ABSTRACT

Statistics in missions often come from the blackest of boxes. That's not to immediately write them off as misguided or wrong, but I would hardly use the word "transparent." This paper attempts to bridge that gap by providing a (comparatively) simple and obvious model for calculating the likelihood of someone becoming incredibly close friends with a Christian. Of course, the goal here is not to come up with the "perfect" model using 20 different variables on a city-by-city basis (as interesting as such a study would be!). Rather, the goal is to make sure we're even in the right ballpark with our current missiological and statistical frameworks. This model points to the incredible need for ongoing church planting among the unreached.

INTRODUCTION

Please note this is a follow-up to an earlier post[1] I wrote on the growing problem of loneliness and the implication for missions. I'm going to assume that if you've made it this far, then you've already read that article, which does a great job of highlighting the different aspects of this paper.

METHODOLOGY

In order to calculate the likelihood of having Christian confidants as a function of Christian population, I created a Monte Carlo simulation using approximate values from the scientific literature.

People tended to self-report 2-3 close confidants, while sociologists like Dunbar estimate the number in the range of 4-5. Given that self-reporting is more prone to both bias and cultural differences, I went with the upper-range value of 5 close friends at any given point in time. This is almost certainly higher than average, but I wanted to give more of an upper limit and account for the fact that non-Western cultures may have more confidant-level relationships.

As for replacing friends, Mollenhorst suggests that roughly half of all close friendships change every seven years. For simplicity, I rounded this to a 7% turnover per year (or just under 50% in 7 years). At this rate, we would expect the average person to have roughly 25 "turnovers" over the course of 70 years, or 30 total confidants (including the 5 they already have now, at time t=0)

To model this, I created a hypothetical "person" with 5 different confidants. I used a random number generator between 0 and 1 for each confidant every year to represent the likelihood of that friend changing. In other words, a random value from 0-0.07 (or 7% of the time) represented a "change" from one confidant to another, while higher values suggested that the initial friendship remained intact. As expected, the average "person" in this model maintained between 29-30 confidants during their 70-year simulation.

A separate random value from 0 to 1 was assigned for each confidant, this time representing their likelihood of being an evangelical[2] Christian. A value between 0-x represented a confidant

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[1] https://omf.org/us/social-isolation-loneliness-epidemic-affect-way-we-do-missions/

[2] I use "evangelical" throughout this article to refer to people who subscribe to a particular theology. I realize this word can often carry certain political and even racial connotations, especially in the U.S. I don't mean to imply any such relationships.

who also happened to be Christian, where x = the percentage of evangelical Christians in a given country, per Joshua Project.

To determine the average number of evangelical confidants a person would expect over the course of their life, I ran the simulation for 70 years per person (close to the average life expectancy for both men and women). I repeated this 10,000 times for each country and calculated p(x) = the percentage of people who had not made at least 1 evangelical confidant over the 70-year period.

I then ran this model for multiple values of x corresponding to the actual percentage of evangelicals in different countries. Graphing the results of p(x) and x revealed a perfect ($R^2 = 1$) exponential regression of $p(x) = 1.0235\ e^{-25.07x}$. I ran the simulation for a new value of x and confirmed that both the simulation and regression produced the same p(x). Note, this does break down for incredibly small values of x << 0.001.

Next, I reran the simulation, this time making people "immortal"—they just kept making friends until somebody was an evangelical Christian. Again, I used different real-world evangelical rates of x, to determine t(x), the amount of time in years required to make a confidant, given that people are immortal (and assuming no change in x over that time span). The regression ($R^2 = 1$ again) this time yielded $t(x) = 2.9805x^{-0.991}$.

LIMITATIONS

There are certainly many limitations to this model. After all, I wrote this for a blog post, not a PhD thesis (dibbs on this thesis topic!) However, I don't think the limitations are enough to completely discount these findings, especially when taken as general approximations. The point isn't that it would take exactly 557 years for someone in Thailand to make a close evangelical friend, as though things would suddenly change if the "real" answer turned out to be 700, or even 200. The practical point is that it takes much, much longer than people are alive.

I'll be the first one to admit that I have no idea whether the numeric values I used are true across different cultures. Both Dunbar and Mollenhorst focus primarily on Western Europe and North America. I haven't found studies to suggest how these numbers change in, say, East Asia.

These sociologists seem to hint at the fact that these are due to *cognitive* limitations rather than social ones, and thus, should remain relatively stable across different cultures. Both "Eastern" and "Western" cultures are increasingly dealing with the same socially destabilizing pressures of globalization and urbanization. And while by no means scientific, a quick online search of "loneliness in _____" suggests that many people outside the U.S. are experiencing a similar sense of social isolation.

Another major limitation of this model is that it assumes people just become friends at random with anyone else in the population. People are far more likely to associate with people who are "like them." In other words, people are inherently less likely to become close friends with someone of another religion, and even less likely if that person happens to be from a different culture.

This also assumes that evangelical Christians are dispersed fairly evenly geographically, which is seldom the case. In that sense, this model would make even more sense looking within a specific people group or a regional cluster rather than the country as a whole.

Taken together, these limitations suggest that these models are the "best-case" scenario, as the aforementioned limitations all tend to limit the likelihood of Christian to Non-Christian interactions.

Finally, it's important to note that I'm not trying to suggest that people *have* to develop close friendships with another Christian before coming to Christ. Nor am I suggesting that the Holy Spirit needs to be restrained by everything in this model. Nor am I trying to come up with flawless approximations. Rather, this is meant to give a tangible demonstration on the effects of Christian populations and the importance of ongoing cross-cultural missions among the unreached.

DATA

After calculating formulas for f(x) and t(x), I went to Joshua Project and gathered the rates of evangelical Christianity in each country of East Asia. Using those values of x, I calculated the following table.

Country	Population (Million)	% evan. Christian	Ave years for evan. Christian confidant	% Population w/o evan. confidant in lifetime[a]	# People without evan. Confidant in lifetime[a] (Million)
North Korea	25.2	1.0%	285.9	79.7%	20.1
South Korea	50.6	16.4%	17.9	1.7%	0.8
Japan	125.9	0.6%	490.6	88.5%	111.4
Mongolia	3	1.6%	179.5	68.5%	2.1
China	1375	6.2%	46.6	21.4%	294.4
Taiwan	23.4	2.8%	102.0	50.3%	11.8
Thailand	68.1	0.5%	557.3	90.1%	61.3
Vietnam	95.3	2.2%	129.2	58.5%	55.8
Laos	7	2.4%	120.6	56.2%	3.9
Cambodia	16	1.6%	179.5	68.5%	11.0
Malaysia	31.2	3.3%	88.4	45.1%	14.1
Indonesia	262.1	2.8%	102.0	50.3%	132.0
Philippines	103.6	12.2%	24.0	4.8%	5.0
East Asia	2186.4	5.4%	101.9	33%	723.6
U.S.A.	325.0	26.4%	11.2	0.1%	0.4

Table 1: **Evangelical Confidant frequency in East Asia.** [a] where lifetime = 70 years.

A few observations from the values calculated in Table 1.

1. The continued need for ministry in China

Through God's grace, the percentage of evangelical Christianity in China has grown to over 6%, making it the third-highest among these countries after South Korea (16%) and the Philippines (12%). However, due to China's sheer size, there are still roughly 300 million people in China who will never meet an evangelical Christian. That's almost the entire population of the United States (325 million).

So while we certainly praise God for the growth of his church in China, there is still an enormous need for Christian ministry, particularly among the mega-urban cities on the one hand and the minority group "frontiers" on the other.

2. The need for workers in "open" countries

Somewhat interestingly, the two countries above with the lowest percentage of evangelical Christians are both considered "open access". Over 90% of people in Japan and Thailand will not make a trusted evangelical Christian in their entire lifetime. Yet both countries offer religious worker visas–something unheard of in most other Asian countries. Some of the biggest needs in missions today are in countries who are not only allowing foreign missionaries, but actually giving them visas to do so!

3. The tipping point

Consider Taiwan and its 2.8% evangelical rate. This model suggests that all things being equal, roughly half of the population will have an evangelical Christian confidant over the course of their life. Compare that to a country like Cambodia with 1.6% evangelical population or Japan with 0.6%. The likelihood of having a Christian confidant falls to 30% and 10%, respectively. Thus, a small change in the evangelical population can still produce a significant change within the society at large. This would also suggest a good "target" of approximately 2—3% evangelical Christians among a given people group[3].

4. The task is unfinished

Despite the overwhelming growth of the East Asian church over the past few decades, roughly 1/3 of East Asians (~725 million people) will die without ever making a Christian confidant. To re-emphasize, this estimate is probably on the lower end. Granted, that's not quite the same as saying that they will "never hear" the gospel or "know" a Christian in some vague sense. But as far as having a realistic opportunity to understand and respond to the gospel, you can do a whole lot worse than this estimate.

5. What about the needs here in America?

Undoubtedly, there are myriad opportunities for evangelical growth in the United States, particularly in certain urban areas. I'm not suggesting that we shouldn't be focusing on the U.S. at all. However, I hope these statistics help paint a broader global picture. The whole "aren't there just as many needs here" argument quickly breaks down in the face of these simulations. A 1% rise in evangelicals in Japan, for example, can dramatically shift the socio-religious landscape; a 1% rise in the U.S., not so much.

CONCLUSION

In conclusion, it seems realistic to propose that roughly 750 million East Asians will die without ever making a trusted Christian friend. I leave it to the reader to consider all of the different missiological conclusions based on that statement. For those convicted to go overseas in some sort of "missionary" capacity, Table 1 should provide a helpful framework for potential supporters during partnership development. Similarly, it provides a rough estimate for missions

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3 It's also worth noting that the 2.8% evangelical "tipping point" is relatively close to the 2.0% value used by Joshua Project and others for determining the "reached-ness" of a given people. I'm pleased the figures are as close as they are.

agencies as they communicate various needs and statistics. This model is far too vague to be helpful to missionaries on the field in its current form; though a more complex model with better regional statistics, migration rates, conversion rates, cross-cultural dynamics, and so on could be developed. Finally, and perhaps most importantly, this provides clear content for prayer. If nothing else, I hope it can accomplish that.