of my life, 2) I want God to be the master of my life, and 3) There is nothing that I want to keep from God.”) using the same scale endpoints (e.g., 1 to 5), the results can be averaged for each person and the new scale that is created has the characteristics of an interval scale (Harpe, 2015; Norman, 2010). This is important because scales need to be at either the interval or ratio (see below) level to be analyzed with standard (parametric) statistics.

**Ratio Scales.** When we directly measure something that is countable or measurable with a scale with equal intervals, we are using a ratio scale if a value of 0 means that there is none of what we are measuring. Sunday School attendance, the number of parking spaces, and offerings are examples of ratio scales. They can be used in standard statistical analyses, and measurements using the same scale can often be meaningfully added together (e.g., 52 weekly offerings can be added together to set next year’s budget). Other ratio scales include age, number of baptisms during a specific period or at a given event, number of small group members, number of ministries, number of staff members, and number of church members involved in ministry. These scales tend to be the easiest to use because they often measure physical, not psychological, variables.

## What Should Be Measured?

The question of what should be measured is extremely important. We have the example of King David, in 2 Samuel 24 and I Chronicles 21, when he conducted a census of the men of fighting age that brought about God’s wrath. Although the texts do not provide as much information about the event as we would like, it appears that this census was motivated by a lack of faith in God. Because David was not trusting God, he experienced his discipline. Apparently, David learned from this experience because the text later states that “David did not take the number of men twenty years

old or less, because the Lord had promised to make Israel as numerous as the stars in the sky” (I Chron. 27:23, NIV). Any measurement that is motivated by our lack of faith in God and his promises is unlikely to enable us to serve him better. It is far more important for us to examine our own hearts first to see if we are trusting in him completely.

Nevertheless, there are biblical examples of measurements that received God’s blessing and confirmed his promises. In Numbers 1 and 26, we have two censuses of the nation of Israel that demonstrate God’s faithfulness. Despite difficult hardships, war, and much rebellion against God during the Exodus, the population of Israel remained stable, dropping less than one-third of one percent during forty years in the wilderness. In the New Testament, Jesus started with a group of 12 disciples (Matt. 10:1-42) whom he sent out, and then later sent another group 6 times larger (Luke 10:1-23). After Christ’s ascension, there were about 120 believers gathered in Jerusalem (Acts 1:15), and another 3000 believers were added to the church at Pentecost (Acts 2:41). This number grew to 5000 (Acts 4:4) and continued to grow (Acts 6:1,7). The rest of the book of Acts reports the number of believers growing in many other places (9:31,35,42; 11:21,24; 14:1,21; 16:5; 17:12).

A reasonable conclusion to be made from these examples of good and bad counting is that a single measurement concerning a community of faith, such as its size or some measure of its health, is not going to provide us with useful information. However, it might make us feel content, or even proud, about what we have. It is only when comparing measurements that we can tell how God is working in the community or how the community is progressing in some domain (measurements used for comparisons are sometimes called *metrics*). Trends, differences, and relationships between phenomena will provide us with more useful information than will a simple count of the people.

Performing research that yields useful information often involves measuring people’s behavior, characteristics of individuals that vary from one person to another (individual differences), and people’s beliefs and attitudes. Although these categories overlap, examining each one can provide us with a glimpse of how useful and relevant to ministry research can be.

## **Behavior**

In church-based research, the most common behavioral measurement is church attendance. The number of people who attend an event is often recorded to compare the event to some other event or to detect trends in attendance. Such data can provide evidence of how attractive an event is

relative to another event or how a community is changing over time. But attendance can also be recorded on the individual level; each week the presence or absence of a member or potential member can be recorded. This type of measurement is called *frequency recording* and answers the question of how often something happens (Salkind, 2017). Repeated absences at church, like repeated absences from school, may indicate dysfunction in the person's life. Such absences can be followed by some form of personal communication to determine exactly what spiritual, pastoral, or physical needs the person might have. In small churches, such absences might be noted spontaneously, but in larger churches where there is not a leader who interacts with every individual at each meeting, absences are not noticed unless there is some intentional attempt to determine who is present and absent each week, either through self-recorded attendance or group leaders who track the attendance of a subset of the church, often through some sort of app.

Other common behaviors also measured at the church level or individual level include baptism, giving, small group participation, training, and ministry involvement. The actual data collected at each point in time is not especially meaningful by itself. Trends in data provide far much information. For example, a church might claim to put a strong emphasis on small group involvement. Suppose the number of participants in all the small groups is counted one week and it comes to 24% of the church. This number, by itself, is not very useful. However, if the church across the street has 67% of its members involved in small groups or a second count done 6 months after the first count comes to 24% of the church, making a comparison between the numbers now becomes useful. Such comparisons can indicate where change is needed if the leaders sense that God is calling the church in a specific direction.

Other types of behavioral measurements are less common. *Duration recording* measures how long an event happens. For example, a video of a worship service could be examined to determine how long the average attender spends interacting with others after the service but before leaving the building. *Interval recording* measures how many times something happens during a given period. For example, a Sunday School class could be observed and the number of interactions each child has with an adult during the class can be observed. This information can be compared between classes or between Sunday School workers to provide useful feedback for improving the Sunday School.

When data is collected by observing people's behavior, people often change their behavior when they know they are being observed. Observers should try to be as unobtrusive as possible, and they should understand



that their presence might influence others' behavior, preventing a recording of what would have happened if they were not present. Similarly, if people are observed anonymously in a public setting where a right to privacy would not be expected, efforts should be made to maintain their anonymity. Providing information about specific people without their consent to a third party might be considered unethical.

### **Individual Differences**

People differ from one another in rather stable ways. Differences in spiritual gifts, the way they were raised, personality traits, mental abilities, learned skills, and knowledge are all examples of *individual differences* (Carver & Scheier, 2004). Normally, when we want to understand how a specific individual differs from other people, we talk to them and get to know them. It is a normal part of developing relationships. However, sometimes we want to know more about a specific individual difference (e.g., extraversion or cognitive ability) to understand the phenomenon rather than developing a relationship with a specific individual. In this case, measuring the individual difference is important so that we can understand the variation that exists in humans and how the individual difference tends to be related to behaviors, beliefs, or other individual differences. Through hypothesis testing, we can determine if a theoretical relationship between variables is true, or if it may simply be a figment of our imagination or biases.

### **Personality Traits**

Some of the most common individual differences to measure are personality traits, that is, behavioral tendencies that distinguish one person from another and which are relatively stable. Extraversion (vs. Introversion) is the most well-known and easiest-to-measure trait. Although popular personality schemes such as the Myers-Briggs Type Indicator (Myers et al., 2003) and the Enneagram (Rohr & Ebert, 2001) classify individuals into categories or types (i.e. extrovert or introvert), more precise measures of personality traits demonstrate a normal (bell-shaped) distribution, which is characteristic of virtually all individual differences. A few people are extremely extroverted or introverted (the tails of the bell curve), but most are near the middle of the curve or not too far away from the middle.

Modern personality science usually uses the Big 5 personality traits (Costa & McCrae, 1992; John et al., 1991) or the HEXACO model of personality (also known as the Big 6; Ashton & Lee, 2009; Lee & Ashton, 2004). All personality traits tend to be correlated with five principal traits:

Extraversion, Conscientiousness, Openness to Experience, Agreeableness, and Neuroticism (and Honesty-Humility, when using the HEXACO model). Other personality tests may claim to be measuring something else, but usually they are measuring these traits or some combination of them. They are very useful in research because they successfully predict many important behaviors such as work performance (Barrick & Mount, 1991), career success (Judge et al., 1999), and sexual misconduct (Lee & Ashton, 2012; Lee et al., 2013). Each trait is typically measured by asking individuals to indicate to what degree several statements describe their typical behavior. When such measures are anonymous, people tend to respond truthfully. When they are not anonymous, there is a risk of providing socially desirable responses (Ones et al., 1996; Ready et al., 2000).

### ***Abilities***

Another category of individual differences that can be measured consists of abilities, the degree to which a person is able to perform some behavior or set of actions. In churches, abilities are often viewed through the lens of spiritual gifts (e.g., teaching, administration, evangelism, pastoring, serving, and so on; Rom. 12:3-8, I Cor. 12:1-11, Eph. 4:7-13, I Pet. 4:10-11). Although survey instruments have been developed to identify spiritual gifts (e.g., Wagner, 1989), most or all have not been validated and there is little evidence that they accurately predict a Christian's gifting (Kehe, 2000; Ledbetter & Foster, 1989). For now (and perhaps until the Lord's return), the best way to determine a person's spiritual gifts is through direct observation, as the biblical authors undoubtedly had in mind.

Nevertheless, some abilities (e.g., general cognitive ability, emotional intelligence, and manual dexterity) are regularly and accurately measured in research contexts through tests that measure to what degree a person can perform a task or set of tasks (Mathiowetz et al., 1985; Salovey et al., 2016; Schmidt & Hunter, 2000). However, church-based research concerning abilities is rarely conducted, at least partially because measuring abilities tends to be costly and time-consuming, especially compared to measuring traits.

### ***Skills and Knowledge***

Another set of individual differences concerns what individuals have learned. Skills are learned behaviors and knowledge typically involves mastering facts, processes, and procedures. Like abilities, skills and knowledge are measured through tests covering a specific topic. On the practical level, they are demonstrated through degrees, certifications, and work experience. In churches, skills and knowledge, like abilities, would

be closely related to specific gifts and typically influences one's ministry involvement. The goal of much church-based training, teaching, and preaching is to increase the skills and knowledge of church members. The effectiveness of these ministries can be evaluated by measuring changes in skills and knowledge.

## **Beliefs and Attitudes**

Beliefs are ideas that we deem true (e.g., "The 66 books of the Bible are inspired and trustworthy" or "Knowledge of another person is necessary for meeting his or her needs.") and attitudes are beliefs with an evaluative aspect to them (e.g., "Expository preaching is the best way to proclaim the gospel" or "I love my church."). Unlike individual differences like personality traits and abilities that are often stable over the long term, the beliefs and attitudes of some people change when they receive new information (Zanna et al., 1980). Changes in beliefs and attitudes often, but not always, lead to changes in behavior (Ajzen & Fishbein, 1977; James 2:14-26). Research related to beliefs and attitudes in churches is a potentially rich domain because so much of church-based and missional ministry is focused on changing beliefs and attitudes (e.g., preaching and evangelism).

Our attitudes toward things we view as important (e.g., a church, the church's pastor, or a ministry that we are involved in) tend to be complex (Crano & Schroder, 1967). Many factors contribute to our global evaluation of what is known as the attitude object. However, our global evaluation of the attitude object remains relatively stable from day to day until we receive disconfirming information, and even then, our attitude toward it might not change (Tormala & Petty, 2004). Measuring beliefs and attitudes is usually done to predict behavior (e.g., some innovations predicted a greater willingness to stay committed to one's church during the pandemic than others; Covarrubias et al., 2021). To measure a person's attitude toward something, the person is typically presented with a series of statements to which they respond on some sort of ordinal scale. Perhaps the most common scale is the Likert scale where the participant is asked to indicate their level of agreement with a statement. Typically, there are 5 or 7 choices ranging from Strongly Disagree to Strongly Agree. It is important to have a neutral middle point (e.g., "Neither Agree nor Disagree") so that participants who do not have an opinion or are not familiar with a concept can provide a response that is on the same scale as other participants and can thus be converted into a numerical response.

Examples of measuring beliefs and attitudes can be found in the study by Dunaetz and colleagues (2022) examining the relationship between values congruence (i.e., the degree to which a church attender shares the

same values as his or her church) and affective church commitment (the degree to which a church attender is emotionally attached to his or her church). They found that, in theologically conservative churches, there was a strong, positive relationship between values congruence and affective church commitment; the more one agreed with their church's values, the more one liked the church. However, in churches that were more theologically liberal, this relationship did not exist; how much people agreed with the church's values had no impact on how much they liked their church.

To measure theological conservatism in that study (Dunaetz et al., 2022), people indicated to what degree their church believed the following four statements, which were based on the statement of faith of the National Association of Evangelicals (2018):

1. The Bible is the highest authority for what to believe about God and morality.
2. It is very important to encourage non-Christians to trust Jesus Christ as their Savior.
3. Jesus Christ's death on the cross is the only sacrifice that could remove the penalty of one's sin.
4. Only those who trust in Jesus Christ alone as their Savior receive God's free gift of eternal salvation.

Participants were given seven choices for each statement and their response to each item was then converted to a number (Strongly Disagree = 1, Moderately Disagree = 2, Slightly Disagree = 3, Neither Disagree nor Agree = 4, Slightly Agree = 5, Agree = 6, Moderately Agree = 7, Strongly Agree = 8). Their four responses were then averaged, and higher scores indicated theological conservatism while lower scores indicated the opposite.

To measure affective church commitment, the following eight items were used, based on Allen and Meyer's (1990) affective organizational commitment scale (Dunaetz et al., 2022):

1. I would be very happy to spend the rest of my life with this church.
2. I enjoy discussing my church with people outside of it.
3. I really feel as if this church's problems are my own.
4. I think that I could easily become as attached to another church as I am to this one. (R)
5. I do not feel like "part of the family" at my church. (R)
6. I do not feel "emotionally attached" to this church. (R)
7. This church has a great deal of personal meaning for me.

8. I do not feel a strong sense of belonging to my church. (R)

These questions were scored similarly to those for theological conservatism, except items 4, 5, 6, and 7 which were reverse scored, as indicated by the (R). For these items, agreement with the statements indicates lower affective church commitment, whereas, for the other items, agreement indicates higher affective church commitment. So, the reverse-scored items were scored so that Strongly Disagree = 8, Moderately Disagree = 7, and so on to Strongly Agree = 1. These eight scores were then averaged to obtain a single value. This value is a measure of people's attitude toward their church, specifically, their affective church commitment.

One advantage of adding reverse-scored items to a scale is that variety in the statements helps keep participants focused. Another advantage is that it helps identify participants who provide meaningless data because they were not paying attention; for example, strongly agreeing with all 8 statements in the scale would not make sense. Non-sense responses like that should be discarded when analyzing the data.

## Measurements in Church-Based Research

David's census of men of fighting age which provoked the Lord's anger (2 Sam. 24) serves as an example of an unwise measurement, most likely because he placed more trust in human strength than in the Lord. However, if our goal is to gain wisdom, that is to better understand human nature, the human condition, or the specific context in which we work, then measuring different concepts can be both wise and useful for better serving the Lord. Advances in science and technology have made this easier than ever before. May all of our research be driven by a strong faith in God and by the desire to serve him and see him glorified among all peoples.

## References

- Ajzen, I., & Fishbein, M. (1977). Attitude-behavior relations: A theoretical analysis and review of empirical research. *Psychological Bulletin*, 84, 888-918.
- Allen, N. J., & Meyer, J. P. (1990). The measurement and antecedents of affective, continuance and normative commitment to the organization. *Journal of Occupational Psychology*, 63(1), 1-18.
- Ashton, M. C., & Lee, K. (2009). The HEXACO-60: A short measure of the major dimensions of personality. *Journal of Personality Assessment*, 91(4), 340-345.
- Barrick, M. R., & Mount, M. K. (1991). The Big Five personality dimensions and job performance: A meta-analysis. *Personnel Psychology*, 44(1), 1-26.
- Carver, C. S., & Scheier, M. F. (2004). *Perspectives on personality* (5th ed.). Pearson.

- Costa, P. T., Jr., & McCrae, R. R. (1992). *Revised NEO personality inventory (NEO-PI-R) and NEO five-factor inventory (NEO-FFI)*. Psychological Assessment Resources.
- Covarrubias, A., Dunaetz, D. R., & Dykes, W. (2021). Innovativeness and church commitment: What innovations were most important during the pandemic? *Great Commission Research Journal*, 13(2), 49-70.
- Crano, W. D., & Schroder, H. M. (1967). Complexity of attitude structure and processes of conflict reduction. *Journal of Personality and Social Psychology*, 5(1), 110.
- Dunaetz, D. R. (2021). The importance of hypotheses in church-based research. *Great Commission Research Journal*, 13(1), 5-18.
- Dunaetz, D. R., Smyly, C., Fairley, C. M., & Heykoop, C. (2022). Values congruence and organizational commitment in churches: When do shared values matter? *Psychology of Religion and Spirituality*, Advance online publication.
- Gaito, J. (1980). Measurement scales and statistics: Resurgence of an old misconception. *Psychological Bulletin*, 87(3), 564-567.
- Harpe, S. E. (2015). How to analyze Likert and other rating scale data. *Currents in Pharmacy Teaching and Learning*, 7(6), 836-850.
- John, O. P., Donahue, E. M., & Kentle, R. L. (1991). *The Big Five inventory: Versions 4a and 54*. University of California, Berkeley, Institute of Personality and Social Research.
- Judge, T. A., Higgins, C. A., Thoresen, C. J., & Barrick, M. R. (1999). The Big Five personality traits, general mental ability, and career success across the life span. *Personnel Psychology*, 52(3), 621-652.
- Kehe, J. V. (2000). An empirical assessment of the Wagner-Modified Houts Questionnaire: A spiritual gifts inventory. *Research in the Social Scientific Study of Religion*, 11, 81-98.
- Ledbetter, M. F., & Foster, J. D. (1989). Measuring spiritual giftedness: A factor analytic study of a spiritual gifts inventory. *Journal of Psychology and Theology*, 17(3), 274-283.
- Lee, K., & Ashton, M. C. (2004). Psychometric properties of the HEXACO personality inventory. *Multivariate Behavioral Research*, 39(2), 329-358.
- Lee, K., & Ashton, M. C. (2012). *The h factor of personality: Why some people are manipulative, self-entitled, materialistic, and exploitive—and why it matters for everyone*. Wilfrid Laurier University Press.
- Lee, K., Ashton, M. C., Wiltshire, J., Bourdage, J. S., Visser, B. A., & Gallucci, A. (2013). Sex, power, and money: Prediction from the dark triad and honesty-humility. *European Journal of Personality*, 27(2), 169-184.
- Mathiowetz, V., Weber, K., Kashman, N., & Volland, G. (1985). Adult norms for the nine hole peg test of finger dexterity. *The Occupational Therapy Journal of Research*, 5(1), 24-38.
- Myers, I. B., McCaulley, M. H., Quenk, N. L., & Hammer, A. L. (2003). *MBTI manual* (3rd ed.). CPP.
- National Association of Evangelicals. (2018). *What is an evangelical?* <https://www.nae.net/what-is-an-evangelical/>

- Norman, G. (2010). Likert scales, levels of measurement and the “laws” of statistics. *Advances in Health Sciences Education, 15*(5), 625-632.
- Ones, D. S., Viswesvaran, C., & Reiss, A. D. (1996). Role of social desirability in personality testing for personnel selection: The red herring. *Journal of Applied Psychology, 81*(6), 660-679.
- Ready, R. E., Clark, L. A., Watson, D., & Westerhouse, K. (2000). Self-and peer-reported personality: Agreement, trait ratability, and the “self-based heuristic”. *Journal of Research in Personality, 34*(2), 208-224.
- Rohr, R., & Ebert, A. (2001). *The enneagram: A Christian perspective*. Crossroad Publishing Company.
- Salkind, N. J. (2017). *Exploring research* (9th ed.). Pearson.
- Salovey, P., Caruso, D. R., & Mayer, J. D. (2016). The ability model of emotional intelligence: Principles and updates. *Emotion Review, 8*(4), 290-300.
- Schmidt, F. L., & Hunter, J. E. (2000). Select on intelligence. In E. A. Locke (Ed.), *Handbook of principles of organizational behavior* (pp. 3-14). Blackwell Publishers.
- Stevens, S. S. (1951). Mathematics, measurement, and psychophysics. In S. S. Stevens (Ed.), *Handbook of experimental psychology* (pp. 1-49). Wiley.
- Tormala, Z. L., & Petty, R. E. (2004). Source credibility and attitude certainty: A metacognitive analysis of resistance to persuasion. *Journal of Consumer Psychology, 14*, 427-442.
- Wagner, C. P. (1989). *Wagner-modified Houts questionnaire*. Charles E. Fuller Institute of Evangelism & Church Growth.
- Zanna, M. P., Olson, J. M., & Fazio, R. H. (1980). Attitude-behavior consistency: An individual difference perspective. *Journal of Personality and Social Psychology, 38*(3), 432-440.