

Analysis of Trends in Sermons from General Conference

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Math 402

Dr. Emily Evans

Yvonne Andrewsen, David Morley, Adam Robertson

1 Introduction

1.1 Background

Members of the Church of Jesus Christ of Latter-day Saints gather every year in April and October in a worldwide Church conference, called General Conference. During these biannual conferences, senior Church leaders give counsel and instruction to members of the Church throughout the world. These messages are recorded and stored for later study on the Church's website¹.

During their talks, leaders teach about Jesus Christ and review the doctrines of the gospel of Jesus Christ. Among the themes that are frequently discussed in general conference are:

- Jesus Christ
- Families
- Faith
- Repentance
- Testimony (a personal testimony of Jesus Christ)
- Accountability (agency)
- The Second Coming of Jesus Christ
- Missionary work
- Temple worship (sacred rites are performed for Church members and vicariously for deceased individuals in temples)
- Adversity
- Scripture (sacred scripture for Latter-day Saints includes the Holy Bible and the Book of Mormon)
- Restoration (Latter-day Saints believe that Jesus Christ restored the church that He organized when He lived on the earth through a prophet named Joseph Smith)
- Priesthood (power and authority of God to perform sacred rites, called ordinances, in His name)
- Chastity (the Lord's law that sexual relations should only be had within marriages)
- Word of Wisdom (the Lord's law of health which prohibits, among other things: tea, coffee, alcohol, and the use of tobacco)

Speakers in General Conference are generally called from the leadership of the Church², which can be divided into the following categories:

- Prophet. The Prophet is the president of the Church. He provides direction for all Church activity. Church members believe that the Prophet is the only individual entitled to receive revelation from

¹ The website of the Church is <https://www.churchofjesuschrist.org/general-conference/?lang=eng>.

² See <https://www.churchofjesuschrist.org/topics/church-organization?lang=eng> for a description of Church leadership.

God for all members of the Church throughout the world. The current prophet is President Russell M. Nelson³, who has held this position since 2018. The list below enumerates each man who has been the prophet since 1970.

- Joseph Fielding Smith (prophet from 1970 – 1972)
 - Harold B. Lee (prophet from 1972 – 1973)
 - Spencer W. Kimball (prophet from 1973 – 1985)
 - Ezra Taft Benson (prophet from 1985 – 1994)
 - Howard W. Hunter (prophet from 1994 – 1995)
 - Gordon B. Hinckley (prophet from 1995 – 2008)
 - Thomas S. Monson (prophet from 2008 – 2018)
- First Presidency. The First Presidency consists of the Prophet and several counselors who, along with the Prophet, direct the worldwide activities of the Church. There are generally two counselors in the First Presidency.
 - Apostles. Following the pattern that the Savior established during His mortal life (as recorded in the Bible), twelve men belong to the Quorum of the Twelve Apostles, which shares the responsibility of directing the international Church with the First Presidency.
 - Relief Society General Presidency. The Relief Society General Presidency consists of three women who direct the Relief Society, the international Church program for adult women in the Church.
 - Young Men General Presidency. This presidency consists of three men who provide direction and leadership for young men in the Church between the ages of 11 and 18.
 - Young Women General Presidency. This presidency consists of three women who provide direction and leadership for young women in the Church between the ages of 11 and 18.
 - Primary General Presidency. This presidency consists of three women who lead the organization called Primary, which provides classes and activities for children up to age 11.
 - Sunday School General Presidency. This presidency consists of three men who organize Church curriculum and provide instruction related to teaching and learning in the Church.
 - Seventy. Members of the Quorums of the Seventy. These men act under the apostles and support them in their role of directing the church in various areas around the world. They are commonly referred to as Seventies. As the Church grows, the number of Seventies increases. At present, there are more Seventies than members of any other group.

During the Church's general conferences, a selection of leaders is asked to prepare and deliver messages for all members of the Church. Topics are not assigned; however, a speaker's message generally relates to their leadership assignment. In general, all members of the First Presidency and Quorum of the Twelve speak in every General Conference. Roughly seven or eight Seventies are also

³ See <https://www.churchofjesuschrist.org/church/leader/russell-m-nelson?lang=eng> for a biography of President Nelson.

selected, along with one or two members from every other organization (Young Men, Young Women, etc.).

1.2 Research Questions

As the Church experiences growth, particularly international growth, Church culture changes. These changes are reflected in General Conference. The themes discussed in conference vary over time. We are interested in analyzing themes presented in the General Conferences of the Church of Jesus Christ of Latter-day Saints. Analysis of the themes presented in General Conference may lead to insights into how the priorities of Church leaders change over time. This study considers the following questions:

1. Is there a correlation between the prevalence of missionary work in conference and the number of missionaries serving or converts baptized?
2. Do members of a group tend to have talk theme profiles that are more similar to one another than they are to profiles of speakers from other groups?
3. How do the prophet's main themes affect the themes of other speakers over time? It is possible that a change in the topic of the prophet precedes a significant increase in the prevalence of the theme in later conferences.

1.3 Existing Research

Religious scholars have developed several tools that are useful for analyzing localized themes within conferences but are ill-suited for a longitudinal study. Most of the research in this field consists of microanalyses of themes within conferences.

In 1986, Shepherd and Shepherd performed a systematic review of General Conference talks from 1830-1980. They randomly selected conference addresses to determine a list of themes, then charted the prevalence of these themes over time. Their study relied on human readers and they focused on the tone and audience for each theme. Their investigation was limited to a subset of conference talks.

Our investigation is more comprehensive over the period from 1970 - 2019 because we analyzed every talk. However, our method does not discriminate among the intended audiences of each talk nor among the subtleties of each theme.

2 Data Collection

2.1 Gathering the Talks from Conference

2.1.1 Web Scraper

We built a simple web scraper to grab each talk from every conference between April 1971 and October 2019 from the official website of the Church. Since we also wanted to include talks from 1970, we found text archives of the talks given in that year⁴. The text was stored in two versions: the original and the cleaned version. The cleaned version consisted of an array of words stored in a numpy file. Each talk then passed through the following procedure:

⁴ These talks were retrieved from <https://archive.org/details/conferencereport>.

1. The title, the speaker's name, and the speaker's calling (if included) were stored.
2. All text was changed to lowercase and all non-ascii characters, punctuation, and stop words (pronouns, prepositions, conjunctions, etc.) were removed.
3. All the name versions were manually unified (e.g. 'Russell Ballard, Jr.' became 'M. Russell Ballard', 'Michelle Craig' became 'Michelle D. Craig', etc.).
4. All callings were unified (e.g. every type of calling for an apostle became apostle).
5. The null values created when callings weren't included on either source were filled with the person's calling in the year the talk was given. We referenced a lookup table which contained a time-indexed list of people in each of the leadership categories. This lookup table was generated by hand from Wikipedia pages devoted to each area of Church leadership⁵.

Statistical information about the growth of the Church over time was scraped from the annual statistical report of the Church, which was published in the General Conference report⁶ for each year from 1970 - 2017.

More recent data was retrieved manually from the Church's online newsroom⁷. Missionary statistics not published in a given year were estimated from a plot published by the Church⁸. After these replacements, there were three remaining null values, which were filled with the averages of surrounding years.

2.1.2 Data Quality

Where possible, data was retrieved from official sources. When official sources did not exist, we checked references and otherwise did our best to determine the quality and authenticity of our sources. When scraping we always checked the robots.txt file for that website and followed all prescribed guidelines. We declare that to the best of our ability, our data was ethically and honestly retrieved, processed, and stored.

2.2 Score Themes

We wrote an analysis class which counted the number of appearances of each theme word in each talk and assigned talks theme scores.

2.2.1 Word Tree

Each theme word was assigned a minimum number (threshold) of required appearances in a talk. We manually created a word tree which contained the fifteen themes enumerated in the introduction. After investigating a sample of conference talks, we identified a series of detail words related to each theme

⁵ See [https://en.wikipedia.org/wiki/Chronology_of_the_Quorum_of_the_Twelve_Apostles_\(LDS_Church\)](https://en.wikipedia.org/wiki/Chronology_of_the_Quorum_of_the_Twelve_Apostles_(LDS_Church)).

⁶ See <https://www.churchofjesuschrist.org/study/generalconference/2017/04/statistical-report-2016?lang=eng> for an example.

⁷ See <https://newsroom.churchofjesuschrist.org/article/2018-statistical-report> for the most recent year.

⁸ See <https://newsroom.churchofjesuschrist.org/facts-and-statistics>.

word (e.g. mentions of “mother” or “father” indicate a theme of “family”; for a complete list of these detail words, refer to the auxiliary file).

In order to assign appropriate thresholds to each of these detail words, a human audience read a set of talks and identified talks with clear themes that matched our theme words. We randomly selected one talk from each decade for each theme word. All appearances of the theme word and the detail words in the talk were counted. By considering the mean appearances of these words in the five talks evaluated for each theme, we assigned an appropriate weight to each detail word and set a threshold for the theme.

2.2.2 Assigning Theme Scores

The analysis class reads in the word tree. Then, for a given talk, the class counts the number of occurrences of each theme word and each detail word in the talk. The number of appearances of each detail word was multiplied by the weight of the detail word. The weighted values of the detail words for each theme word were summed. If the theme word count surpassed the threshold, the theme word was considered a theme of the talk.

We computed the percentage of each talk that is devoted to each theme (the theme score). For example, had themes, t_1 , t_2 , and t_3 , each with threshold h_1 , h_2 , and h_3 respectively, then the percentage of the talk devoted to theme 1 is calculated according to the following formula:

$$\frac{\frac{t_1}{h_1}}{\frac{t_1}{h_1} + \frac{t_2}{h_2} + \frac{t_3}{h_3}}$$

If a talk had more than three themes, we selected the three most prevalent themes and their theme scores.

After all our talks were run through analysis class, we discovered that many of the talks did not have a theme assigned because no theme word had surpassed its threshold. When this occurred, we assigned the theme word that appeared the most in the talk as the theme with a theme score of 1.0. Many of the talks that did not have a theme score were not long enough to have a statistically significant probability of containing enough occurrences of a theme word to exceed the theme threshold. Since all talks reference Jesus Christ (it is common in the Church for speakers to conclude their talks with the phrase “in the name of Jesus Christ”), most of the talks that had been missing a theme were automatically assigned “savior” as the theme.

2.3 Potential Problems with the Data

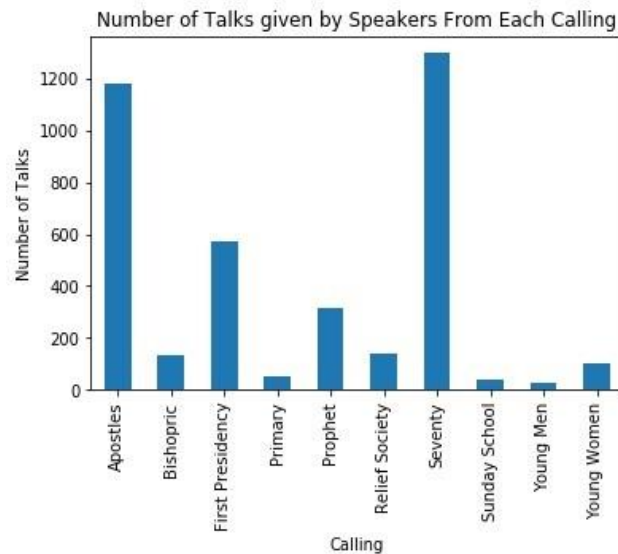
The talks came from reputable sources because they were pulled directly from official archives of the Church. However, the method of scraping the talks had some issues. For example, the text of the HTML sometimes forgot about spaces and concatenated words that should have been left separate whenever a heading was included in the talk. Also, we could not find a data set listing every seventy in every year, so we assumed that if a person wasn’t in a named presidency in a given year that he (or she) was a member of a quorum of the seventy. The occurrence of concatenated words or outlier callings were both relatively rare and will have a negligible impact on the quality of our analysis.

There is also bias in the theme words and detail words that we chose to include in the word tree. Furthermore, because only five talks were chosen for each theme score, the weights and thresholds may not accurately reflect the relative prevalence of various themes in the set of conference talks.

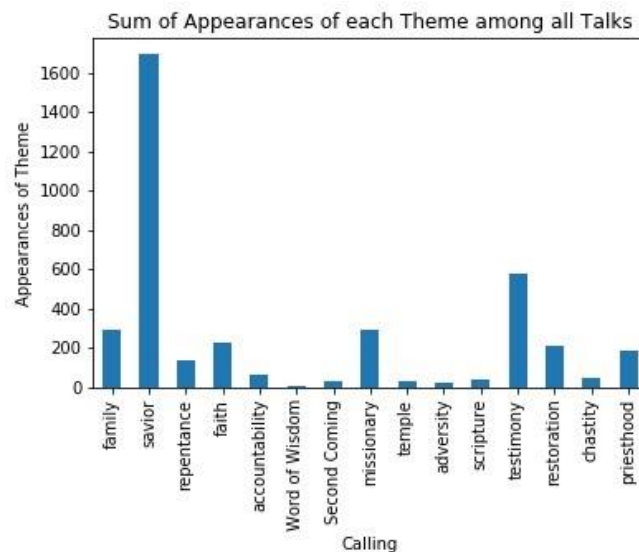
3 Analysis

3.1 Overview of the Data

Since the number of representatives of each calling type are not distributed uniformly, there is a difference in the number of talks from each group. There are significantly more talks from Seventies, Apostles, and First Presidency than from any other group.

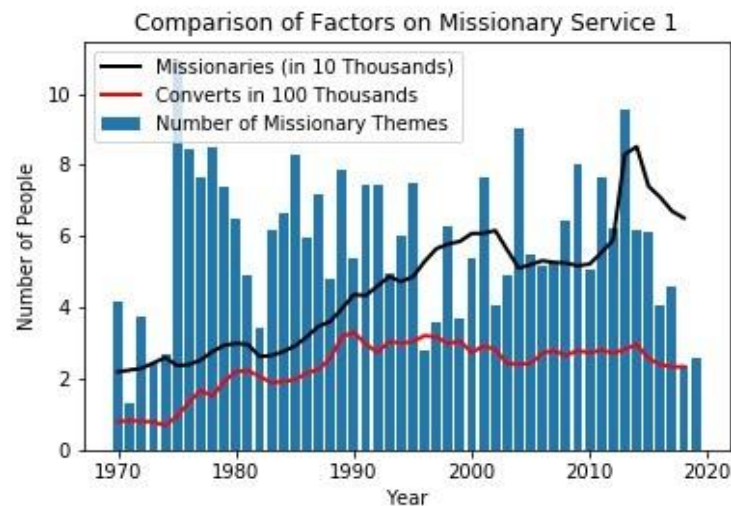


The distribution of themes among talks is also not uniform. There are many more talks about the Savior than about any other theme.

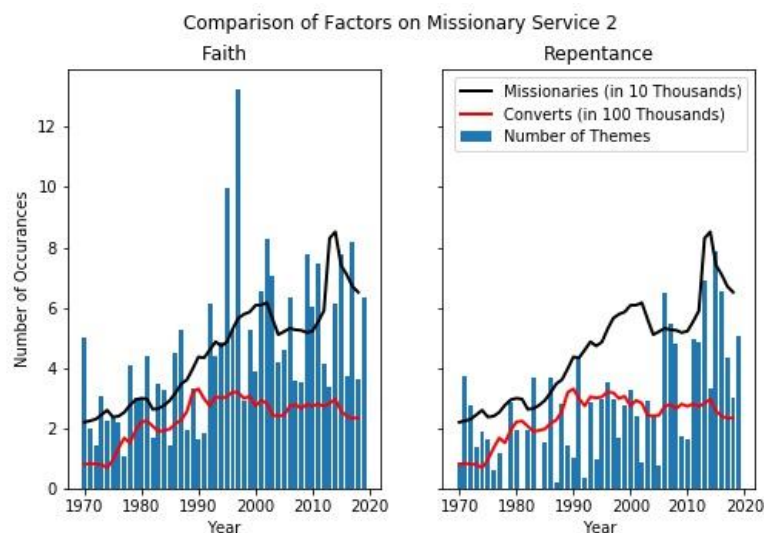


3.2 Missionary Trends

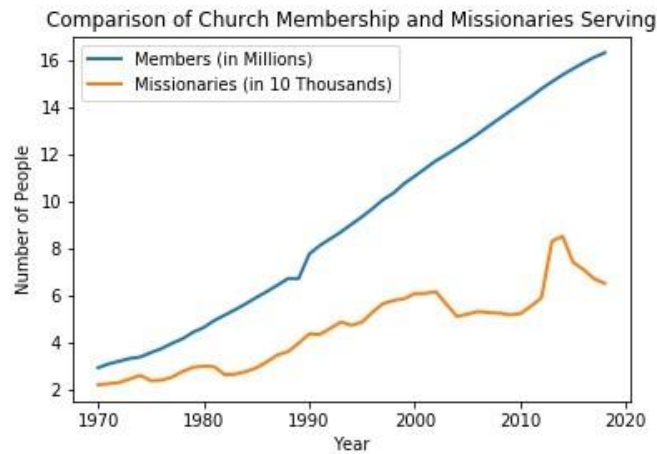
Our hypothesis was that the number of General Conference talks about missionary service would have a direct correlation with the number of full-time missionaries serving for the Church and the number of converts baptized. It seemed reasonable to us that if many leaders spoke about missionary work, then more people would feel inspired and choose to serve missions or to share the gospel with their friends. The correlation between missionary themed talks and the number of missionaries serving had a p -value of 0.982, which was much larger than our threshold of 0.05, and a large Akaike Information Criterion (AIC) value of 193.87. The plot below, which is scaled to show intricacies, shows the number of missionaries serving, converts baptized, and the relative presence of talks about missionary work from each session of conference.



We also found the correlation between missionary service and every other theme. We found the theme of missionary work had both the largest p -value and the largest AIC value. By contrast, the themes of faith and repentance had p -values of 0.00016 and 0.00002 and AIC values of 178.9 and 175.04, respectively. Given these p -values, we decided to reject the null hypothesis that talks about faith and repentance and the number of missionaries serving are uncorrelated.

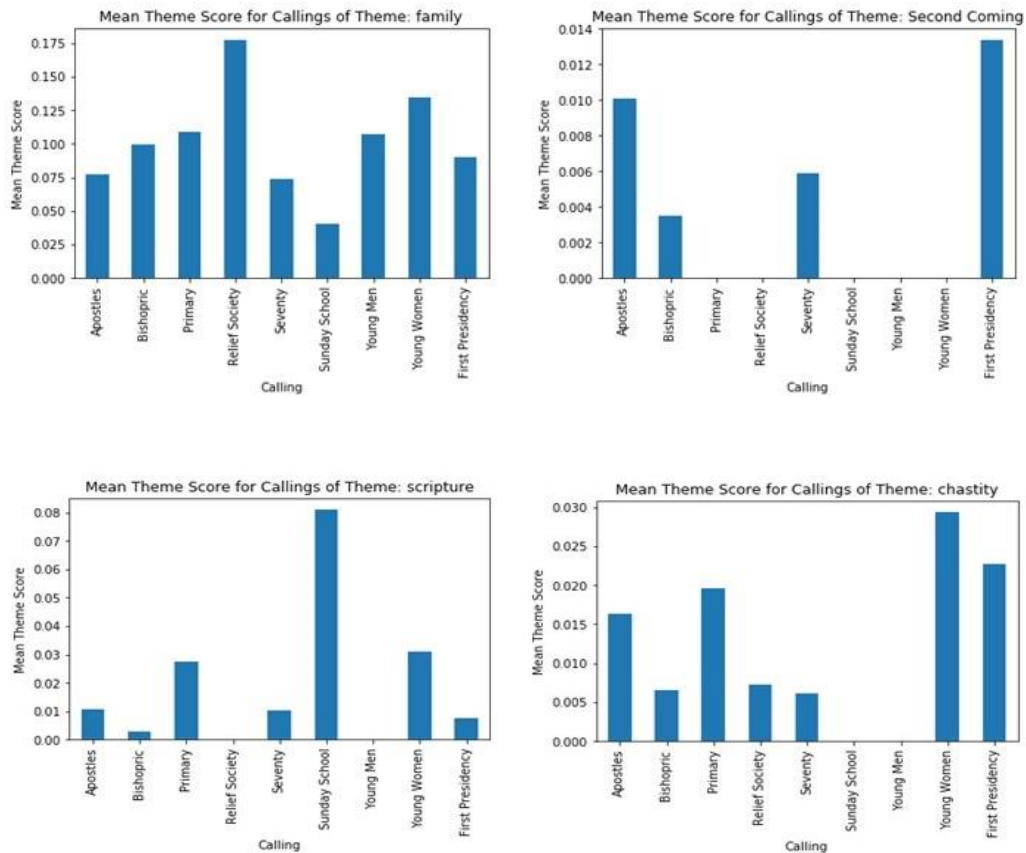


Despite the correlation we observed between talks about faith and repentance and the number of missionaries serving, we found that the strongest single factor correlating to missionary service was the total membership of the Church, as shown in the plot below.



3.3 Similarities Among Speakers by Group

We plotted the mean number of talks given by members of each group for each theme. A few of the most notable plots are shown below.



After studying these theme plots, we observed that certain themes are discussed more by one group than by the others:

- Family: Relief Society
- Second Coming: First Presidency, Apostles
- Scripture: Sunday School
- Chastity: Young Women, First Presidency, Primary

Furthermore, certain groups don't discuss certain themes at all (for example, the Sunday School and the Young Men have no talks related to the law of chastity).

Since themes are not uniformly distributed across callings, we considered the possibility of being able to predict the calling of a speaker given the themes in the talk. We ran a chi-square test of independence across all callings and all talks, which resulted in a very low p -value of $2.02e-37$. This confirms the conclusion that there is significant variance among callings.

We ran additional chi-square tests which compared each calling to the aggregate of all other callings. We isolated each calling and ran a chi-square test of independence comparing the data for that calling with the aggregate of all other callings. The resulting p -values for each calling are shown below.

| Calling | p -value |
|------------------|------------|
| Apostles | 1.651e-10 |
| Bishopric | 3.355e-06 |
| Primary | 0.101 |
| Relief Society | 1.447e-05 |
| Seventy | 3.342e-16 |
| Sunday School | 0.044 |
| Young Men | 0.0999 |
| Young Women | 0.0006 |
| First Presidency | 1.077e-16 |

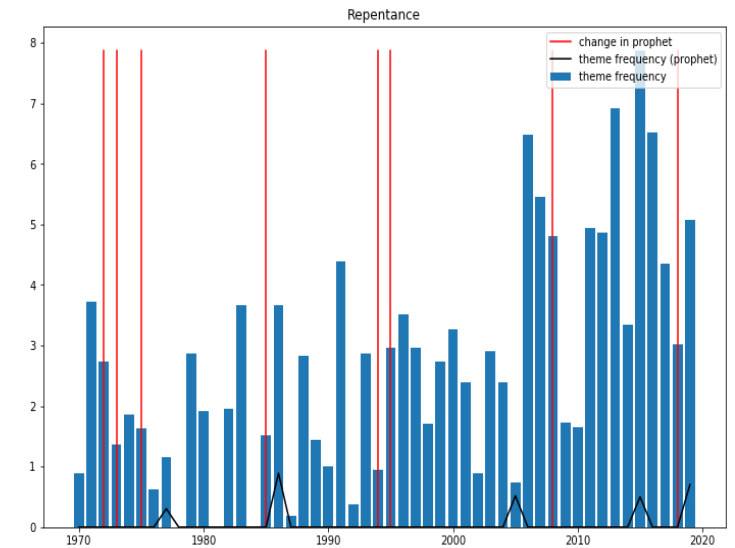
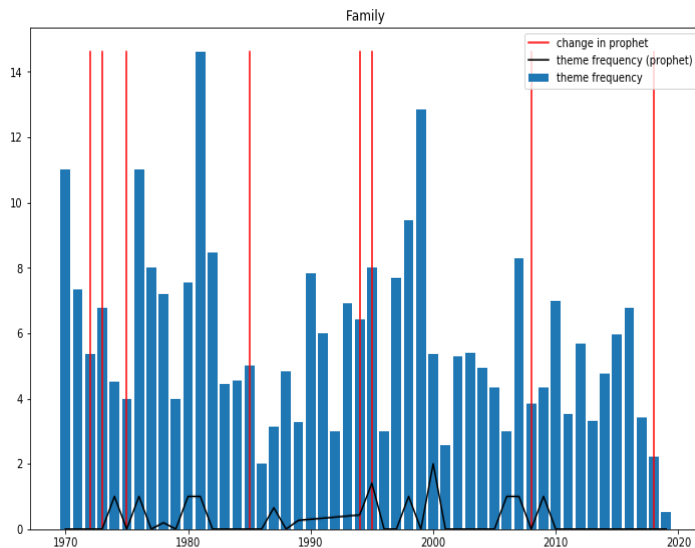
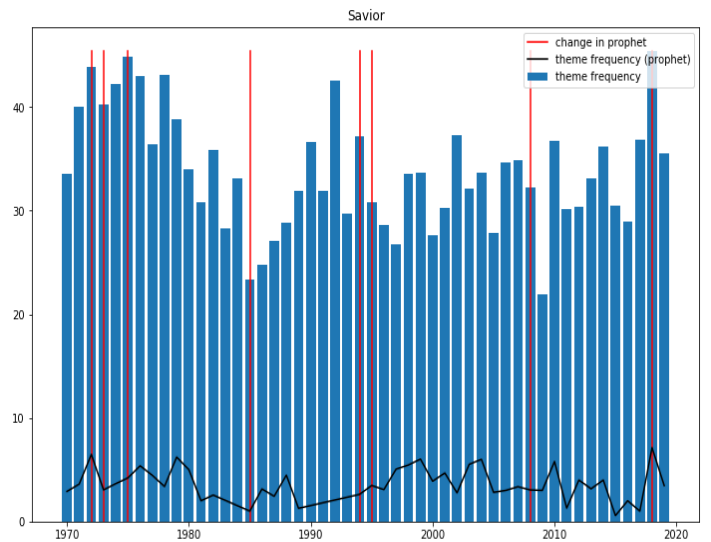
Given these p -values, and assuming a significance threshold of 0.05, we observed that the following groups varied significantly from the rest: Apostles, the Presiding Bishopric, the Relief Society, the Seventies, the Sunday School, the Young Women, and the First Presidency.

Future investigation could analyze the specific appearances of certain themes within talks and analyze the probability of being able to precisely identify a calling given a collection of theme scores from a talk.

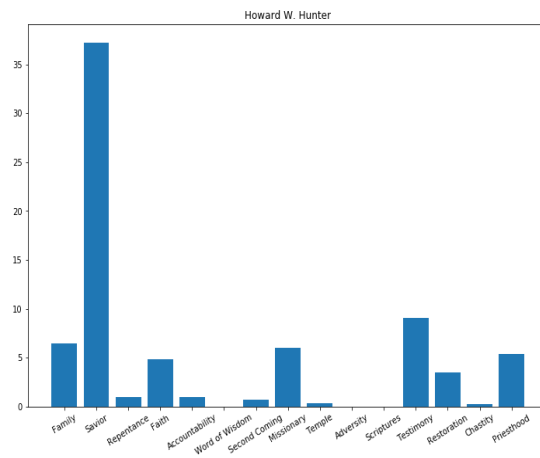
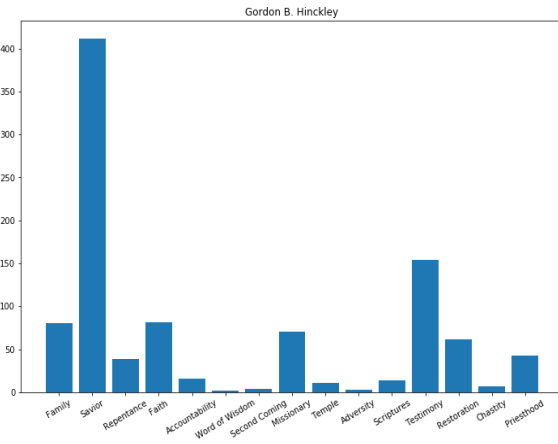
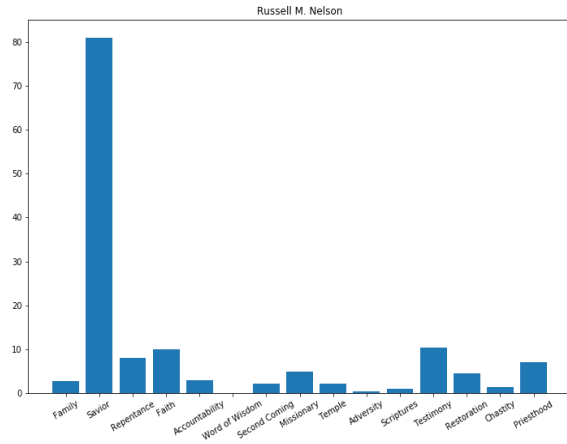
3.4 The Prophet and Conferences

In an effort to analyze the effect a prophet has on the talks given during his time as prophet, we consider the frequency of themes throughout the years. Unfortunately, there seems to be very little relation in most of the themes. There is, however, a very distinct trend in the theme "savior":

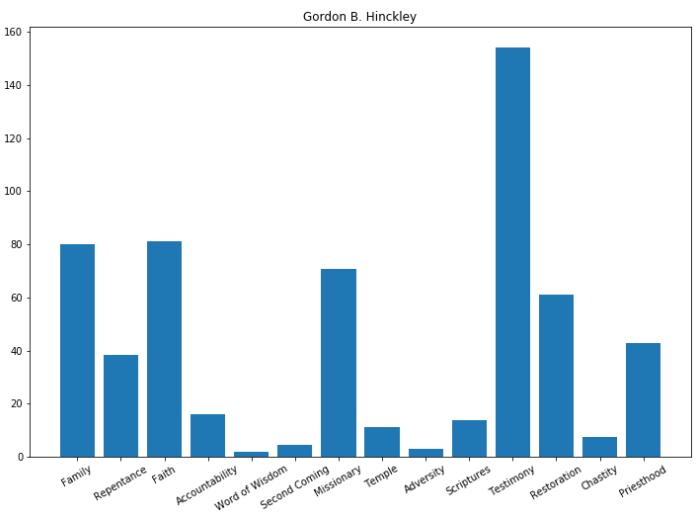
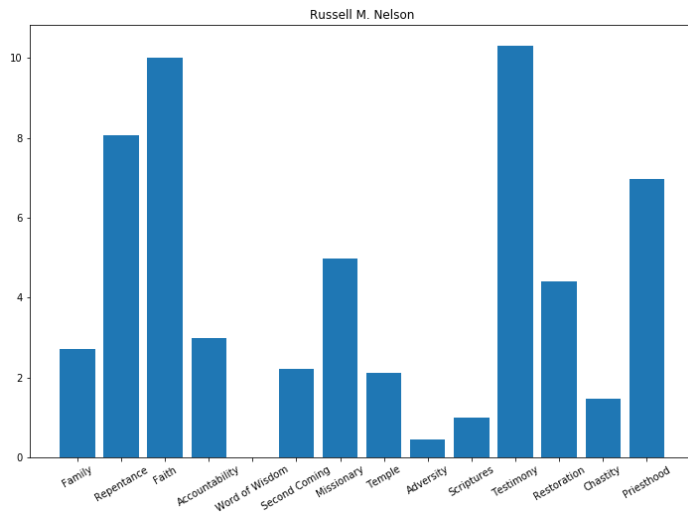
The trend follows a distinct slope that seems to change every time the prophet changes. This may be due to chance and to the fact that we are looking for significance among several plots, which inflates the odds of finding something ‘significant’. There seems to be little or no correlation between talks from the prophet and the talks that follow from other General Authorities about themes with a high frequency of discussion, such as “family”, and themes with few talks, such as “repentance”.

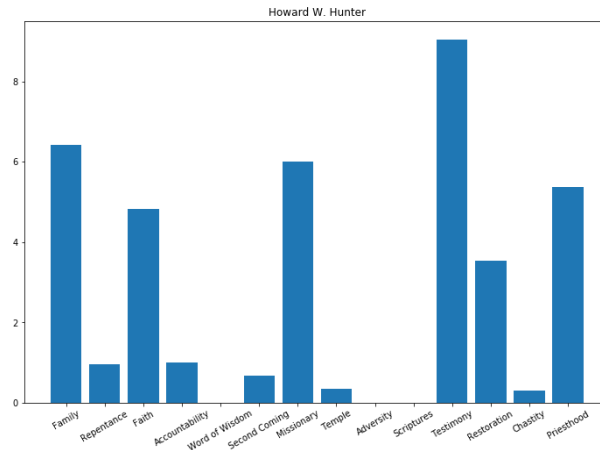


In addition to analyzing the change in a topic’s frequency from year to year, we examined at the distribution of themes by prophet to determine whether the difference is statistically significant. We provide visualizations for three prophets here: Russell M. Nelson, Gordon B. Hinckley, and Howard W. Hunter. See the auxiliary file for visualizations for the other prophets.



This visualization revealed that the “savior” theme drowns out all other themes, making theme profiles among prophets difficult to compare. With this in mind, we disregarded the “savior” theme in order to enhance the differences among the theme profiles of different prophets.





We observed that the distribution is distinctly different between prophets, but it was unclear whether the differences are statistically significant or due to chance variation. To analyze this, we ran a chi-square test of independence, which resulted in a p -value of .0000167. This value indicates that at least one prophet's distribution of themes is significantly different from the others. Unfortunately, analysis cannot be run to determine whether this difference is due to the differing prophet's initiative or to the evolving culture of the Church over time.

4 Conclusion

Through our analysis of General Conference talks of The Church of Jesus Christ of Latter-day Saints, we found many interesting results. Contrary to our assumptions, we found that there was a very low correlation between the talks about missionary work and the number of full-time missionaries serving. We did conclude that there is some variation between talks given by members of different groups. Lastly, we found that themes changed significantly from one prophet to another, but it was impossible to tell from the data whether the prophet initiated change or responded to current events and culture.

These results can be used to help further member's understanding of the Church they belong to. It is faith-building to see such a strong order in the way that the Church is organized. For example, we found that leaders with specific callings try to influence the Church in ways that are related to their responsibilities. Our results inform Church leaders who speak in conference to focus their talks on themes that are likely to lead to increased missionary service rates. Similar analysis could be done to determine topics that influence other aspects of the Church.

While the focus of our analysis specifically dealt with a corpus of General Conference talks of The Church of Jesus Christ of Latter-day Saints, our methods would be generalizable to any text setting with marked themes. A similar word tree could be constructed to help analyze themes in United Nations proceedings, advertisements, or just about any other medium. As we have seen, there is significant value in identifying and analyzing themes over time.

5 References

Gary Shepherd, Gordon Shepherd, Modes of Leader Rhetoric in the Institutional Development of Mormonism, *Sociology of Religion*, Volume 47, Issue 2, Summer 1986, Pages 125–136, <https://doi.org/10.2307/3711457>