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Introduction

Since the purpose of the church is to make disciples, the goal of the church is to be faithful in the task of making disciples. Numerical church growth is not the primary goal of the church, but is a major output of a church's disciple-making process and the work of the Holy Spirit. If numbers alone were the ultimate goal, it would be a very short step to completely resort to pragmatism and cheapening the gospel. Those in the Church Growth Movement are interested in researching statistics in order to increase the numbers of disciples. "The philosophy of church growth is that growth and numbers should be pursued because numbers represent people, and people are important to God."[1] Even in Acts, there is evidence that the early church at Jerusalem appreciated the significance and usefulness of numbers and record keeping.[2]

In a classic statement, Alan Tippett presents the rationale for researching church growth statistics:

> Statistics are examined as evidence of the state of the Lord's work—where it is prospering or where something is obstructing its growth—that it may be applied to a self-examination of the techniques of our stewardship or shepherding in all humility. We seek to discover where these techniques may be improved, that God's name alone may be praised. . . . It is sound scriptural method to assume that leadership should be tested now, because it will stand before the judgment of God. Thus,

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numerical data are of value to us; and we are responsible for keeping mission statistics with care.[3]

Faithfulness to God includes good stewardship. Keeping and analyzing records are important tools for leaders to use as faithful stewards. The good shepherd knows, due to accurate counting, when even one out of a hundred sheep is missing. "Good numbering is part of good shepherding."[4] The rest of this article outlines methods of analyzing church statistics and how they can be used to increase church effectiveness.

Existing Formulas Measuring Numerical Growth Rates

A close look at the church growth formulas used by well-known experts shows that they use similar terminology for dissimilar formulas which can result in a good deal of confusion. Unless otherwise noted, the following symbols are used throughout this article:

L–the last number of population in a specified time.
B–the beginning number of population in a specified time.
n–the number of years specified.
e–an irrational number: e = approximately 2.7183.
K–a constant used in mathematical population growth formulas.
G–1000 times K. This refers to the G Value below.
ln–the natural logarithm of a number.

The most common of all formulas uses a simple percentage calculation.

Percent Growth

One generic formula for calculating growth rates is the percentage increase or decrease.[5] The formula for percent growth is as follows.

PERCENT GROWTH
((L-B) ÷ L) X 100 = % increase

Throughout this section the following hypothetical church will be used as an illustration. First Church had a total membership of 532 in 1985. In 1990 it had a total membership of 658. Therefore, the percentage increase for this church is:

L = 658, B = 532, n = 5
((658-532) ÷ 658) X 100 = 19% increase for 5 years

Many churches use the definition of plateaued churches as plus or minus 10% in five years.[6] Since this church grew 19% in five years, it is not plateaued, but growing.

Annual Growth Rate

A formula closely related to Percentage Growth Rate is Annual Growth Rate (AGR).[7] Though Chaney and Lewis in *Design for Church Growth* refer to AGR and Decadal Growth Rate (DGR), they do not provide the calculations for these formulas.[8] Therefore, figure 2 provides the calculation:

ANNUAL GROWTH RATE

$$AGR = ((L-B) \div B)(100)$$

The hypothetical First Church has an AGR of:

$$((658-532) \div 532) \times 100 = 23.7\% \text{ AGR.}$$

Average Annual Growth Rate

One should *not* confuse Annual Growth Rate with Average Annual Growth Rate (AAGR).[9] Figure 3 contains the formula for the AAGR.

AVERAGE ANNUAL GROWTH RATE
(IN PERCENT FORM)

$$100 \times ((L \div B)^{1/n})-100 = \% \text{ AAGR}$$

The % AAGR for the hypothetical church is:

$$100 ((658 \div 532)^{1/5})-100 = 4.3\ \% \text{ AAGR}$$

This is the growth rate that the church averaged for one year, but notice that 4.3% X 5 (years) = 21.7% is *not* equal to the 23.7% of the AGR for five years. McGavran makes these helpful comments about AAGR.

> The AAGR is especially useful in freeing Christian leaders from illusions generated by absolute numbers. For example, if church H of one hundred grows to two hundred in five years, it has grown much faster than church S of six hundred which has grown to seven hundred in the same time. Both have added one hundred members, but the first has an average annual growth rate of 15 while the second has one of only 3.[10]

Unfortunately, McGavran gives tables for computations instead of the needed calculations. It should be carefully noted that AAGR measures the rate of growth and is equivalent to compounding money on an *annual* basis. The root formula for AAGR is:

$$L = B(1 + AAGR)^n$$

AAGR measures the rate of growth as compounded annually. Chaney and McGavran are consistent in calculating AAGR the same way.[11]

Decadal Growth Rate

One of the most common church growth formulas is the Decadal Growth Rate (DGR).[12] The formula for DGR, which again is not often found in church growth books,[13] is shown below.

DECADAL GROWTH RATE

$$DGR = 100 \text{ X } (((L \div B)^{(1/n)})^{10})–100$$

Notice that this formula is the same as AAGR except for being raised to the tenth power. The hypothetical First Church's Decadal Growth Rate would be calculated as:

$$100 \text{ } (((658 \div 532)^{1/5})^{10})–100 = 53\% \text{ DGR}$$

Like AAGR, this formula is based on the formula for compounding interest, but this time the compounding is based on every *ten* years.

To confuse matters, the way that Chaney calculates DGR is *not* the same as Wagner and McGavran compute DGR.[14] Chaney's formulas do not include any exponential functions. For example, on page 93 of *Design for Church Growth*, Chaney computes the DGR of a church with B = 100, L = 350, and n = 5 to be 500%.[15] Using the formula given above for DGR gives a result of 1125% DGR. This result is confirmed by computing the AAGR and using the chart in *Understanding Church Growth*.[16]

Serious students of church growth should benefit from the analyses of these formulas. After using them, they will also wish for a formula which combines usefulness with ease of use. This is part of the reason the writer suggests the use of the G Value.

The G Value

The G Value is a simplified formula which incorporates the advantages of all the formulas in the previous section. The G Value has several distinct advantages. First, like AAGR and DGR, it measures growth rates exponentially, but it is much easier to use with a calculator or in programming computers. Second, it avoids the confusion of AGR and AAGR and the two different ways of computing DGR.

Third, the G Value is based on a better model of population growth. AAGR and DGR are based on annual and decadal compounding. The G Value is based on continual compounding, which is how populations actually grow. This method also offers the advantage that growth rates can be compared in lengths other than just one and ten years.

The G Value is based on a common mathematical model for describing population growth: $L = Be^{kn}$. This formula can be found in high school algebra textbooks.[17] In financial terms, this is the same formula used for continuous compounding. AAGR and DGR are based on annual and decadal compounding formulas. The G Value is derived by multiplying the K from the above formula by 1000. This is done because K is often a small number and hard to manipulate and visualize. The G Value represents the rate of growth of a population or number of items. The easiest formula to use in calculating G Value rate of growth is found below.

G VALUE

$$G\ Value = (1000 \div n) \times (\ln (L \div B))$$

One of the benefits of using the G Value which percent formulas do not offer is the ability to predict with greater accuracy what a population may be in the future. This formula is shown below.

ESTIMATING FUTURE POPULATIONS

$$L\ (\text{the estimated population}) = B\ (\text{current population})\ e^{(G/1000)n}$$

For example, in 1985 total membership in the Southern Baptist Convention (SBC) was 14,486,403. In 1990 the membership was 15,044,413. To predict SBC membership in 1995 the following procedure is used:

1. Find G

$$G = (1000 \div 5)\ (\ln\ (15{,}044{,}413 \div 14{,}486{,}403))$$

$$G = 200\ (\ln\ 1.03852)$$

$$G = 200\ (.0378)$$

$$G = 7.56$$

2. Predict the membership in 1995

$$L = (B)\ (e^{(G\ /\ 1000)\ (5)})$$

$$L = 15{,}044{,}413 \text{ X } 2.7183^{((7.56\ /\ 1000)\ (5))}$$

$$L = 15{,}044{,}413 \text{ X } 1.0385 = 15{,}623{,}921$$

15,623,921–the estimated SBC membership in 1995 based on G Value for 1985 to 1990.

Using this calculation in 1990, the writer predicted that the SBC would lose membership around the year 2000. This actually occurred in 1998.

The calculations of the G Value for the hypothetical First Church are easy in comparison to AAGR and DGR:

$$(1000 \div 5)\ (\ln\ (658 \div 532)) = 42.5 \text{ G Value}$$

G Values and DGR will usually be fairly close to one another. In this example DGR = 52%, G Value = 43. The G Value is preferred for reasons cited above.

As a summary, all of the previous formulas are applied to the statistics of the hypothetical First Church, with the following results. The membership of 532 in 1985 increased to 658 by 1990. The percent increase for that five years is 19%, which falls into the growing category. The Average Annual Growth Rate is 4.3% and the Decadal Growth Rate is 53%. All of these factors can be correlated using the single G Value of 42.5. Using G = 42.5, this church's projected membership in the year 2000 would be 1006 members.

Two New Standards

Those who have studied church numerical growth see many discrepancies in counting and comparison methods. Some count membership, others worship attendance, and so on. The best solution to this problem is to use "composite membership."[18] The formula used to calculate composite membership is below.

CALCULATING COMPOSITE MEMBERSHIP

(church membership + average Sunday School attendance + average weekend worship attendance) ÷ 3 = composite member-

ship

The proposed new standard for studying numerical church growth is a five-year G Value of composite membership. This calculation is shown below, and is called the Composite Growth Rate (CGR).

A NEW STANDARD: COMPOSITE GROWTH RATE
A FIVE YEAR G VALUE OF COMPOSITE MEMBERSHIP
$CGR = 200(\ln(L \div B))$

In this formula the L and B refer to composite membership.

Using the CGR would enable diagnosticians to compare churches with an "apples to apples" comparison regardless of size. The CGR standardizes what is being measured and for how long. Sometimes it is easier to do G Value calculations on other items besides composite membership. The value of other counting methods in order are:

1. average Sunday School or small group attendance,
2. average worship attendance,
3. Sunday School enrollment,
4. resident membership.[19]

If composite membership numbers are not available, then the next best formula to use is a five-year G Value of Sunday School or small group attendance.

A second proposed new standard is a five-year G Value of Sunday School attendance. The calculation for the Sunday School Growth Rate (SSGR):

A NEW STANDARD: SUNDAY SCHOOL GROWTH RATE
A FIVE YEAR G VALUE OF AVERAGE SUNDAY SCHOOL ATTENDANCE
$SSGR = 200(\ln(L \div B))$

In this formula the L and B refer to Sunday School attendance averaged over a 52 week period.

The SSGR is the easiest way to use the G Value, but the best approach is to use Composite Growth Rate. Both of these new standards provide a way to compare churches using the same criteria in a manner far superior to church size. Table 1 in the next section will provide an interpretation for both CGR and SSGR values.

Application of the G Value

Plotting G Values on a graph can be a powerful indicator of a church's numerical growth. A physical graph of a declining growth rate can be of great benefit to leaders wishing to break out of the status quo. It is highly recommended that *each* leader draws a graph of his/her church's G Values. This forces each person to wrestle with the facts of growth. Equally effective is a graph plotting G Values of the church compared to the community. Often churches will not keep up with even the biological growth in the community. If desired, separate G Values can be computed for membership, resident membership, and Sunday School attendance. Comparing each of these to one another may provide some valuable insights.

As a diagnostic tool of numerical growth, the G Value is unsurpassed. A very valuable exercise for a church would be to plot its G Value over a long period of time (e.g., 25 years), and do an interpretive historical analysis of the peaks, valleys, and trends. Community demographic changes, major changes in vision and pastors, building programs, and special events such as revivals should be included in the analysis. Church leaders should also consider McGavran's excellent suggestions on discerning the reasons for growth or decline in *Understanding Church Growth*.[20] This analysis may be the first time that long-term members have ever tried to take an objective look at the history of their church.

The G Value can also be used to compare churches with other churches. Table 1 combines a standard definition of plateau (plus or minus ten percent) and Wagner's interpretations of DGR with original material to help diagnose numerical growth in the local church.[21]

TABLE 1
LOCAL CHURCH G VALUE RATINGS

CGR or SSGR	ASSESSMENT
OVER 200	TREMENDOUS
150–200	EXCELLENT
100–150	VERY GOOD
50–100	GOOD

25–50	FAIR
0–25	PLATEAUED
-25–0	DECLINING
-60–-25	LOSING
UNDER -60	HEMORRHAGING

Single year G Values can vary considerably, but these numbers could be used on a moving average over a longer period of time, such as three to ten years, to give a very accurate picture of the trend in rate of growth. Table 1 can also be used to evaluate the CGR and SSGR of churches. If desired, churches can compute their growth rates and compare them to other churches in the community. The results of any comparisons should be for kingdom, and not ego building.

A previous section described how to predict the size of a population at some future point. Churches doing strategic planning should consider using the G Value to estimate the size of the congregation in five or ten years from the present time. For example, this procedure may reveal the need to go to multiple services due to building limitations. G Value analysis of church organizations may also reveal the need for a shift in the church's resources.

A final application of the G Value is its usefulness in statistical analysis. Correlation studies could compare certain variables with the G Value. This method would be superior to studies utilizing only numerical increases. An increase of 20 members in one year would be great for a church of 30 members, but a disaster for a church of 3000.

Though numbers can be measured using percent, Annual Growth Rate, Average Annual Growth Rate, or Decadal Growth Rate, use of the G Value is more advantageous for a number of reasons. The G Value is equivalent to continuous compounding, which is the best model of population growth. The G Value is also easier to compute than AAGR and DGR. Another reason for using the G Value is that DGR has been calculated in different ways by different authors. A new standard called the Composite Growth Rate (CGR) will serve as the single best indicator of a church's numerical growth. The second best standard—but easier to obtain reliable numbers for—is the Sunday School Growth

Rate (SSGR). Doubtless, the percent calculation will be the most common workhorse, but driving the Cadillac of G Value analysis will pay rich dividends for a small extra investment of time.

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NOTES

1. James E. White, *Opening the Front Door: Worship and Church Growth* (Nashville: Convention Press, 1992), 14.

2. See Acts 2:41; 4:4; 19:10.

3. Alan R. Tippett, *Church Growth and the Word of God* (Grand Rapids: William B. Eerdmans Publishing Co., 1970), 17.

4. Ibid., 16.

5. Generally throughout this article only the term increase will be used. It is understood that this term can refer to a decrease and is indicated by the negative sign.

6. For example, C. Kirk Hadaway, "New Churches and Church Growth in the Southern Baptist Convention" *The Quarterly Review* (January/February/March 1989), 44.

7. Charles Chaney and Ron Lewis,*Design for Church Growth* (Nashville: Broadman Press, 1977), 93.

8. Ibid., 96.

9. Ibid.

10. Donald McGavran, *Understanding Church Growth, Revised Edition* (Grand Rapids: William B. Eerdmans, 1980), 428.

11. Chaney and Lewis, 209.

12. C. Peter Wagner, *Your Church Can Be Healthy* (Ventura: Regal Books, 1996), 48.

13. The closest thing to a formula given can be found in C. Peter Wagner, *Church Growth: The State of the Art* (Wheaton: Tyndale House Publishers, 1986), 287.

14. Chaney and Lewis, 93.

15. Ibid.

16. McGavran, 431.

17. Stanley Smith, *Algebra and Trigonometry* (Menlo Park, CA:

Addison-Wesley Publishing Co., 1990), 551.

18. For a complete description of the history and need for composite membership see C. Peter Wagner, *Your Church Can Grow* (Ventura: Regal Books, 1976), 62.

19. For most SBC churches total membership is a useless number.

20. McGavran, 114–85.

21. Wagner ranks DGRs in Wagner, *Your Church Can Grow*, 63–64.