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What Missionary Activities Lead to Baptisms? Evidence from a Latter-day Saint Mission in Brazil

Alexander Poulsen*

What missionary activities lead to convert baptisms into the Church of Jesus Christ of Latter-day Saints? Is it most important to contact many new people, making it more likely that missionaries find potential converts with whom the church's message resonates? Or is it more important to teach lessons in cooperation with local members, to help potential converts learn what church participation might look like in their lives, and begin to be integrated into the church community? I provide a statistical framework to answer these questions using data on weekly missionary activities (missionary key indicator data). While the answers to these questions may vary by setting, I provide an answer for one setting by analyzing weekly missionary data from 89 mission areas and 233 missionaries in a mission in southern Brazil for the year 2011. I find that lessons taught with a local member of the church present are associated with almost two times greater an increase in baptisms compared to lessons without a member present and over two times greater an increase in sacrament meeting attendees. I find that in the mission being studied, contacting additional new people and finding new potential converts does not increase subsequent baptisms.

These findings suggest that (1) social connections are an important driver of church affiliation; and (2) in the mission studied, there could have been an increase in convert baptisms if missionaries spent less time trying to find additional people to teach and more time recruiting local members to join them for lessons. This same statistical framework could be used to gain similar insights about other settings, given the appropriate data.

1. Overview

Background

Full-time missionaries for the Church of Jesus Christ of Latter-day Saints make many decisions every day about how to spend their proselyting time. This article provides a framework for how to gain more information about the effects of some of these decisions using weekly data on missionary activities (missionary key indicator data) and presents an application of this framework

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using data from Brazil. This overview section provides a non-technical synopsis of the empirical approach and findings, while subsequent sections provide the technical details of the analysis.

Missionaries find people to teach by contacting strangers in public spaces, knocking on doors, and soliciting referrals from local members of the church. They then schedule times to meet with these people and share the church's teachings—sometimes with local members of the church present to assist with the teaching and testifying, and sometimes without. Finally, missionaries invite the people with whom they are meeting to attend church, follow the church's teachings, and be baptized.

We can think about various informal theories of missionary work that missionaries implicitly hold in their minds. Some missionaries may feel that successful missionary work should be focused on simply finding the right person, who is prepared to accept the church's teachings and join the church. This is the so-called "golden investigator."[1] If this theory of missionary work is correct, then we would expect the most important predictors of missionary success to be the number of people the missionaries contacted and the number of new potential converts they found. Statistically, the more people a set of missionaries finds who are willing to be taught, the more likely they are to find one that is ready to accept the message. Teaching lessons is merely a matter of course once they have found the "right" person.

On the other hand, missionary work may be less about finding the right "prepared" person, and more about following the right process. This might involve teaching lessons accompanied by local members of the church so that potential converts can hear from people like them about how church participation has affected their lives and begin to be woven into the community of the congregation. If this theory of missionary work is correct, then we would expect the most important predictor of convert baptisms to be the number of lessons taught with a member present.

While no missionary believes exclusively in either one of these theories of missionary work, every missionary has some mental model of how the conversion process occurs that implicitly favors one of these two theories (or some other related theory) and influences the decisions they make.

Which of these theories is "right" may depend on the region and culture within which the missionaries are operating. Missionaries operate in contexts

[1] "Investigator" is the term historically used to describe a person who is learning about the church and being taught by the missionaries, though this term has been de-emphasized in favor of "friend." For clarity in exposition I use the term "potential convert."

that vary widely, and missionary work in North America functions differently from missionary work in South America, which is in turn different from missionary work in Asia, Africa, or Europe.

Empirical Approach

To distinguish empirically between these different theories of missionary work, I provide a framework for analyzing weekly missionary activity data, and I apply this method to analyze a data set from the Brazil Santa Maria Mission in southern Brazil. This data was shared with all missionaries serving in the mission while the author was a missionary there. For each companionship[2] in the mission I observe their area of service (usually corresponding to a single congregation), the numbers of baptisms, the number of sacrament meeting (church service) attendees, the number of lessons missionaries taught to prospective converts with a local member present ("lessons with a member"), the number of lessons missionaries taught without a local member present ("other lessons"),[3] new people taught by the missionaries who agreed to be taught again ("new potential converts"), and the number of new individuals the missionaries approached ("contacts"[4]) during each week of 2011.

To test the effectiveness of different missionary actions in inviting people to attend church and be baptized, I use a fixed effects regression model where the outcome of interest is either baptisms or sacrament meeting attendance. The explanatory variables are the number of lessons with a member present, other lessons, new potential converts, and contacts, as well as five weeks of lags of each of these variables. I also control for mission area fixed effects, week fixed effects, and fixed effects for the individual missionaries serving in the area.

In plain terms, the question this regression model answers is this: If the same missionaries in the same mission area and in same week of the year had taught the same number of other lessons, the same number of new potential converts, and done the same number of contacts in that week and the previous five weeks *but* had taught one more lesson with a member than they actually taught that week (while teaching the same number of lessons with a member in the previous five weeks), by how much would we expect baptisms to

[2] All Latter-day Saint missionaries work in duos (or occaisionally trios) called "companionships."

[3] Lessons with non-participating members or recent converts were also recorded separately.

[4] While "contacts" was not an officially recorded key indicator at the time (and isn't now), it was recorded by missionaries and tracked by leadership in the Santa Maria Mission at this time.

increase? That is the question this model answers for each of the missionary activities examined here (lessons with a member, other lessons, new potential converts, and contacts).

A key point to note is that this means the model estimates the associated increase in baptisms of an additional lesson with a member taught (or an additional new potential convert, etc.) at the prevailing level of that missionary activity in the Brazil Santa Maria Mission in 2011. In other words, if every missionary companionship teaches 10 lessons per week, then the model will tell us the average associated increase in baptisms of a 10th lesson (but not the fourth or fifth lesson, for example).

It is important to note, however, that this is *not* a causal model, strictly speaking. To be specific, even though we are controlling for the mission area, week of the year, and the missionaries working in the area, we don't know why the same missionaries in the same area might have more lessons with a member one week and less another. If it is due to some kind of quasi-random chance—for example, random variation in the availability of members to join the missionaries—then the model has causal interpretation. However, if variation in lessons with a member is due to some unobserved (to the researcher) factor that is correlated with baptism, then the model does not have causal interpretation. For example, missionaries may be more likely to exert effort in coordinating with members to come to lessons with potential converts who they feel have a high potential to be baptized. If this is the case, then any relationship between baptisms and lessons with a member may have more to do with the latent potential of the missionaries' potential converts than the lessons with a member. Of course, both of these are likely reasons why there is week-to-week variation in lessons with a member, but the relative importance of these different mechanisms influences how we would interpret results. Because we lack data on the potential converts themselves (and their potential for baptism), we cannot test these mechanisms.

Findings

In the data from the Brazil Santa Maria Mission, I find that on average an additional lesson with a member is associated with 0.0158 additional baptisms in the subsequent week, while an additional other lesson (lesson without a member present) is associated with 0.00856 additional baptisms in the subsequent week. In other words, while 100 additional lessons with a member present would be associated with 1.58 additional baptisms, 100 additional other les-

sons would be associated with only 0.856 additional baptisms. Therefore, an additional lesson with a member is associated with 1.8 times more baptisms in the subsequent week compared to a lesson without a member present. At prevailing levels of weekly new potential converts and contacts in the Santa Maria Mission in 2011, additional new potential converts and contacts are not associated with any increase in baptisms even up to five weeks later. This finding also holds up to 11 weeks later, but I do not report these regression results in this article in the interest of space.

Similarly, I find that an additional lesson with a member is associated with 0.111 additional sacrament meeting attendees in the same week, compared to an additional other lesson, which is associated with 0.0428 additional attendees in the same week. So an additional lesson with a member is associated with 2.6 times more sacrament meeting attendees in the same week compared to a lesson without a member present. An additional new potential convert has only a weak relationship with future sacrament meeting attendance, and an additional contact is not at all associated with an increase in sacrament meeting attendance.

I also examine the effect that receiving a reference[5] may have on missionary work. A reference received increases the number of lessons with a member in the same week and the week after, and also increases sacrament attendance in the same week. However, effects trickle off and are statistically insignificant after that. Additional references received are not statistically significantly associated with increased baptisms in the Brazil Santa Maria mission in 2011.

If the model has causal interpretation (which it may, given certain assumptions outlined below), then these findings together suggest that in the mission studied here, missionary time may have been more effectively spent by shifting away from activities geared toward finding new potential converts to teach and shifting towards making sure that every existing lesson possible had a member present. On average, missionary companionships taught five lessons with a member per week and 15 other lessons, leaving considerable room for more lessons with a member. This is not to say that contacts and new potential converts are not relevant for missionary work, just that at the level of contacts and new potential converts in the Brazil Santa Maria mission in 2011, additional contacts and new potential investigators have no relationship to subsequent baptisms. Another implication is that for members of the church

[5] A "reference" is when an existing member of the church recommends a friend or other acquaintance to meet with the missionaries.

in this mission who wanted to advance missionary work, the best thing they could do is make themselves available for lessons with the missionaries, rather than trying to refer people to the missionaries.

Finally, I use a Shorrocks-Shapley decomposition (Shorrocks, 1982) to understand how much of variation in baptisms and sacrament meeting attendance is explained by missionary activities, versus the missionaries serving in an area or the mission area itself. I find that of the variation in baptisms explained by the model, the missionaries working in the area explain 39.3% of variation in baptisms, while the mission area is responsible for only 17.9% of variation. All the missionary activities combined—lessons with a member, other lessons, new potential converts, contacts, and all their lags—explain 15.7% of the explained variation in baptisms. So, while some areas are harder to work in than others, the missionaries themselves are paramount in determining missionary success. The missionaries stationed in the mission area are, in a way, even more important than what the missionaries *do*, as measured by the missionary activity data.

The findings from this model are valid for the Brazil Santa Maria Mission in 2011, and the level of applicability to other missions in other time periods will vary widely. The findings may be applicable for missions that are similar to the Brazil Santa Maria Mission in terms of prevailing levels of lessons taught, sacrament meeting attendees, baptisms, and new potential converts, as many other Latin American missions will be. However, applicability for missions in North America, Europe, Africa, and Asia is unknown and would require similar analysis to be conducted on missionary activity data from those regions.

Sociologists of religion have long held that social networks play a critical role in the process of conversion and church affiliation (Lofland and Stark 1965). This article provides empirical support for this idea, since I find that lessons with local members are vital for baptism. Until now, qualitative studies have largely stressed the spread of church affiliation through *existing* social networks (Shepherd and Shepherd 1998; Stark 2005; Stewart 2008; Bryant et al. 2014). In contrast, the evidence in the present article suggests that at least for Latter-day Saints in Brazil, the formation of *new* social connections is more important than existing social connections, since I find references are not associated with future baptisms. Quantitative studies on the role of social networks and community in religious affiliation and practice have also focused on existing social networks and found that these predict church involvement (Cornwall 1987; Stroope 2012; Cragun et al. 2021).

This article contributes to the literature on Latter-day Saint missiology, in Brazil specifically (Grover 1985; Martins 2020). Quantitative studies of Latter-day Saint missionaries have largely been restricted to studying missionaries' post-mission lives (see Whittaker 2000), likely because missionary performance/activity data is not generally available to researchers, whereas researchers are able to more easily conduct surveys among recently returned missionaries at Latter-day Saint universities.

Finally, this article also contributes to the literature studying Latter-day Saint missionary effectiveness. While this literature is largely self-help books (see Whittaker 2000 for a review), Stewart (2007) provides a critical and systematic treatment, involving interviews across many countries and a detailed look at many aspects of missionary work. Of particular relevance for the present study, Stewart puts strong emphasis on contacts and finding new potential converts and very little on teaching lessons with a member. The present article suggests that some attention should be shifted to lessons with a member.

This article proceeds as follows. Section 2 describes the data used for the analysis, Section 3 describes the methodology in detail, Section 4 shows the results of the analysis, and Section 5 discusses the results and concludes.

2. Data

Missionaries typically work in duos (called a companionship), and work in an assigned mission area, typically a section of a town or city, that corresponds to a given congregation. In 2011, missionaries in the Brazil Santa Maria Mission would track their daily lessons taught, new potential converts found, and contacts made with strangers in handheld planners. Typically, the number of lessons taught and new potential converts found would be counted up at the end of each day by reviewing all the lessons taught, which were recorded in the handheld planner, while contacts were tallied up throughout the day as they happened. At the end of the week, totals would be added up and reported to mission leaders. Missionaries reported these numbers to district leaders[6] by phone, who then sent numbers to zone leaders[7] by email. The zone leaders would then forward numbers to the assistants of the mission president,[8] who produced the final report. The mission president's assistants would then send

[6] District leaders typically oversee districts of two to six missionary companionships and are missionaries themselves.

[7] Zone leaders typically oversee two to four districts and are also missionaries themselves.

[8] The assistants are also missionaries themselves.

Table 1: Summary Statistics

	Mean	Std. Dev.
Baptisms	0.22	0.65
Sacrament meeting attendance	3.01	3.32
Lessons with a member	5.03	3.56
Other lessons	15.1	8.62
New potential converts	8.07	6.93
Contacts	54.22	40.19
References received	1.49	2.73
References contacted	1.07	1.77
Observations	3476	
Distinct mission areas	91	
Distinct missionaries	233	

Weekly averages and standard deviations for each missionary companionship's baptisms, sacrament attendance, lessons with member, other lessons, new potential converts, contacts, references received, and references contacted for each area.

aggregated mission numbers to church headquarters and, each month, sent the full report out to all missionaries in the mission—with the weekly numbers for all companionships for the month. These reports included data on the number of contacts made, new potential converts, lessons with a member taught, other lessons, references received, references contacted, baptisms, and confirmations.[9] These data are known as key indicators.[10]

A contact refers to any time a missionary approaches a new person to ask if they would be interested in meeting with the missionaries and hearing their message about Jesus Christ. In the Brazil Santa Maria Mission, contacts occurred often at people's homes, where missionaries would either knock on a person's door or clap in front of their gate, and ask the person if they could come in. Many contacts also occurred in the street where missionaries would approach a person and ask if they would be interested in receiving the missionaries at their home another time.

[9] Confirmation is a blessing that occurs after the baptism, which confers the gift of the Holy Ghost upon the receiver.

[10] The church has since changed practices. It now collects only the number of converts baptized and confirmed, the number of potential converts with a baptismal date scheduled, the number of potential converts who attended sacrament meeting, and the number of new potential converts who were taught and agreed to meet with missionaries again. The key difference is that lessons are no longer counted. Also, rather than reporting by phone and email, missionaries report directly through an app.

A new potential convert was defined as a person that the missionaries taught for the first time and who agreed to a return visit. Missionary lessons generally occurred in people's homes, where the missionaries would visit the person, open the lesson with a prayer, share a message usually lasting 30 to 60 minutes that included doctrine and invitations, and then end with a prayer.

Summary statistics for this data are presented in Table 1. On average, every week each missionary companionship had 0.22 baptisms, 3.01 potential converts attend sacrament meeting, taught 5.03 lessons with a member present, taught 15.1 other lessons, had 8.07 new potential converts, received 1.49 references, and contacted 1.07 references. We observe data from 91 distinct areas where 233 distinct missionaries worked over the course of the year.

Self-reported performance data can be unreliable. While it is possible that some of this missionary performance data may have been intentionally reported inaccurately, anecdotally, this practice was extremely uncommon in the Brazil Santa Maria Mission in 2011. The author of this study knew almost all the missionaries in the mission during this period, worked directly with many of them, and never encountered the practice. To the extent that there was any misreporting, it more likely would be classified as exaggeration rather than fabrication. This could include counting an extended conversation in a park as a lesson rather than just a contact, or counting a lesson as a lesson taught with a member present when there was actually just a member of the church in the next room over and who did not participate actively in the conversation. Inventing church attendees or lessons taught out of whole cloth was unheard of in the author's experience in this particular mission.

Importantly, even if there was fabrication, it would almost surely occur in a manner that would *attenuate* this study's regression estimates rather than accentuate them. The main performance metric that matters for missionaries is baptisms, and baptisms would have been very difficult to falsify. A baptism is accompanied by official paperwork that includes the signatures of the person who was baptized and the leader of the local congregation (i.e., bishop or branch president). Reports of baptisms were also often accompanied by pictures. Since such records would have been difficult to counterfeit, an underperforming duo of missionaries could have felt tempted to fabricate lessons taught or other metrics in order to appear productive, despite not having baptisms. Having inflated numbers of lessons taught or new potential converts found, accompanied by low baptisms, would bias the estimated relationship between these actions and baptisms downward, if anything.

Two main results from this article are that lessons with member are more effective than lessons without a member, and that contacts and new potential investigators don't matter on the margin. For fabricated or exaggerated data to invalidate these results, it would have to be the case that under-baptizing missionaries disproportionately exaggerate lessons without member compared to lessons with member, and disproportionately exaggerate contacts and new potential converts compared to lessons taught. Furthermore, this would have to happen at such a scale to be statistically meaningful in a sample of 233 missionaries. So fabrication or exaggeration alone are not a concern for the results of this study, rather only very specific patterns of fabrication or exaggeration, and only at a large scale. Again, while data inaccuracies are possible, there are not strong reasons to suspect that these *particular* patterns of fabrication or exaggeration existed, particularly at scale, given that no fabrication was detected by the author in two years of working in this mission.

3. Methodology

In order to estimate the relationship between missionary activities (contacts made, new potential converts, lesson with a member, and other lessons) and desired outcomes (potential convert sacrament meeting attendance and baptism), I use a multi-way fixed effects regression of the following form:

$$y_{it} = \sum_{s=0}^{5} \beta_{1s} LessonsMember_{it-s} + \sum_{s=0}^{5} \beta_{2s} LessonsOther_{it-s} + \sum_{s=0}^{5} \beta_{3s} NewPotentialConverts_{it-s} + \sum_{s=0}^{5} \beta_{4s} Contacts_{it-s} + \lambda_i + \delta_t + M(i,t) + \varepsilon_{it}$$

Here, y_{it} is the outcome of interest for mission area i in week t (either weekly baptisms or weekly potential convert sacrament meeting attendance[11]). The variables $LessonsMember_{it}$, $LessonsOther_{it}$ [12], $NewPotentialConverts_{it}$, and $Contacts_{it}$ are respectively the number of lessons with a member taught, the number of other lessons taught, the number of new potential converts taught, and the number of contacts made, all by the missionaries in mission area i in week

[11] One could also imagine sacrament meeting attendance as an independent variable rather than an outcome variable. However, I am interested in the effects of actions that missionaries can take, and have (mostly) direct control over.

[12] I also include an interaction between the variables and an indicator for whether the week was during three months when recent convert lessons were counted with other lessons. This controls for the "dilution" of the effect of an other lesson when lessons with less active members and recent converts were also included in the count. For simplicity I do not show this interaction in the equation.

t. The summations include the contemporaneous week, along with five weeks of lags (i.e., the previous five weeks).[13] These lags are all included because, for example, contacts likely do not influence baptisms in the same week that the contacts are made, but they may influence baptisms some weeks later—and similar things can be said for other explanatory variables. In addition, $\boldsymbol{\lambda}_i$ is a set of mission area fixed effects; $\boldsymbol{\delta}_t$ is a set of week fixed effects; $M(i,t)$ is a set of indicators for if a given missionary is serving in mission area i at time t, for all missionaries in the dataset;[14] and $\boldsymbol{\varepsilon}_{it}$ is the error term, containing all other factors that affect the outcome. Standard errors are clustered by mission area.

The coefficients of interest that I estimate here are the $\boldsymbol{\beta}$ coefficients, which show the relationship between various missionary actions and outcomes of interest like baptism and sacrament meeting attendance. Due to the controls included in the model, each $\boldsymbol{\beta}_{vs}$ coefficient can be interpreted as the relationship between the outcome y and the explanatory variable v *on the margin*, s weeks beforehand, while holding the other variables (missionary actions, the mission area, the week, and the missionaries themselves) constant. To be concrete, the coefficient $\boldsymbol{\beta}_{12}$ tells us the relationship between baptisms (or sacrament meeting attendance) and the number of lessons with a member taught two weeks beforehand, while holding constant the number of other lessons, new potential converts, and contacts in the contemporaneous week and in the five previous weeks, and also holding constant the mission area, the week of the year, and the missionaries working in the area.

As discussed above, while the inclusion of area, week, and missionary controls does account for a significant number of unobservable factors that influence sacrament meeting attendance and baptisms, other unobservable factors could confound causal interpretation of this model. For example, missionaries may exert higher effort in arranging for a member to be present at lessons with particularly promising potential converts, and if so, any association between lessons with a member and baptism could be accounted for by the unobserved "quality" of the potential convert pool. However, if missionaries exert constant effort across weeks in arranging for members to be present, and then variation across weeks (within the same area and missionaries) is just due to random chance in terms of when members happen to be available to

[13] Anecdotally it was common in this mission to find and baptize converts within a six-week span, though this cannot be verified in the data because we observe only weekly key indicators rather than observing data for individual potential converts.

[14] This means there is a separate indicator for each possible missionary that could be serving in an area. In situations where there is a trio, I only consider the two most senior missionaries.

accompany the missionaries, then the model would have causal interpretation. Likely both of these forces are active, but we are not able to test which dominates using the present data.[15]

While there are many possible ways to analyze the data, I use the model outlined above because it minimizes the number of unobserved factors that affect baptisms (given the data available), by using area, week, and missionary fixed effects, and tells us the association between baptisms and of each missionary action, controlling for other missionary actions. This is important because missionary actions do not exist in a vacuum—they exist in the context of everything else the missionaries are doing.

Results

In Table 2 on the following page, I present the estimates of equation (1). For the top panel the outcome is baptisms, while for the bottom it is potential convert sacrament meeting attendance. Each panel represents the estimates from a single regression, where the columns give the explanatory variable, and the rows denote the time lag, from time *t* (the contemporaneous period) to time *t-5*, five weeks before.

I find that holding all else constant, an additional lesson taught with a member is associated with a 0.0158 increase in baptisms in the next week (statistically significant at the 1% level), and an additional other lesson is associated with a 0.00856 increase in baptisms the next week. Additional new potential converts are *negatively* associated with baptisms in the same week and in the following week, and contacts are negatively associated with baptisms in the same week. These results merely remind us that this is not a causal model—the likely story here is that when missionaries have a baptism scheduled in the week, they spend less time looking for more new potential converts, and instead dedicate that time to making sure the baptism goes through. Notably, there is *no positive association* between either new potential converts or contacts and baptisms up to five weeks later.[16] This same result holds when looking

[15] An alternative model that could make a case for causality is an instrumental variable regression model, though finding a suitable instrument for such a model is a challenge. In analysis that I do not report here, I attempted an instrumental variables model using local rainfall as an instrument for missionary activities, but the first stage was non-existent.

[16] Anecdotally it was common in this mission to find and baptize converts within a six-week span.

Table 2: Relationship Between Missionary Activities and Key Outcomes

Outcome: Baptisms (n=2610, Clusters=84)

Time Period	Lessons with a member	Other lessons	New potential converts	Contacts
t	0.00341	-0.00602	-0.0118***	-0.00134***
	(-0.0051)	(-0.0038)	(-0.00346)	(-0.000421)
t-1	0.0158***	0.00856**	-0.00981***	-0.000333
	(-0.00577)	(-0.00362)	(-0.00321)	(-0.00043)
t-2	0.00731	0.00355	-0.00337	0.000368
	(-0.00516)	(-0.00372)	(-0.00424)	(-0.000425)
t-3	-0.00362	-0.0027	0.00613	0.0000367
	(-0.00456)	(-0.004)	(-0.00438)	(-0.000416)
t-4	0.000843	0.00129	0.00322	-0.000303
	(-0.00539)	(-0.00346)	(-0.00384)	(-0.000429)
t-5	0.00429	-0.00126	-0.00139	-0.00039
	(-0.00597)	(-0.00336)	(-0.00281)	(-0.00045)

Outcome: Sacrament Attendance (n=2610, Clusters=84)

Time Period	Lessons with a member	Other lessons	New potential converts	Contacts
t	0.111***	0.0428***	-0.0129	-0.00406**
	(-0.0168)	(-0.0127)	(-0.00968)	(-0.00163)
t-1	0.00604	0.0156	-0.00481	-0.000395
	(-0.0154)	(-0.0111)	(-0.0116)	(-0.00135)
t-2	0.0188	-0.00193	0.0153	0.000583
	(-0.0145)	(-0.0117)	(-0.0123)	(-0.00154)
t-3	0.00441	0.0307**	0.0198*	0.0000879
	(-0.0142)	(-0.0121)	(-0.0109)	(-0.00153)
t-4	0.000568	-0.00912	0.000456	0.00229
	(-0.0195)	(-0.0127)	(-0.0106)	(-0.00187)
t-5	-0.00572	0.0148	0.00466	-0.0000434
	(-0.0153)	(-0.00986)	(-0.00894)	(-0.002)

This table shows the results of two regressions. The top panel regresses baptisms on lessons with member, other lessons, new potential converts, contacts, and 5 weeks of lags of each of those variables, and the bottom panel regresses sacrament meeting attendance on the same variables. Regressions control for week and mission area fixed effects as well as indicators for the two missionaries working in the area (any third companion is omitted). Standard errors are clustered by mission area. Standard error in parentheses. *** $p<$: 0.01, ** $p<$ 0.05, * $p<$ 0.1

at 11 weeks of lags as well, though I do not report the estimates from those regressions in the interest of space.[17]

Results are similar when analyzing sacrament attendance as the outcome. All else being equal, an additional lesson with a member is associated with 0.111 additional sacrament meeting attendees in the same week, whereas an other lesson is associated with 0.0428 additional sacrament meeting attendees in the same week. An additional other lesson is also associated with a 0.0307 increase in sacrament meeting attendance three weeks later. An additional new potential convert is associated with a 0.0198 increase in sacrament meeting attendees three weeks later, though this is statistically significant only at the 10% level. An additional contact is associated with 0.00406 fewer sacrament meeting attendees in the same week. Once again, this model is not causal, and a likely explanation is that when missionaries have no potential converts that they expect to be attending church, they spend more time contacting people and inviting them to come to church.

The results show a strong association between lessons with a member and baptisms, and a weaker relationship between other lessons and baptisms. The results also show no positive relationship between contacts or new potential converts and baptisms. Even though this is not a causal model, the absence of a statistically significant relationship is notable and potentially suggests the *absence* of a causal relationship. In more specific terms, while the estimated relationship between lessons with a member and baptisms is not necessarily causal (because of the existence of accentuating confounders like the unobserved "potential" of the potential convert pool), we have strong theoretical reasons to believe it is at least partially causal. However, the absence of a positive relationship between new potential converts/contacts and baptisms suggests there is no causal relationship, unless there is some attenuating confounder. There would have to be some omitted variable that is positively associated with new potential converts or contacts but negatively associated with baptisms. A potential example of such a variable would be the number of potential converts in the missionaries' teaching pool. Specifically, if the missionaries had very few potential converts they were regularly teaching, this would potentially lead to a high number of contacts and new potential converts, but would predict few baptisms in the short run. While we do not directly observe the size of the missionaries' teaching pool, we can indirectly control for it by

[17] As an additional check of the absence of a relationship between new potential converts or contacts and baptisms or sacrament meeting attendance, I estimate equation (1) including only the new potential convert and contacts variables one at a time, without controlling for all other key indicators. This analysis is presented in the appendix in Table A1. Results are qualitatively similar.

controlling for new potential converts and contacts up to 11 weeks prior. In this model with 11 weeks of lags (not reported here in the interest of space), the same results hold[18].

To augment my main analysis in Table 3, I also estimate the same fixed effects model as equation (1) but examine how each step in the missionary/potential convert process translates into the next, *without* controlling for all the other key indicators simultaneously (only the mission area, week of the year, and missionary fixed effects). In Table 3 we find that in the Santa Maria Mission in 2011, an additional contact leads to 0.0352 new potential converts in the same week, but none the following week. In other words, if someone contacted is not taught in that same week, they are not likely to become a potential convert later.[19] An additional new potential convert is not associated with an additional lesson with a member in the same week or in the next week, but an additional new potential convert *is* associated with 0.449 more other lessons in the same week, but none the next week. This adds a bit of additional insight to the findings from Table 2, where we find that lessons with a member are strongly associated with baptisms, while new potential converts and contacts are not. Here we find that the marginal new potential convert is not taught a lesson with a member present, which may explain in part why new potential converts are not associated with an increase in baptisms.

Moving further along the table, we find that additional other lessons are not associated with an increase in sacrament meeting attendance in the same week, but are associated with a 0.016 increase in sacrament meeting attendees a week later, which is statistically significant only at the 10% level. On the other hand, an additional lesson with a member is associated with a 0.123 increase in sacrament meeting attendance in the same week.[20] Finally, we

[18] The model with 11 weeks of lags can also be thought of as an indirect way of controlling for the "quality" of potential convert pool. If missionaries have done many contacts, they are more likely to have potential converts that are likely to accept baptism (a higher "quality" pool). Because the results for lessons taught are robust to the inclusion of 11 lags, this gives some evidence that the effects of lessons with a member and others lessons may be causal.

[19] This may in part come from the fact that many contacts are done via door-to-door tracting, so if the potential convert is not taught then, it is likely that they expressed to the missionaries that they were not interested in receiving them at all.

[20] These findings are both similar to and different from our findings in Table 2. The estimated 0.123 increase from a lesson with a member is very close to the 0.111 increase above, but in contrast we find little relationship here between other lessons and sacrament meeting attendance, whereas in Table 2 we find a 0.0458 increase in sacrament meeting attendance from an additional other lesson. The difference exists because of the control variables involved. In Table 2 we estimate the relationship while holding lessons with a member, other lessons, new potential converts, and contacts constant for the same week and up to five weeks before (in addition to the mission area, week of the year, and the missionaries in the area), but in Table 3 we control only for the mission area, week of the year, and the missionaries in the area.

Table 3: Steps to Baptism

	New potential converts	Lessons with a member	Other lessons	Sacrament meeting attendance	Sacrament meeting attendance	Baptisms
Contacts	0.0352***					
	(-0.00431)					
Contacts (t-1)	-0.00108					
	(-0.00315)					
New potential converts		0.0197	0.449***			
		(-0.0131)	(-0.0322)			
New potential converts (t-1)		0.00526	0.025			
		(-0.00944)	(-0.0227)			
Other lessons				0.0116		
				(-0.00918)		
Other lessons (t-1)				0.0160*		
				(-0.00929)		
Lessons with a member					0.123***	
					(-0.0152)	
Lessons with a member (t-1)					0.0213	
					(-0.0137)	
Sacrament meeting attendance						-0.00382
						(-0.00666)
Sacrament meeting attendance (t-1)						0.0330***
						(-0.00931)
Sacrament meeting attendance (t-2)						0.0283***
						(-0.00791)
Sacrament meeting attendance (t-3)						0.00308
						(-0.00559)
Observations	3058	3339	3335	3331	3339	3109
Clusters	88	89	89	89	89	87

This table shows the effect of each step in the potential convert process on the next step. Contacts lead to new potential converts, new potential converts lead to more lessons, lessons lead to sacrament attendance, and sacrament attendance leads to baptisms. Regressions control for week and mission area fixed effects, and indicators for the two missionaries working in the area (any third companion is omitted). Standard errors (in parentheses) are clustered by mission area. ***: p<0.01, **:p<0.05, *:p<0.1

find that an additional sacrament meeting attendee is associated with 0.0330 more baptisms a week later, and 0.0283 additional baptisms two weeks later, consistent with the requirement on the mission that potential converts must attend church two times before baptism.

While my analysis has mostly focused on actions missionaries have more direct control over, I also briefly consider one variable that missionaries have less control over—references received. For this analysis I estimate equation (1), but I include only references received and up to four weeks of lags as explanatory variables. I look at the relationship between references received and references contacted, new potential converts, lessons with a member, other lessons, sacrament attendance, and baptisms. In the interest of space, the estimates table is presented in the appendix in Table A2.

I find that an additional reference received is associated with 0.18 additional references contacted in the same week, and an additional 0.0573 references contacted the week after. References received are not associated with an increase in new potential converts, even up to two weeks later, suggesting either that references contacted often do not end up agreeing to meet with the missionaries again (which is a requirement to be counted as a new potential convert), or that the time spent contacting a reference would have been used finding a different new potential convert. An additional reference received is associated with 0.0603 more lessons with a member in the same week and 0.0439 more lessons with a member in the following week, but is statistically insignificant after that. There is not a positive association between references received and other lessons—suggesting that if references are taught, they are taught with the referring member. A reference received is associated with 0.0448 additional sacrament meeting attendees in the same week, but any subsequent increase is statistically insignificant. There is no positive relationship[21] between references received and baptisms, at least within four weeks after the week when the reference was received.[22]

Finally, we implement a Shorrocks-Shapley decomposition (Shorrocks, 1982) on the model in equation (1), and report the results in Table 4. This decomposition tells us how much of the variation in baptisms (or sacrament meeting attendance) is explained by various missionary activities, the missionaries in the area, the mission area itself, and time trends (the week of the year).

[21] There is a statistically significant negative relationship, but this is likely a spurious correlation, as suggested previously with respect to the relationship between baptisms and both contacts and new potential converts in the contemporaneous week.

[22] Nor is there likely to be any relationship in any longer time horizon, because the church attendance effect is statistically insignificant after one week.

Table 4: Shorrocks-Shapley Decomposition

Outcome: Baptisms		
	Shapley Value	Percent
Missionaries in area	0.0954	39.30%
Mission area	0.0434	17.90%
Week of year	0.0659	27.10%
Key indicators	0.03796	15.70%
Total	**0.26**	**100%**
Outcome: Sacrament Attendance		
	Shapley Value	Percent
Missionaries in area	0.217	46.60%
Mission area	0.157	33.80%
Week of year	0.0274	5.89%
Key indicators	0.06394	13.77%
Total	**0.465**	**100%**

This table shows the results of Shorrocks-Shapley decompositions of equation (1). The Shapley Value represents the portion of the regression's R-squared that is explained by each group of variables, and the Percent value is the Shapley Value divided by the R-squared. In other words, the Percent value shows the percent of explained variation that is explained by each set of variables. The sets of variables are missionary indicators, mission area fixed effects, week of year fixed effects, and then all of the key indicator variables: sacrament attendance (and five weeks of lags), lessons with a member (and five weeks of lags), other lessons (and five weeks of lags), new potential converts (and five weeks of lags), and contacts (and five weeks of lags).

Specifically, the Shapley values are the portion of the regression's R-squared that is attributable to a given group of variables.

Overall, equation (1) explains 26% of variation in baptisms. Of that 26% of explained variation, I find that the missionaries that are serving in an area explain 39.3% of variation in baptisms, while the mission area itself explains only 17.9%. The week of the year explains 27.1% of the variation in baptisms. Summed together, all missionary key indicators and their lags explain 15.7% of the variation in baptisms. Anecdotally, it is common for some missionaries to complain that certain areas are particularly difficult to work and have success in, but this analysis suggests that while this may be the case to some extent

(17.9% of variation in baptisms is explained by the area), the missionaries that are working in the area explain far more of the success than anything else, over double what is explained by the mission area. Additionally, this analysis shows that some missionaries are simply much more effective than others, even after controlling for their key indicators.

I perform the same exercise for sacrament meeting attendance, for which equation (1) explains 46.5% of the variation. Of that 46.5% explained variation, I find that the missionaries that are serving in an area explain 46.6% of variation in sacrament meeting attendance, while the mission area itself explains only 33.8%. The week of the year (time trends) explains 5.89% of the variation in sacrament meeting attendance, while all of the key indicators and their lags explain 13.77% of the variation.

Discussion

The findings provide empirical evidence that social connections play a crucial role in a person's decision to affiliate with a religion. I find that lessons with a member are strongly associated with baptisms and other lessons as well, though at a much smaller magnitude—lessons with a member are 1.8 times more effective than other lessons in leading to baptisms (if the model has causal interpretation, as discussed above). Meanwhile, on the margin (meaning at the prevailing levels of new potential converts and contacts in the Santa Maria mission in 2011), additional new potential converts and contacts had no effect on baptisms.

In terms of the various theories of missionary work introduced at the beginning of this article, this suggests that the "golden investigator" theory of missionary work is not likely to be the right one. Rather, the theory that emphasizes relationships with local members of the church seems to be more reflective of reality.

This is not to suggest that new potential converts and contacts never have any effect on baptisms but rather that at prevailing levels of new potential converts and contacts in the Santa Maria Mission in 2011, additional new potential converts and contacts were not effective. If the model has causal interpretation, this suggests that to obtain more baptisms in the Santa Maria Mission, missionaries would have benefited from spending less time trying to find new potential converts and more time trying to make sure that lessons had a member present. Table 1 shows that on average a missionary companionship taught about five lessons with a member per week and 15 other lessons per

week, leaving significant room to convert other lessons into lessons with a member present by coordinating with members.

It will not surprise missionaries themselves that lessons are important and associated with baptism. Few missionaries would choose to look for new potential converts and do contacts if there is someone willing to be taught a lesson instead. Anecdotally, teaching is strongly preferred over finding. This means that it may not be straightforward to increase overall lessons taught without increasing contacts and new potential converts. Missionaries must find new people to be able to teach more lessons. However it is far more straightforward to increase lessons *with a member* without increasing total lessons. Missionaries would merely need to spend more time coordinating with members, and make that a stronger priority—turning other lessons into lessons with a member.

How applicable are these findings to other missions? Applicability will vary greatly. These findings likely have some applicability to missions that are similar to the Brazil Santa Maria Mission in terms of the prevailing numbers of lessons taught, new potential converts taught, and contacts made. However, applicability may be limited for missions that are quite different from the Brazil Santa Maria Mission. Ultimately, this article provides a framework from which similar analysis could be drawn, given the right data.

One limitation of the present analysis is that we observe only weekly totals for each missionary companionship. While the model does control for many unobservable factors using area, week, and missionary fixed effects, there are still other unobservable factors that could bias results. For example, I do not observe the level of interest of the missionaries' potential converts (though I argue I control for it by proxy using lags of the number of contacts done). One way this analysis could be improved is if instead of observing just weekly totals for each key indicator, we observe in the data the weekly progress of each potential convert or potential convert family. This could include how many lessons each potential convert was taught, the topics of the lessons, which lessons were accompanied by local members of the church, and whether or not the potential convert attended church. Such granular data would allow us to control for potential convert fixed effects, which would implicitly control for the latent potential of the missionaries' teaching pool.

Appendix

Table A1: Contacts and New Potential Converts

	Baptisms	Sacrament meeting attendance	Baptisms	Sacrament meeting attendance
New potential converts	-0.0185***	0.000605		
	(-0.00263)	(-0.00894)		
New potential converts (t-1)	-0.00700***	0.00349		
	(-0.00254)	(-0.0105)		
New potential converts (t-2)	-0.00169	0.0146		
	(-0.00333)	(-0.0118)		
New potential converts (t-3)	0.00800*	0.0434***		
	(-0.00408)	(-0.0103)		
New potential converts (t-4)	0.00286	0.00265		
	(-0.00347)	(-0.0096)		
New potential converts (t-5)	-0.00101	0.0134		
	(-0.0026)	(-0.00947)		
New potential converts (t-6)	-0.00211	-0.0054		
	(-0.0025)	(-0.00802)		
Contacts			-0.00212***	-0.00339**
			(-0.000434)	(-0.00168)
Contacts (t-1)			-0.000614	-0.000504
			(-0.00039)	(-0.00136)
Contacts (t-2)			0.000309	0.000871
			(-0.000416)	(-0.0015)
Contacts (t-3)			0.000402	0.00258
			(-0.000444)	(-0.00155)
Contacts (t-4)			-0.000207	0.00246
			(-0.000416)	(-0.00183)
Contacts (t-5)			-0.000316	-0.0000694
			(-0.000453)	(-0.00201)
Contacts (t-6)			-0.000803	0.002
			(-0.000501)	(-0.00149)
Observations	**2779**	**2780**	**2530**	**2531**

This table shows the relationship between new potential converts and contacts, and baptisms and sacrament attendance. Regressions control for week and mission area fixed effects as well as indicators for the two missionaries working in the area (any third companion is omitted). Standard errors are clustered by mission area. *Standard error in parentheses.* ***: p<0.01, **:p<0.05, *:p<0.1

Table A2: Effect of References

	References contacted	New potential converts	Lessons with a member	Other lessons	Sacrament meeting attendance	Baptisms
References received	0.180***	0.113	0.0603***	0.0498	0.0448*	-0.00888
	(-0.0622)	(-0.0678)	(-0.0222)	(-0.0743)	(-0.0255)	(-0.00578)
References received (t-1)	0.0573***	0.0364	0.0439*	-0.0923**	0.0105	0.00575
	(-0.0211)	(-0.0322)	(-0.0226)	(-0.0452)	(-0.0177)	(-0.00707)
References received (t-2)	0.0152	-0.0271	0.0314	-0.0545	-0.000744	-0.00317
	(-0.0112)	(-0.033)	(-0.0262)	(-0.0681)	(-0.0226)	(-0.00595)
References received (t-3)			-0.014	0.0714	-0.00339	-0.0107**
			(-0.0283)	(-0.0538)	(-0.0182)	(-0.00492)
References received (t-4)						-0.00467
						(-0.00403)
Observations	3223	3223	3110	3106	3110	2998

This table shows the relationship between referrals and subsequent steps in the conversion process. Regressions control for week and mission area fixed effects as well as indicators for the two missionaries working in the area (any third companion is omitted). Standard errors are clustered by mission area. *Standard error in parentheses.*

***: p<0.01, **:p<0.05, *:p<0.1

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