

When is fertility salient to religion?
Colonization and counterculture in frontier Utah

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Abstract

Fertility research often concludes that declining religious parity is owed to increasing secularization. Such models risk ignoring the dynamic nature of institutions while simultaneously displacing religion from its fundamental role of social organization. Instead, I advance a framework that emphasizes religious fertility patterns as emergent phenomena of social need, group objectives, and resources. In this model, changing fertility illustrates the evolving intentions of religion and their relation to broader society. Utilizing the Utah Population Database, a dataset of Latter-day Saint religious genealogies matched to census, health, and vital records, I present a demographic analysis of maternal parity in 19th and early 20th century Utah according to individual religious ceremony participation and community religiosity. Here, population fertility decreases across all commitment level subgroups, yet paradoxically in a manner that actually widens differences between most committed and less-committed or non-Latter-day Saint sub-groups. Thus, Latter-day Saint declining fertility better reflects an adaptable religious identity, built through the pragmatic alignment of social restraints and group objectives, supported through community approaches. A discussion concerning a more flexible framework to advance religion and fertility examinations ends this presentation.

1. Introduction

Population fertility patterns are largely described in simpler terms than the actual realities of individual family decision making. For potential parents, childbearing hinges upon a host of intertwining concerns such as personal health, educational goals, cultural expectations, partner relations, or religious beliefs. Yet, demographic descriptions of declining fertility in religiously pronatalist populations often owe the phenomenon to the decreasing influence of religion. While this explanation may offer truth in certain circumstances, to define a fundamental human behavior like reproduction in such a simplified manner risks over-reducing both religion and fertility. Instead, I advance a model where a given religion's fertility patterns arise from the broader evolution of group objectives, better viewed as the outcome of how the religion views its role in society.

To illustrate this concept, I examine fertility differences among religious sub-groups and local communities in Utah between late 19th to mid-20th century and their relation to broader institutional and national currents. I utilize the Church of Jesus Christ of Latter-day Saints (hereafter the Latter-day Saints, Latter-day Saint faith, or the Church *see: Style Guide — The Name of the Church*, 2022), a pro-fertility faith, as the religion of interest. This institution continually redefined its approach to reproduction as it separated from America, founded hundreds of insular frontier settlements, and eventually reabsorbed into American society. With this story in mind, I propose that the complexities of religious fertility better perform as a metric of religious and social interaction than as the measurement of group decline.

2. Background

2.1 Framework

In approaching religion and fertility, I situate human institutions as cooperative networks that both stabilize and protect common biological concerns to a degree not attainable through individual effort (Sources). As evolution frames increased offspring output as necessary to species replication (SOURCES), it would follow that group cooperation might focus upon supporting reproduction in a beneficial manner (SOURCES). A social interactionist framing (Meltzer & Petras 1973; Abbott 2017) would support such a notion. Rather than proposing religious institutions as concrete structures that house its constituents, religions are abstract concepts that arise from the innumerable interactions of individuals with common objectives (Simmel 2010; Abbott 2010). Thus, evolving fertility dynamics culminating from the currents of member opinion eventually define the religion itself. In this scenario, the newest version of the group is the religion.

This dynamic depiction has implication for group norms and identities. Theories in these areas advance that the borders surrounding acceptable behavior and thought, which in turn defines what group membership means, continuously adapt to internal and external interactions (Abbott 1995, more sources). In the case of reproduction, fertility expectations that define religious group identity will continually evolve according to new events. Religious groups must constantly readdress if they should delineate from or assimilate to society, grow or stagnate their populations, or advance or relinquish a particular theology. Therefore, despite the seemingly static nature of a pro-natalist belief, interactionist theory situates theological statements and clerical assertions as single tiles in the larger mosaic of religious events.

2.2 Fertility Models

Previous religious fertility studies advance that pronatalist religions exercise a determinant influence upon fertility unless replaced by secular concerns (Heaton 1986; McQuillen 2004; Agadjanian & Yabiku 2014). This logic misplaces fertility as the final measure of religiosity: when fertility is high, so is religious adherence; when fertility is low, secularization has occurred. It assumes, moreover, that religious institutions exist separately from those who produce fertility patterns. Consequently, we can only assume a definition of religious pro-natalism that consistently demands the highest number of children possible. If such a hypothesis were true, we would expect an inelastic relationship between clergy and congregants manifesting as high religious individuals (hopefully validated through some other means than parity) maintaining static fertility levels during times of social change. Such scenarios are difficult to imagine.

Clergy and congregant: Clearly a division of roles exists between religious clergy and congregants. That these roles would not reciprocally inform each other seems unlikely. For instance, Pope Leo XIII's 1891 *Rerum Novarum* (León 1980), the "Rights and Duties of Capital and Labor" offers a flexible approach to Catholic family struggles when he calls for reformation of working conditions. Here, Leo claims that low wages and poor treatment of labor keeps the working class from owning land or homes, thereby diminishing the capacity of believing Catholics to start families. He plants Catholic fertility into the ecosystem of capitalist life when he states that factories need workers, and workers are humans produced in families. Dalla-Zuanna (2011) describes how local clergy develop broader understandings concerning the contexts of fertility behaviors. The author describes 1930's Sicilian men confess to their priests acts of fertility control (the sin of Onan) for economic or maternal health reasons. Yet these same men remained active in their faith through these very confessions that inducing both sympathy

and moral conflict among the clergy. In a modern setting, Yeatman and Trinitapoli (2008) find that individual clerical views on birth control behaviors in Malawi Catholics and Protestants, whether in line with general church teachings or not, are the best predictor of congregant reproductive behaviors. The authors' qualitative data describes very little public prognostications on family practices, leaving converging opinions as outcome of private pastoral meetings, or more simply that the priest and congregant derive from the same community. In sum, how a religion approaches member fertility is likely the ongoing process informed by events, circumstances, and community.

Fixed fertility: Beyond cleric-member relations, elastic fertility patterns can occur even among the faithful. Jaffee (1939) examines fertility among Chicago Catholics between 1920 to 1935, as an ethnic sub-group phenomenon. Jaffee finds elevated fertility among Italian compared to Polish Catholics, owed not religious commitment, but rather the increased economic status and resources of Chicago Italians. Guinnane, et al (2006) demonstrates that lower total fertility rates among early 20th century Irish American Catholics were contradicted by high endogamous fertility rates. The authors owed this phenomenon to Irish American Catholic males who, too poor to own a home, were consigned to boarding houses, leaving family life out of reach. Conversely, their female counterparts were left to marry Protestants who favored smaller families. Yet, when Irish Catholic marriages occurred, high fertility ensued. Were these non-married Irish American workers less interested in Catholicism than their married counterparts? Given the circumstances, living single with other Irish American men or more normative family sizes for Chicago Polish immigrants, may have been the distinguishing aspect of their localized Catholic identities.

2.2 Latter-day Saints: Adaptability and fertility

Beginnings: Latter-day Saint history as a Second Great Awakening outsider, the high values of communal living best typified in polygamy, and its final evolution to a grander version of the modern Protestant family provide the framework to the faith's fertility practices. The Church's founder, Joseph Smith, was born to an itinerant agriculture family in 1805, that eventually settled in Palmyra, New York. At the time, upstate New York was the center of the American religious social discontent aimed towards mainline protestant institutions. Within this milieu, Smith's boyhood heavenly visions and claims of authority, stories of ancient American prophets in a new book of scripture translated from hidden golden plates, and the gift of individual revelation for all believers checked all the boxes of religious individualism and distrust of hierarchical authority so common in the Second Great Awakening (Wood 1980). Yet, this same adaptable collection New England-styled religious beliefs became the bedrock of truth claims that separated early Latter-day Saints from all other religions. As such, after a series failed utopian styled efforts and the killing of Joseph Smith, the Latter-day Saints exited society under the direction of Brigham Young and headed west.

Polygamy in the West: These refugees who settled in the barren Salt Lake valley in July of 1847 immediately worked to control the arid mountain soil and then spread outwards. In this they were successful. By the time of Young's death in 1877, the Church had founded over 350 settlements meant to supply God's kingdom with economic stability and social independence. This insular society now spanned a 1000-mile axis that stretched from Arizona to Idaho, Colorado to California. Importantly, Young understood that the creation and continued success of these colonies rested not only upon the caused they sustained but also the infrastructures they required.

Although Smith initially introduced polygamy in Illinois as a ritual for a select group of followers (Hales & Hales 2015), under the leadership of Young it became an official public practice of the Church, the ideal family model. Under Young, polygamy transformed beyond Smith's theological mysticism and into a practical institution of alloparental care with the added benefit of a selection male fertility enhancement as it counted its patriarchs as the most faithful of Latter-day Saints. Clearly many polygamous women had detrimental experiences despite these advantages (Ulrich 2017). But for others, polygamy divided household responsibilities, enough so provide additional opportunities in education and activism. For instance, polygamist women were fervent suffragists (Arrington 1988), winning the right to vote in Utah long before the 19th amendment¹.

Despite national political perceptions of Latter-day Saint polygamy gendered slavery, few women wanted out and many were its fiercest supporters (Embry 1984; Iversen 1984). To these, polygamy was engrained into Utah family life and thereby a moral institution. Latter-day Saints viewed the ideal polygamous patriarch, committed to their community and children, as a contrasting figure to the frontier ruffians who drunkenly stumbled in and out of Salt Lake City on their way west. Noting the subtle irony of polygamy's "gentile" opposition, one practitioner claimed, "If we were to establish a whorehouse on every corner of the streets, as in nearly all other cities outside of Utah...we should doubtless then be considered good fellows" (Anderson 1966).

Abandonment and Assimilation: New polygamous marriages had severely diminished by 1880 due to intensifying national opposition and imprisonment of Church leaders (source).

¹ For in depths studies of Latter-day Saint history during this time, see Quinn 1988, 1997, 2002; Arrington 1992, 2005, Anderson 1966, O'Dea 1957, Turner 2012, and Park 2024.

Yet, the Latter-day Saints were surprised in 1890 when Church leader Wilford Woodruff announced the official end of polygamy due to the federal government's 1887 confiscation of all Church property (source). Though polygamy performed as a practical family infrastructure, it was nevertheless core to Latter-day Saint theology and identity, the byproduct of their communal roots. As such, the initial dismay gave way to confusion and obstinance as some polygamous marriages were still performed in secret, and those publicly excommunicated for continued polygamy were never sure if their Church discipline was for show or a true severance (Smith 2009). Accordingly, in 1904 the Church released a follow-up second statement reiterating their opposition to polygamy, and polygamy receded as its practitioners disappeared through migration to Mexico and Canada or attrition. Conversely, the brisk leap to monogamy initiated the Latter-day Saints reabsorption into American: in 1896 Utah, still under federal territorial control, was given a measure of independence by entering the Union as the 45th state. Although Church-wide polygamy eradication took decades to achieve, by the turn of the 19th century it was the Church had embedded itself into America.

Subsequently, Latter-day Saints were encouraged to join the mainstream as its youth were sent to secular universities and its businessmen developed national ties with leaders of industry and government. The Church's flagship school, Brigham Young University, hired its first PhD president and sent its religious faculty to the University of Chicago's divinity school. Church leaders later cancelled the relation due to the secular views of Chicago's faculty (Quinn 2002). Regarding fertility, the Church exchanged polygamy for Protestant nuclear families, only with more children, and strict codes of abstinence outside of monogamous marriages. Leaders who once themselves used alcohol, quickly moved to prohibit its use as an olive branch to evangelical Christians (Peterson 1972). Though always patriotic, the Church shifted the Latter-

day Saint family from an emblem of insular counterculture to the best version for Protestant America (Mauss 1994(a), 1994 (b)). As assimilation was never meant to be complete, the Latter-day Saints would join the world, but be a little better.

2.4 A 20th century fertility infrastructure

While the Latter-day Saints maintain a unique fertility theology, one that contends large families are the landing place for all spirits in the pre-earth world who chose to come to earth to gain salvation (*Where Did We Come From?*, n.d.; Andersen, 2011), the institutions continued efforts to provide alloparental care post-polygamy are most germane to this study. This includes an array of programs emanating from the Latter-day Saint women's organization, the Relief Society (RS). Created under Smith's wife in Illinois in the 1840's, the RS paralleled many similar mid-19th century women's organizations meant to aid the poor. After moving to Utah, the Church's women's organization lay dormant until the late 19th century as a more official organization with its own all female leadership and budgetary control. But as Latter-day Saint young women spread out to American universities in the early 20th century, the aims of the RS expanded as new ideas regarding social welfare were imported back to Utah.

Amy Lyman, a pivotal figure in RS history, had spent the summer of 1902 at the University of Chicago studying progressive approaches to social ills under Sociologist George Vincent while also meeting with Jane Addams at Hull House (Embry, 2021). After Lyman's husband Richard finished his graduate studies at Cornell University, the couple returned to Utah where Amy Lyman joined the RS general board and expanded RS's visiting teaching (VT) program. Originally VT consisted of two women in each local ward (the Church's term for congregation) assigned to visit each woman in the congregation and offer a church lesson.

Under Lyman, this program grew into a church-wide community-based social welfare system. VT now consisted of each female member of the ward assigned to make monthly visits to one or two other women in the same congregation. These visits included support, friendship, and temporal help when needed. If an assigned mother was sick, the VT might take in her children for the day or make a dinner for the family. Or, an older VT might be assigned to a new mother and offer informal mentorship. Thus, one aspect fundamental to Latter-day Saint polygamy, women sharing the loads of their religious sisters towards the advancement of Latter-day Saint families, reemerged again in this new communal arrangement.

Data and Methods

The demographic analysis for this study uses data and methods uniquely suited to examine the changing nature of Latter-day Saint fertility in Utah. Using the Utah Population Database, a collection of religious genealogies matched to census and health records, I examination gross changes in fertility across time within the predominantly religious population of Utah in the 19th and 20th centuries. I consider parity in relation to individual religious practice and a unique community religiosity variable developed for this analysis. Each test is conducted within the historical backdrop of general fertility decline.

3.1 Dataset

The Utah Population Database (UPDB), a comprehensive computerized genealogy, serves as this study's data source. In 1975, The Utah Genealogical Society (UGS) provided copies of 185,000 three-generation genealogic documents to the University of Utah concerning all individuals who had a demographic event (birth, marriage, reproduction, or death) on the Mormon Trail or in Utah. These genealogies, kept over many generations by LDS members,

represented approximately 1.9 million individuals. This donation included virtually every baptized Latter-day Saint found in Utah prior to 1975, now matched to census, vital records, hospital records, and more (Smith & Mineau 2021). For a given individual, the UPDB provides information of residences, occupations, marriages, births, and dates of participation in the Latter-day Saint ceremonies.

3.2 Population

The study population consists of 178,448 women, born from 1850 through 1925, who survived past childbearing years (age 50) and were recorded in at least one Utah census between 1900 to 1940. All population members are from the initial 1975 UGS donation and represent a fertility period from approximately 1870 to 1970.

3.3 Fertility outcomes

I measure maternal fertility using the staple measures from the literature: parity, birth space interval, age at first birth, and age at last birth. The study's primary outcome, parity, is defined as the total number of maternal live births. For descriptive purposes, I employ secondary endpoints to contextualize fertility changes. Birth space interval (measured in months) is the average time between each maternal birth event; multiparous births are counted as single events. Further, maternal age (in years) at first and last birth is also utilized. The UPDB provides a data quality indicator, included as a control variable in this study, that denotes database managers believe the individual women's fertility history is complete (Y) or incomplete (N).

3.4 Religious variables

To assess if fertility patterns divide along religious lines, I employ both individual and community level measurements:

Individual religious participation (IRP): Individual religiosity is measured through the women's participation in Latter-day Saint baptism and endowment ceremonies. The UPDB records individual participation in important Latter-day Saint religious ceremonies (by year). Baptism, in the Latter-day Saint tradition, occurs at age 8 for those born in the faith (median age= 8.54) and is best interpreted as an indicator of parental religious observance. The endowment ceremony, performed in temples during early adulthood (median age= 25.12), represents further promises of fealty to the Church's theology, leadership, and codes of conduct (*About the Temple Endowment*, n.d.). Particular to this study's aims, the endowment acts an individual measurement of an adult autonomous religious choice that allows a measurement of religious adherence separate from one's fertility history. Consequently, I categorize women into three groups: 1) Non-Latter-day Saint: those women never baptized or endowed 2) Baptized only: only baptized during the majority of fertility years, 3) Endowed before age 40: those women baptized and later endowed before age 40.

Community religious intensity (CRI): To measure the influence of local religious communities and infrastructures upon individual fertility, I introduce a score based upon the proportion of endowed Latter-day Saints adults to all adults within a given enumeration district. Denominators were provided by IPUMS (Ruggles et al., 2024) and districts with less than 100 individuals were removed. The individual female's score is calculated by the mean proportion across all linked census appearances between 1900 and 1940.

3.5 Controls

1. **Mothers birth year:** to control for known and unknown time effects such as public health improvements or evolving religious heterogeneity, I include maternal birth year.
2. **Epoch:** All analyses are stratified by birth epochs that approximate important time-periods mentioned in this study's narrative.
3. **Urbanicity:** I include whether the majority of census appearances occurred in rural or urban counties (SOURCE) as urban zoned individuals are generally associated with differing rates declining fertility (source), is likewise included.
4. **Occupation:** A mean head of household occupational score recorded in across census appearances is utilized to account for social standing. UPDB standardizes each census score according to the 1950 occupational ranking. Individual scores range from 0 to 999. Many individuals are listed with an occupational score of 100, meaning farm/agriculture worker. As the agriculture category includes both migrant agriculture owners and large ranch owners, in accordance with UPDB standards (sources) I include a separate indicator variable (farmer = 1).

3.8 Analytic Approach

This analysis of fertility and religion proceeds in three parts:

1. **Descriptive analysis:** Here I describe important population characteristics and offer an exploratory figure that compares fertility and religious recidivism rates in the population.
2. **Individual religious participation (IRP) and parity:** Using ordinary least squares (OLS) regression, I investigate the associations between birth year and religious participation with maternal parity, stratified by birth epoch. Given religious fertility literature that advances declining religious fertility resulting from secularization, when stratified by ceremony participation levels one would assume that parity among endowed

women would remain static across time, while those only baptized would decrease faster than the mean.

3. **Community religious intensity (CRI) and parity:** This analysis utilizes the CRI score as a proxy for maternal access to church community resources like the RS and VT. As such, I begin with a descriptive analysis of fertility outcomes (parity, birth space interval, age at first and last birth) according to female CRI score. I then offer use OLS regression to test for the interaction between CRI and IRP to fertility outcomes. If higher intensity communities manifest elevated individual fertility among endowed individuals concomitant to fertility decline, the evidence would suggest a relative approach to fertility that emphasizes the church's interest in comparative distinctions over absolute numbers. Changing relations across time may further support this hypothesis.

4. Results

4.1 Descriptive analysis

Table 1 provides population descriptive details. The mean parity is 4.29, age at first birth is 23.03 years, age at last birth is 34.58 years and birth space interval is 27.82 months. The population proportion of endowed women is 0.52, baptized only is 0.37, and non-Latter-day Saints is 0.10. The mean CRI score is 0.436 and maternal birth year is 1896.67. Of the population, 0.66 have a completed fertility history record, and the mean occupational score is 422.67 (0 to 999). [Table 1 here]

Figure 1 demonstrates a consistent drop in fertility across birth cohorts until the beginnings of the baby boom appear in the 1905 to 1910 birth cohorts. A smaller drop within early is seen in the proportion of women with endowed parents who they themselves are

endowed, but from then on recidivism rates remain mostly stable existing between 50% to 65% other than a .10 dip around the 1910 cohort. The higher proportions early on may reflect the nature of the cohort members, many of whom were Latter-day Saint immigrants who converted as families. Whereas later cohorts gradually consisted more of those born into a religious community, not undergoing the selection process of conversion and westward migration. Yet above all, recidivism trends do not convincingly account for declining parity. [Figure 1 here.]

4.2 Individual religious participation and parity

Figures 2a through 2d demonstrate the relation of individual religious participation (IRP) to fertility. All subgroups manifest parallel but declining parity. Yet, the fertility of baptized only women eventually assimilates to that of their non-Latter-day Saint counterparts by 1900. Endowed women maintain a consistent buffer across cohorts, with two dimensions: that of the actual size of the buffer (consistently between .5 to 1 child), and that of increasing ratio parity decreases. This second dimension suggests larger families as growing point of differentiation.

Of important note is the inverting trend of age at first birth (Figure 2c) between endowed women and other IRP groups during 1870 to 1890 cohorts. When considered with increasing birth intervals (Figure 2b) and increasing distance between IRP groups of age at last birth (Figure 2d) it seems plausible that childbearing among endowed women shifts to later and somewhat more extended periods compared to other IRP groups. This may suggest a change in family structure related to increased women's education during assimilation. [Figure 2 Here]

Table 2 offers strong statistical evidence of parity boundaries. When adjusting for record completeness, urbanicity, and occupation, we see a growing fertility decline across birth cohorts within the first three epochs among the non-Latter-day Saint reference group until a fourth epoch

reversal, representative of the post-World War 2 baby boom (1850 to 1869: ($\beta=-0.009$ [0.001]; 1870 to 1889: ($\beta=-0.015$ [0.000]; 1890 to 1909: ($\beta=-0.021$ [0.000]; 1910 to 1915: ($\beta=0.004$ [0.001])). Yet for baptized-only Latter-day Saint women, the initial differences to the reference group diminish in later epochs (1850 to 1869: ($\beta=0.141$ [0.030]; 1870 to 1889: ($\beta=0.144$ [0.009]; 1890 to 1909: ($\beta=0.089$ [0.008]; 1910 to 1915: ($\beta=0.031$ [0.010])). Endowed women on the other hand increase their differentiation to non-Latter-day Saints as their coefficient grows by 47.41% between the first and second epochs (1850 to 1869: ($\beta=0.251$ [0.028]; 1870 to 1889: ($\beta=0.370$ [0.009])). From here their parity differentiation remains stable during fertility decline (1890 to 1909: ($\beta=0.382$ [0.008]; 1910 to 1925: ($\beta=0.365$ [0.009])). Thus, despite fertility decline, and the convergence of baptized-only parity to that of non-Latter-day Saints, endowed women maintain a flexible differentiation towards parity. [Table 2 here]

4.3 Community religious intensity and parity

Table 3 gives the distribution of fertility outcomes according to maternal CRI. Higher fertility generally leans towards those with higher CRI scores. For instance, the proportion of those with over 7 children increases with CRI. For those below the median CRI score of 0.436 only 17.79% have 7 or more children, whereas 24.88% above the median have 7 or more children, and 27.46% in the top 10% of CRI scores (> 0.634) have 7 or more children. Similar trends develop for lower ages at first birth, and higher ages at last birth, although birth space intervals have no clear trend, except within the upper 10%. Thus, higher parity among women with high CRI, likely springs from later and increased fertility length. [Table 3 here]

Figures 3a through 3d depict fertility according to CRI over time. In general, the relation between CRI score and parity diminishes in later years, most notably for post-1900 cohorts.

Similarly, charts 3b and 3c depict age at first and last birth differences that diminish as cohorts progress. Like Table 3, birth space interval differences and CRI scores tend to offer mostly noise.

Yet, a small portion of this convergence across cohorts can be contextualized by Figures 4a and 4b. Figure 4a depicts the difference of CRI according to IRP across time that is reflective of the CRI score's nature (endowed women are more likely to live in areas with more endowed adults) but also demonstrates 20th century assimilation. As Utah assimilated nationally, CRI converges locally (at least to a degree). Figure 4b shows the changing proportionality of IRP among cohorts across time, with similar trends to Figure 1's recidivism rates. One might conclude that some of the convergence in Figure 4a reflects the changing proportions in 4b around 1910, which in turn associates with the recidivism drop mentioned in Figure 1. [Figures 3 and 4 here]

Table 4 offers the main results concerning the CRI and parity analysis. In early cohorts CRI (scaled to .10) offers a strong marginal predictor of higher fertility across all groups ($\beta=0.025$ [0.007]) but non-significant interactive differences between IRP and CRI for endowed ($\beta=-0.000$ [0.007]) and baptized only ($\beta=0.010$ [0.008]) women compared to non-Latter-day Saints. This suggests that 19th century Latter-day Saint communities roles as centers of trade and resources offered better resource predictability, that in turn offered better fertility support, than that found within non-Latter-day Saint settlements oriented towards mining and agriculture. [Table 4 here]

As epochs progress, the interactive effect of CRI and IRP diverges, suggesting that CRI now reflects a religious infrastructure accessible through religious participation (e.g. visiting teaching's provision of allo-parental care), rather than an economic infrastructure accessed

through money. Now parity among endowed women demonstrates increasing association to CRI (1880-1889: ($\beta=0.026$ [0.006]; 1890-1909: ($\beta=0.050$ [0.006]) while baptized-only women more closely align to non-Latter-day Saints (1880-1889: ($\beta=0.015$ [0.006]; 1890-1909: ($\beta=0.017$ [0.006])). It is not until the final epoch, 1910 to 1925, that the association to parity between CRI and IRP lose their significance (Baptized-only: ($\beta=-0.001$ [0.006]; Endowed: ($\beta=0.007$ [0.006])). These results suggest diminishing returns of community possibly due to factors such as religious integration (Figures 1, 4a, 4b), improvements in peri-natal health, and the Church hierarchy's growing use of media (magazines, radio, and television) to communicate its norms to the laity, creating a culture no longer bound by geography (Sources).

Figures 5a and 5b juxtapose parity differences according to IRP and CRI. Using the coefficients from Table 2, these figures display the calculated differences in parity, over time, between baptized-only (Figure 5a) and endowed women (Figure 5b) to non-Latter-day Saint women. Overlaid are the within-IRP calculated parity differences between women in the upper and lower 10% of CRI scores, according to Table 4 (Upper 10%: 0.634; Lower 10%: 0.232; *see Appendix Table A1*). Interestingly, fertility and CRI differences work in tandem within both groups of Latter-day Saint women. Yet, they work in different manners: baptized only parity differences between extreme CRI groups declines quickly until parity between baptized only non-Latter-day Saint assimilates, while endowed CRI seems to prop up endowed parity differentiation, suggesting a correlation between community resource and parity. Diverging trends do appear for endowed women in the final cohorts. Beginning in 1900, endowed parity differentiation increases as IRP differences recede, suggesting new mechanisms to parity and perhaps an increased push across a now national religion to differentiate itself.

In sum, the data from this analysis confirm that fertility is a flexible construct used differently across varying religious contexts. Further, until mid-20th century, community and social networks formed the boundaries that promoted fertility, in terms of both colonization and the Latter-day Saint efforts to maintain a cohesive culture during assimilation. [Figure 5 here]

5. Discussion

When is fertility salient to religion? Clearly, religious fertility is a complex affair. In some cases, fertility is of direct consequence to specific theologies (such as nulliparous fertility among celibate Shakers), yet for other groups parity represents changing institutional objectives. In 19th and 20th century Utah, high fertility helped fill hundreds of new religious settlements but eventually allowed an assimilation that maintained group identity during increased external interaction. For Latter-day Saint women, this change may have reflected the natural consequences of living up to the Latter-day Saint ideals of both advanced education and traditional family roles. Beyond questions of fertility, this analysis might best argue that the most consequential part of Latter-day Saint identity is flexible integration married to clear boundaries.

Future Applications

For demographers interested in religion and fertility, I propose three elements to approach future endeavors. First, one must assess greater society's fertility needs. Is high fertility viewed as necessary, detrimental, or somewhere in between? This answer provides the outer boundaries within which group fertility operates. For Latter-day Saints, expansion, polygamy, and high fertility supported United States efforts in Manifest Destiny until frontier settlement ended. The second assessment must consider the current value of fertility to the group.

The value may arise from needs concerning numerical growth, group identity, or some combination. For this study group, fertility filled its colonies, and then formed the unique identity of the 20th century Latter-day Saint family. How objectives change over time is paramount to demographic interpretation. Finally, an assessment of the internal infrastructures that develop around fertility will yield additional insights. For the Latter-day Saint faith, this includes polygamy, a fertility enhancer for men and an alloparental mechanism for women, and then a transition towards visiting teaching, only an alloparental mechanism for women as assimilation relaxed fertility demands.

Conclusion

While reproduction sits at the center of existential human instincts, institutions organize and protect fertility in a manner supportive to the group. Religion, as a historic organizer of communities and societies, often sits at the forefront of group fertility strategies. For Latter-day Saints, organized reproductive efforts ensured initial success, only to change in manner to maintain group differentiation, and therefore, survival. Thus, fertility is most salient to religion when it is flexible.

Tables and Figures

Table 1. Descriptive statistics of independent and dependent variables. Utah women born between 1850 and 1925, appeared in at least one Census in Utah between 1900 to 1940, and survived to at least age 50. (N=178,448).

	Mean	Standard Dev	Min	Max
Community religious intensity	0.436	1.55	0	1
Fertility Measures				
Parity (Children ever born)	4.29	3.08	0	20.00
Age at first birth (years)	23.03	4.37	8.00	56.00
Age at last birth (years)	34.58	6.45	20.00	61.00
Birth space interval (months)	27.82	15.00	0	184.03
Mother's Birth Year	1896.67	19.40	1850.00	1925.00
Religious Participation				
Not LDS	0.10	0.31	0	1
Baptized only	0.37	0.48	0	1
Endowed	0.52	0.50	0	1
Birth Cohort Epochs				
1850 to 1869	0.12	0.32	0	1
1870 to 1889	0.23	0.42	0	1
1890 to 1909	0.34	0.47	0	1
1910 to 1925	0.32	0.47	0	1
Completed UPDB fertility history (Yes)	0.66	0.48	0	1
Occupation				
Occupational Score	422.67	253.01	0	999.00
Farmer (Yes)	0.08	0.28	0	1

Table 2. Coefficients concerning the relation between maternal parity, maternal birth year, and religious participation. Utah women born between 1850 and 1925, appeared in at least one census in Utah between 1900 to 1940 during fertility age, and survived to at least age 50. (N = 178,448)

	1850 to 1869	1870 to 1889	1890 to 1909	1910 to 1925
	N= 18,802	N= 36,929	N= 55,346	N= 52,028
	β (SE)	β (SE)	β (SE)	β (SE)
Intercept	1.5844 (0.016)	1.626 (0.046)	2.059 (0.021)	0.759 (0.0129)
<i>Main Effects</i>				
Maternal birth year (MBY)	-0.009(0.001)	-0.015 (0.000)	-0.021 (0.000)	0.004 (0.001)
Religious participation				
Non-LDS	1.000	1.000	1.000	1.000
Baptized only	0.141 (0.030)	0.144 (0.009)	0.089 (0.008)	0.031 (0.010)
Endowed	0.251 (0.0283)	0.370 (0.009)	0.382 (0.008)	0.362 (0.009)
<i>Covariates</i>				
Completed UPDB fertility history	0.398 (0.009)	0.229 (0.006)	-0.019 (0.005)	-0.062 (0.005)
Urban census district	-0.093 (0.006)	-0.169 (0.005)	-0.172 (0.005)	-0.033 (0.005)
Occupational score	-0.002 (0.001)	0.035 (0.001)	0.030 (0.001)	0.009 (0.001)
Farmer (= Yes)	-0.102 (0.021)	0.151 (0.014)	-0.008 (0.011)	-0.007 (0.009)

Community religious intensity scaled to .10 and occupational score is scaled to .01. Mother's birth year in years past 1850. General linearized model, negative binomial distribution. All P value = <.0001 unless otherwise notated. * P = <.01, **P = <.05, *** Not Significant

Table 3. Descriptive tables of independent fertility variables according to the individual's enumeration district's proportion of endowed Latter-day Saint Adults (community religious intensity) among Utah women. Women must have been born between 1850 and 1925, appeared in at least one Census in Utah between 1900 to 1940, and survived to at least age 50. (N=178,448).

	Total Population N=178,448 %	Below Median (0.436) N= 88,640 %	Above Median (0.436) N= 88,808 %	Top 10% (0.634) N= 17,840 %
Parity (children ever born)				
0	11.49%	11.92%	11.19%	11.98%
1 to 2	18.74%	21.28%	16.42%	15.34%
3 to 4	27.98%	29.91%	26.37%	24.11%
5 to 6	20.01%	19.10%	21.13%	20.93%
7 or more	21.22%	17.79%	24.88%	27.64%
Birth space interval (in months)				
less than 20	21.98%	23.93%	20.28%	19.08%
20 to 30	21.98%	20.62%	23.58%	36.15%
30 to 35	21.98%	21.17%	23.03%	12.34%
35 and higher	21.98%	22.32%	21.88%	21.16%
Missing	11.52%	11.95%	11.23%	12.06%
Age at first birth (in years)				
younger than 20	16.85%	16.47%	17.40%	17.90%
20 to 22	21.04%	20.16%	22.17%	23.30%
22 to 25	25.11%	25.02%	25.48%	24.28%
25 and older	24.94%	26.43%	23.74%	22.52%
Missing	11.50%	11.93%	11.20%	12.00%
Age at last birth (in years)				
less than 30	20.07%	22.47%	17.91%	16.41%
30 to 35	20.52%	21.66%	19.62%	18.40%
35 to 40	24.68%	24.09%	25.55%	25.45%
40 and older	22.66%	19.86%	25.72%	27.74%
Missing	11.50%	11.93%	11.20%	12.00%

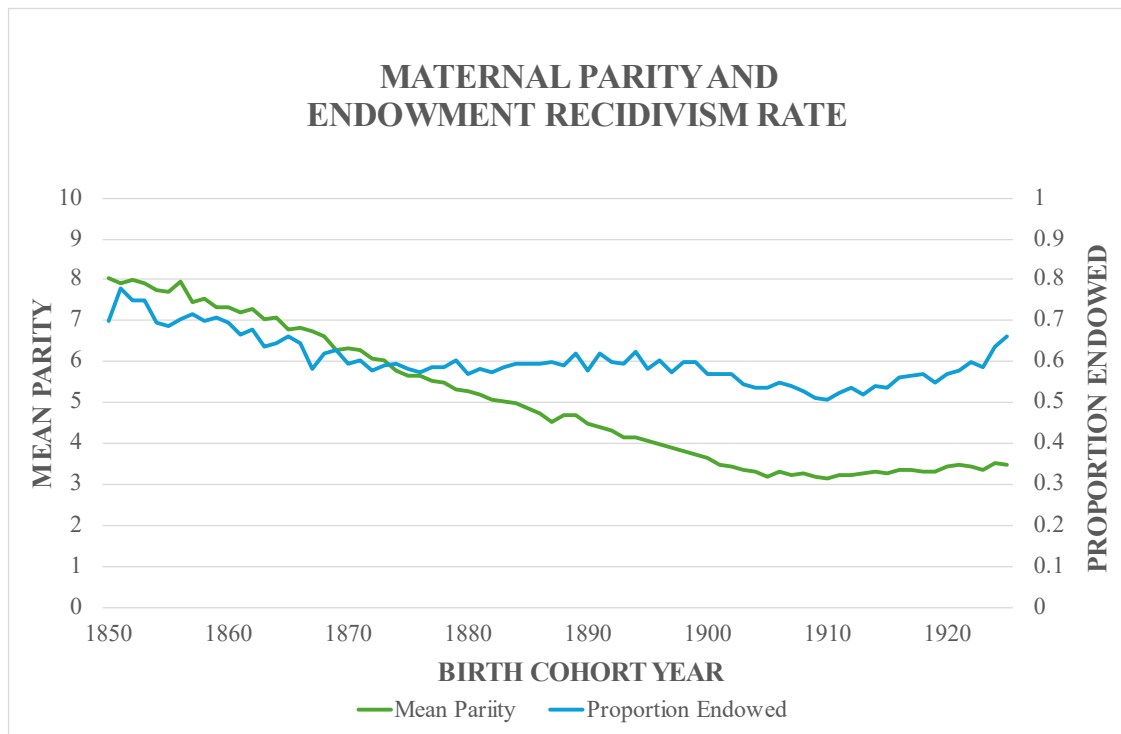
All variables are represented in quadrants except for parity, where zero births are separated out of the first quadrant.

Table 4. Coefficients concerning the relation between maternal parity, community religious intensity, and individual religious participation. Utah women have been born between 1850 and 1925, appeared in at least one census in Utah between 1900 to 1940 during fertility age, and survived to at least age 50. (N = 178,448)

	1850 to 1869 N= 18,802 β (SE)	1870 to 1889 N= 36,929 β (SE)	1890 to 1909 N= 55,346 β (SE)	1910 to 1925 N= 52,028 β (SE)
Intercept	1.473 (0.029)	1.527 (0.025)	2.051 (0.028)	0.724 (0.046)
<i>Main Effects</i>				
(a) Community religious intensity	0.025 (0.007)	0.018 (0.005)	-0.007 (0.005)	0.005 (0.006)
(b) Individual religious participation				
(1) Non-LDS	1.00	1.00	1.00	1.00
(2) Baptized only	0.092 (0.031)	0.080 (0.023)	0.026 (0.023)	0.032 (0.025)
(3) Endowed	0.231 (0.030)	0.230 (0.023)	0.159 (0.022)	0.327 (0.025)
(a) * (b)				
(a)*(b1)	1.00	1.00	1.00	1.00
(a)*(b2)	0.010 (0.008)	0.015 (0.006)	0.017 (0.006)	-0.001 (0.006)
(a)*(b3)	-0.000 (0.007)	0.026 (0.006)	0.050 (0.006)	0.007 (0.006)
<i>Covariates</i>				
Completed UPDB fertility history	0.381 (0.010)	0.217 (0.006)	-0.022 (0.005)	-0.062 (0.005)
Maternal birth year	-0.009 (0.001)	-0.015 (0.004)	-0.020 (0.000)	0.004 (0.001)
Urban census district	-0.056 (0.006)	-0.121 (0.005)	-0.138 (0.005)	-0.023 (0.005)
Occupational Score	0.001 (0.001)	0.039 (0.001)	0.033 (0.001)	0.009 (0.001)
Farmer (= Yes)	-0.108 (0.021)	0.138 (0.014)	-0.022 (0.011)	-0.015 (0.009)

Community religious intensity scaled to .10. Mother's birth year in years past 1850. General linearized model, negative binomial distribution. All P value = <.0001 unless otherwise notated. * P = <.01, **P = <.05, *** Not Significant

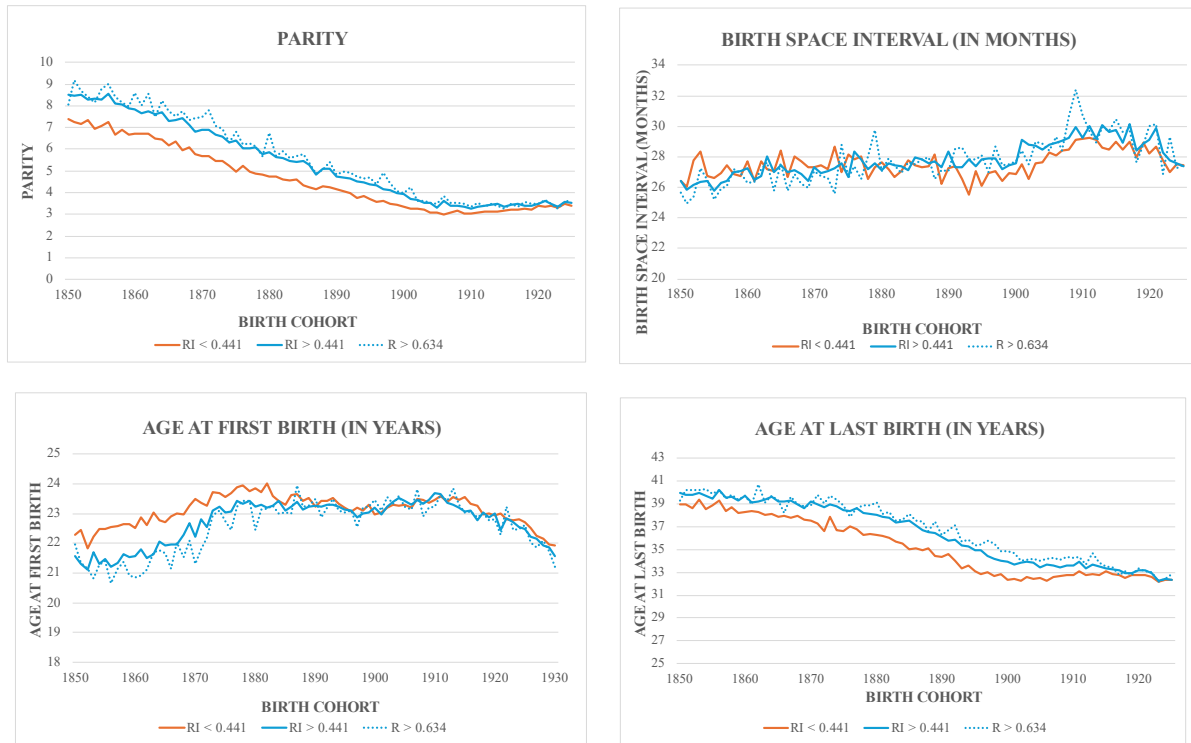
Figure 1. Trends in gross fertility compared to proportion of female offspring, with two endowed parents, who were themselves endowed. Utah women born 1850 to 1925.



Figures 2a-2d. Maternal parity, birth space interval, age at first and last birth according to individual Latter-day Saint ceremony participation. Utah women born between 1850 to 1925.



Figures 3a-3d. Maternal parity, birth space interval, age at first and last birth according to community religious intensity score. (0.441 = median CRI score, 0.634 = upper 10%). Utah women born between 1850 to 1925.



Figures 4a and 4b. Population trends concerning individual religious participation and community religious intensity within the study population.

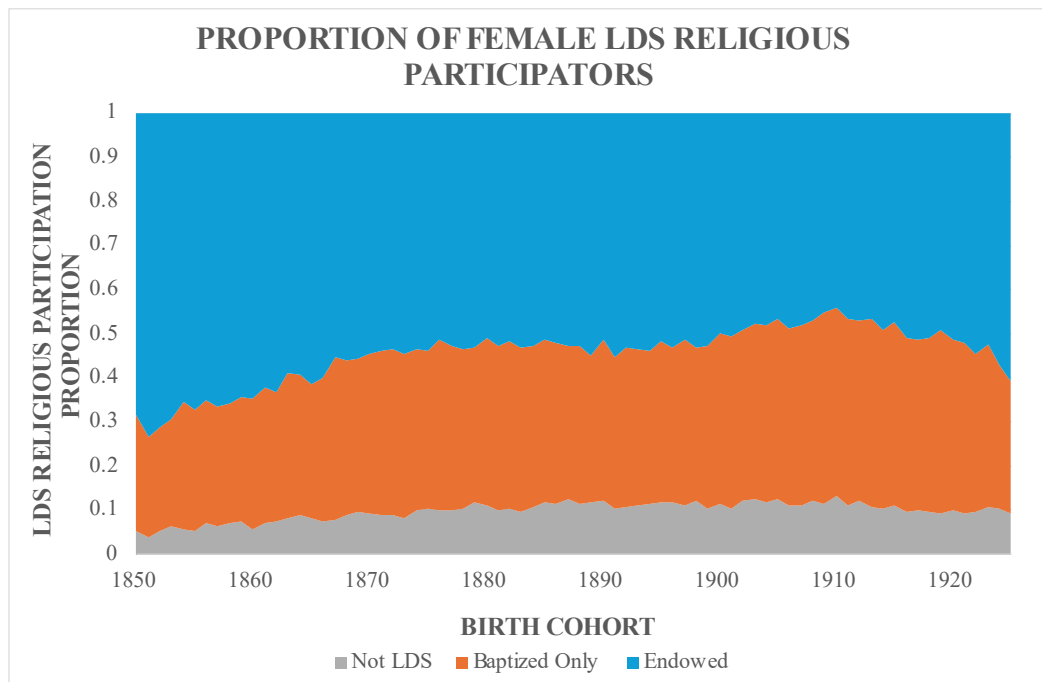
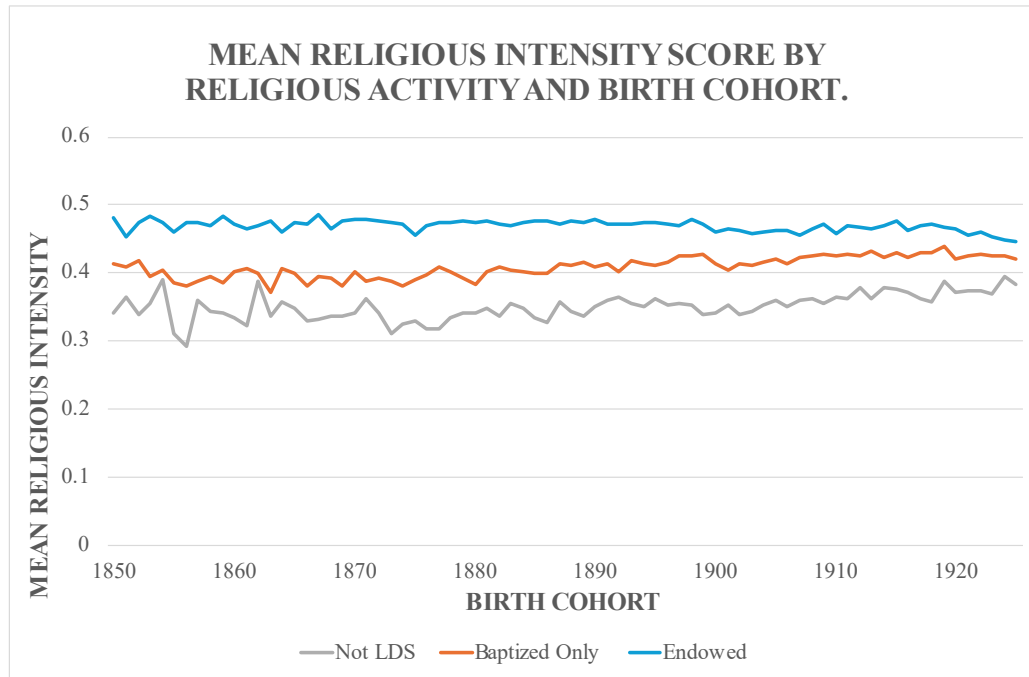
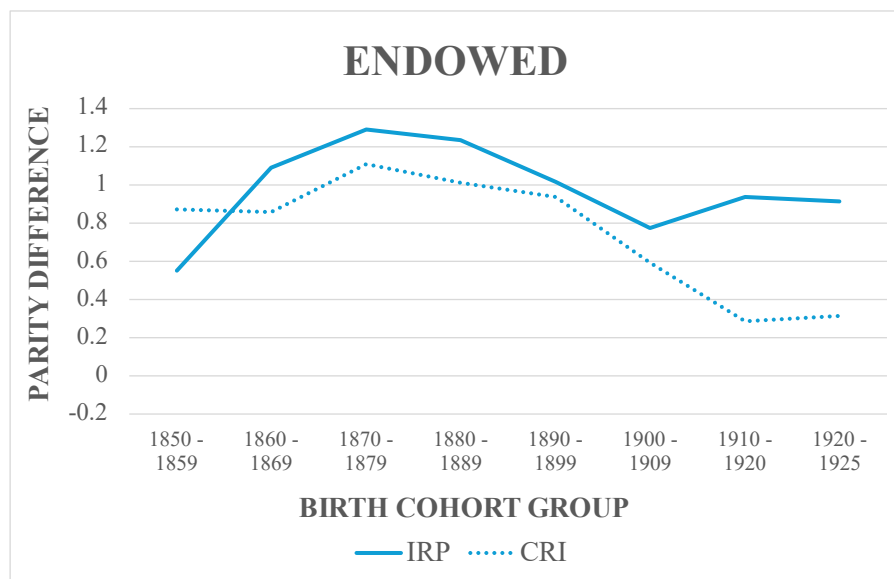
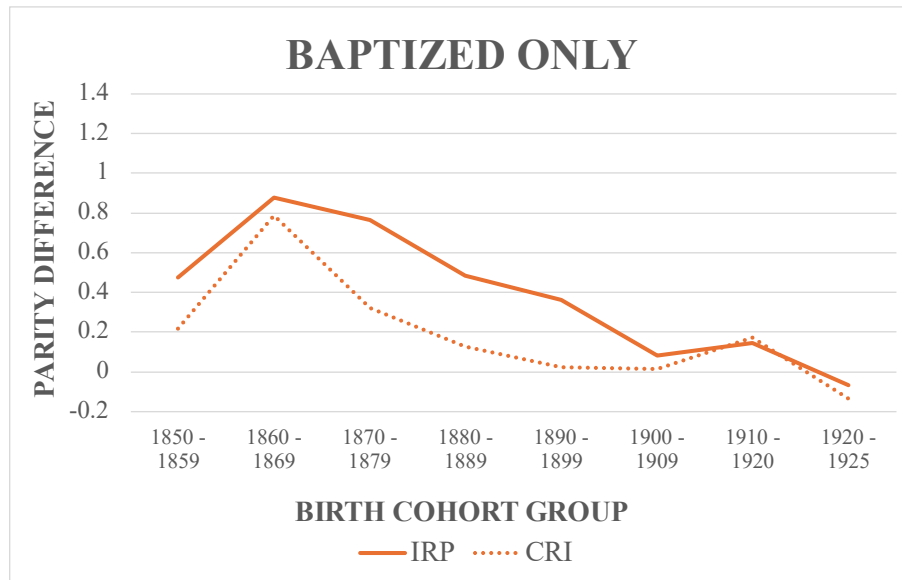


Figure 5. Comparison of parity by religiosity and parity differences between high (> 0.634) and low (< 0.232) CRI score women. By groups of 10-year birth cohorts. Utah women, born 1850 to 1925.



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Appendix

Will add CRI distribution