Introduction

This paper focuses on the emergence and growth of New York county temperance societies during the early stages of the US temperance movement. I analyze associations between county-level characteristics and variations in the numbers of New York county temperance societies between the years 1828 and 1834. I should note that county-level examinations of temperance societies preclude analyses of individual-level characteristics of temperance members, such as their socioeconomic composition or their motivations. This investigation's unit of analysis is the county, and therefore conclusions about individual temperance activists cannot be made. Instead, with county-level data I examine the early growth of New York temperance societies as a function of counties' demographic, religious, and other ecological characteristics. In particular I test the hypothesis that activities associated with the Second Great Awakening provided both the stimulus and resources for the early New York temperance movement. Temperance scholars have long associated the movement with the religious and moral fervor of the early 19th century, and the movement's ties to churches and benevolent organizations have been documented (Morone, 2003; Mathews, 1969; Young, 2001; Merril, 1988). I further investigate the link between the Second Great Awakening and the New York temperance movement by using county-level longitudinal data to test the effects of religious revivals on numbers of temperance societies. I also model the effects of several other ecological factors to compare the relative goodness-of-fit of the Second Great Awakening model. Finally, I run a full model to measure the effects of the Second Great Awakening on numbers of temperance societies while controlling for the effects of other ecological factors. Never before have longitudinal data been used to model change in

temperance numbers as a function of demographic, economic, political, and religious characteristics. With this work I hope to answer Young's (2001: 661) call for a new historical sociology of "social movements that fuse personal and social change and develop primarily within and against civil society." This paper tests Young's hypothesis that the US temperance movement grew from both the "life politics" involved in the religious schemas of the time, as well as the "cultural mechanisms" of contention that sustained the modular forms of its protests (662).

Background

The temperance movement has been called the first sustained national social movement in the United States (Young, 2001). While localized temperance activities have been documented to take place as early as 1789, activities first coalesced into an organized movement in the mid 1820s (Kett, 1981). The American Temperance Society was established in 1826 and its influence quickly spread across the states, boasting some 8,000 auxiliary societies and about 1.5 million members by the mid-1830s (Morone, 2003). Whether or not alcohol was a societal problem of the time, it has been shown that the first third of the nineteenth century saw the greatest per capita consumption of distilled liquor in US history (Rorabaugh, 1979). While my intent is not to evaluate the influence of the US temperance movement, there is a strong correlation between the rise of temperance activity and the fall in alcohol consumption rates. Consumption of alcohol peaked in the US in 1830 at about four gallons per capita, and within a decade of the first organized temperance activities the rate had fallen to under two gallons (Rorabaugh, 1979). The US temperance movement certainly permeated much of nineteenth century life, and its effect on the culture, politics, and lifestyle of American life was substantial.

The early US temperance movement shared many characteristics with other modern social movements. Yet at the same time, certain features made it quite distinct from the more common labor and political movements of the nineteenth century (Calhoun, 1993; Mathews, 1969; Young, 2001). The early US temperance movement broke from the standard forms of modular protests by emphasizing personal and lifestyle changes over material ends. Furthermore, its early struggles largely took place within

civil society, where interactions with state and political institutions were minimal (Young, 2001; Calhoun, 1993). Nevertheless, even without targeting state institutions and pushing non-materialist issues the early US temperance movement certainly had political consequences. As a result of its distinct and exceptional features, the early US temperance movement has eluded the explanatory power of two of the most widely used theories of social movements: (1) the contentious politics perspective, and (2) the life politics perspective.

Charles Tilly's and Sidney Tarrow's theory of contentious politics is often cited during discussions of modular forms of social movements. This viewpoint asserts that "people engage in contentious politics when patterns of *political opportunities* and constraints change and then, by strategically employing a repertoire of collective action, create new opportunities, which are used by others in widening cycles of contention" (Tarrow, 1998: 19. Emphasis added). The theory rests largely on the mobilization of people around issues with political ends and action directed at state institutions. Indeed, it is specifically argued that it was the centralization of state power that granted political opportunities for citizens to organize "mass action that was more consciously public, formal, national, and autonomous" than prior localized actions (Hanagan, et. al, 1998: 17). Tarrow further claims that "contentious collective action" is the defining characteristic of all social movements, and that "collective action becomes contentious when it is used by people *who lack regular access to institutions*, who act in the name of new or unaccepted claims, and who behave in ways that fundamentally challenge others or authorities" (Tarrow, 1998: 3. Emphasis added). This narrow definition of a social movement does not apply well to the characteristics of the early US temperance

movement for two primary reasons. First, early temperance activities were neither characterized by national political ends nor were the efforts directed at the state. Instead, early temperance activities were characterized by protests within civil society, as individuals engaged in "confessional protests" in which groups "gathered together to bear witness against sins of drinking" (Young, 2001; 661). Self-discipline, public confession, and denouncing the national sin of intemperance were the primary foci of the early US temperance movement. "Exhibitions, lectures, newspaper articles, and even melodramas depicting the fate of the drunkard were marshaled against liquor" in the name of pious self-restraint and condemnation for the sinner (Perkins, 17). These actions were directed at other citizens to argue that intemperance violated the culture of industrious self-control that permeated nineteenth-century American Protestant life (Gusfield, 1979). Politicizing temperance and pressuring the state for changes in drinking laws were not features of the movement until the mid nineteenth century (Kett, 1981). Consequently, much of the contentious politics framework fails to address the early temperance movement since it explicitly ignores questions of culture and self-meaning (Calhoun, 1993). Most contentious politics theory "saw movements either as challengers for state power or as contentious groups pursuing some other set of instrumental objectives. There was little recognition of how 'the personal is political' or how important political (or more generally macrostructural) results may stem from actions that are not explicitly political or instrumental in their self-understanding" (Calhoun, 1993: 414). As a second setback to the contentious politics perspective, Tarrow limits the theory with his restrictive assertion that "contentious collective action" is the defining characteristic of a social movement. By doing so, he mistakenly raises the question of "what qualifies collective

action as 'contentious'?" In his own definition of the term, Tarrow states that action becomes contentious only when actors *lack access to institutions* and are making new or previously unaccepted claims. Consequently, by his definition the early US temperance movement was not a social movement at all. While temperance activists certainly proclaimed new ideas about the use of alcohol, a large majority of these actors had direct access to arguably the most important institution of the early nineteenth century: The Church. It has been shown that several of the early US temperance leaders were white religious men, many of whom were themselves ministers of churches or otherwise directly tied to the administration of churches (Mathews, 1969; Merrill, 1988). Furthermore, as Young (2001: 676) notes, while popular party politics were beginning to emerge at this time, "the central state was actually in decline when these (temperance) movements appeared." Without state institutions to give meaning or social unity in times of rapid population growth and economic change, the church became the primary social institution for the people to turn to. And people turned to it in droves. For example, following the Revolutionary War the Methodist denomination alone increased from 10,500 members to over 76,000 in just one decade (Mathews, 1969). And by the turn of the century the Second Great Awakening and its revivals "helped make religion one of the major determinants of public discourse everywhere in the county" (Mathews, 1969: 40).

Shortcomings of contentious politics theory have limited its explanatory power of the early US temperance movement. Analyzing only the resources temperance actors mobilized or the new repertoires of action used by temperance activists fails to encapsulate the full nature of the early US temperance movement. And the movement

certainly cannot be defined by the relation it had with the state. Temperance actors contended with opposition groups within civil society and struggled over the cultural and religious meanings of their actions. As such, Calhoun (1993) and other social movement scholars have turned to the theory of "life politics" to better explain the forces behind the US temperance movement. The life politics perspective of social movements gained considerable attention in the 1960s and 1970s in attempts to explain the rise of many non-materialist political issues and identity politics of that time. Theories of life politics focus on culturally political matters that are very personally significant to activists, such as queer rights, environmentalism, peace movements, and other issues that arose from student movements in the late 1960s. Movements such as these escape the contentious politics frame because they emphasize non-material issues and are not exclusively characterized by interactions with the state. While the 1960s exploded with many such movements, Calhoun (1993) explains that life politics existed in the US throughout the nineteenth century. The "moral crusades" of the US temperance movement "sought public recognition or action with grievances their detractors considered clearly outside the realm of legitimate state action" (399). And the methods the movement used to express its message exemplified the values it sought to spread. Not only did temperance activists denounce others for the sins of drinking, but also pledged sobriety and personally supported others during meetings. Thus, Calhoun stresses that the US temperance movement featured a very important defining characteristic of life politics: that the movement was an end in itself.

Despite their criticism of the contentious politics paradigm, some temperance scholars have found parts of the theory useful. Young (2001) believes that components

from both the contentious politics and life politics frameworks should be applied to best explain the nature of the US temperance movement. Like many life politics theorists, Young asserts that religious institutions provided the "cultural mechanism" necessary to "launch and sustain these popular movements" (662). The struggles largely occurred within civil society and therefore relied on resources of religion and "cultural schemas" for meanings, motivations, and recipes for social action" (664). But beyond the cultural meanings of these religious institutions, Young believes they provided the necessary organization for the repertoires of protest as well. Tilly and Tarrow stress the important role "catnets" play in mobilizing the resources and human power necessary to sustain modular forms of social movements. These "catnets" are composed of both the categories of people who recognize and embrace their common characteristics, and the networks of people linked together by interpersonal bonds. Together, these catnets, more than formal organizations, fortify the relations of trust, reciprocity, and shared interests needed for successful mobilization of social actors. The churches, more than any other institution of the time, provided such relations and interpersonal bonds. The contentious politics theory therefore provides a framework for analyzing these relations, and how imperative they were in the mobilization of temperance activists. Thus, according to Young, the early US temperance movement is best understood not by either the contentious politics theory or life politics theory, but rather by the fusing of the two.

It is this fusing of life politics with tenets of contentious politics that guides my investigation of the association between the growth of early New York county temperance societies and ecological characteristics of the time. Using multiple data sources that span the late 1820s and early 1830s I am able to examine the growth of

temperance societies in New York counties in the early stages of the movement. New York is an excellent case because it underwent rapid social, political, and religious change in the 1820s and 1830s, and was a hotbed of temperance activity. In the early 1830s New York contained more auxiliaries to the American Temperance Society than any other state (Young, 2001). The revivals of Charles Finney during the 1820s made him a national sensation, and rejuvenated religious emotionalism throughout New York. The expansion of agricultural and industrial capitalism was flourishing with the growth of the Erie Canal and other networks of canals and turnpikes. And the political culture of the time was characterized by rapid democratization and the emergence of party politics. New York's demographic, political, economic, and religious forces of the time make it a prime location to assess the association between early US temperance activity and various ecological factors.

I reconsider Young's work by hypothesizing that variables associated with the Second Great Awakening should be significant and strong predictors of temperance activity. Several contesting arguments about the emergence of the New York state temperance movement are also evaluated. I will first briefly explain the tenets of each hypothesis, arguing primarily from Young and Mathew's perspective that the Second Great Awakening provided both the "repertoire of collective action" and the "confessional motivation" for the New York temperance movement. Second, I will describe the variables that are used to evaluate each hypothesis. And third, I will fit and test several models to the longitudinal data to determine the best fit.

Conceptual Framework

Because the United States underwent remarkable change during the early nineteenth century, there are several hypotheses on the early American temperance movement. While many publications speculate on the nature of the US temperance movement, the topic is lacking a rich body of analytical data. As Joseph Gusfield notes in Symbolic Crusade: Status Politics and the American Temperance Movement, much of the work is "partisan writings, histories with preach, or analyses which fail to go beyond general remarks about moral perfectionism, rural-urban conflict, or the Protestant envy of the sinner" (Gusfield, 1986: 3). For example, Dorothy S. Truesdale, writing on behalf of the city historian of Rochester, NY in April 1939 asserted, "not only in the economic sphere, but in the fields of religion and reform the need of earnest endeavor on the part of the individual was stressed. It (the 1830s) was a period of the revival and of such social movements as temperance and moral reform, all of which emphasized the perfectionism of society through effort" (Perkins, 1939: 2). Blanket statements such as this have often perpetuated speculations on the religious roots of the US temperance movement. As alternatives to the religious-based theories that stressed the moral perfectionism of self and society during the early 19th century, several more recent hypotheses of the US temperance movement have been proposed. Nevertheless, the strength of the Second Great Awakening cannot be understated, and I continue to hypothesize that it was indeed the primary force behind the New York temperance movement. I will therefore briefly review each of the following hypotheses about the New York temperance movement: (1)

The Second Great Awakening, (2) The Others, (3) Sex Distribution, (4) Political Status, and (5) Economic Change.

The Second Great Awakening

Religion played a tremendous role in early nineteenth century United States, and there exists a large body of research on the so-called Second Great Awakening in New York State. Growth in churches and membership roles, as well as the penetration of religion into politics and culture are widely documented. And while there was "interdenominational rivalry" between sects, Joseph Barnes points out, "differences of opinion among the orthodox churches were obscured by an over-riding evangelical impulse" since "American Protestantism was at the summit of a revivalistic era" (Barnes, 1974: 2). Certainly a defining characteristic of the Second Great Awakening were the outbursts of revival activities which dotted New York's countryside and revitalized a religious fervor throughout the state. For instance, an attendee of a revival in 1829 wrote, "I have never attended a protracted meeting where the spirit of God was so manifestly present as it was during our meeting…Is there not enough to call forth the feelings of every Christian to labour in this great field? Does it not rejoice your heart to hear the heathen are receiving a greater outpouring of the Spirit than we here? I trust this will be a year long to be remembered by thousands on account of the great outpouring of the 'Holy Spirit,' and feeling that they turned from the evil of their ways unto the living and true God (Perkins, 1939: 7).

Mathews (1969) believes that the Second Great Awakening served social functions above and beyond theological issues alone. It was "an organizing process that helped give meaning and direction to people suffering in various degrees from the social strains of a nation on the move into new political, economic, and geographical areas" (Mathews, 1969: 27). According to Mathews, the Second Great Awakening provided unity and organization in dire times, and he goes so far as to call it a movement in itself. Americans suffered from afflictions brought about by "internal social change with its accompanying anxieties" and thus turned to the Church in general and the revival in particular to "escape the trammels of inability" (28). The Second Great Awakening therefore unified Americans by providing institutions that reaffirmed peoples' faith and gave them direction in unstable times. Furthermore, churches "provided elementary 'disciplined formal organizations', which created a society accustomed to working through voluntary associations for common goals," (29). "The Revival in this general social strain promised a 'positive outcome in an uncertain situation' for it proposed to make men better by putting them into direct contact with God. It also provided values or goals for which to work and codes which regulated behavior giving ideological as well as social order to life" (34). Thus the general force of the Second Great Awakening provided both the "cultural mechanisms" and "catnets" to foment the issue of temperance into the first US national movement.

Table I: High Number of Temperance Societies by High Number of Revivals, 1828-1834

High Temperance Societies?	High Number of Revivals? No	Yes	Total
No	29 78.38%	10 55.56%	39 70.91%
Yes	8 **21.62%**	8 **44.44%**	16 29.09%
Total	37 100%	18 100%	55 100%

$\chi^2 = 3.06$ *df = 1* *p<.1*

Table I's cross-tabulation reveals an association between the total number of revivals in a county between 1828 and 1834 and the total number of temperance societies formed during the same time period. The two dummy variables used in the cross-tab were both created by using the 70th percentile as the threshold for "high." The table reveals that New York counties in the 70th percentile of revival activity were about 105 percent more likely to be in the 70th percentile of temperance societies formed. The difference is statistically significant at the .1 α-level with a p-value of .08. This relationship between revivals and temperance societies is the type of evidence that has prompted many researchers to claim that the Second Great Awakening in general, and churches, revivals, and religious voluntary associations in specific were mobilizing tools of the early US temperance movement (Young, 2001; Mathews, 1969).

The purpose of this paper, however, is to assess the Second Great Awakening's explanatory power of the temperance movement in New York State. The strength of the association between the Second Great Awakening and the formation of temperance societies must therefore be measured across time and against the forces of demographic, political, and economic processes of the time.

Hypothesis I: Variables associated with the Second Great Awakening are significant, strong, and positive predictors of the numbers of early New York county temperance societies.

The Other

The intersection between moral outrage and overt racism played a significant role in the later periods of the temperance movement. Narratives of "Us versus Them" and negative portrayals of "Others" were commonplace in both the North and South during the nineteenth century. In the South, the morally charged rape narrative that depicted African Americans as uncontrollable risks to women was constructed by southern whites to supposedly prevent the "lapse of Caucasian civilization into African barbarism" (Morone, 2003: 293). The role of drinking fit nicely into the storyline. Liquor was purported to have turned the black male into the rapist of white women and a threat to the entire Christian establishment. Images of barbaric, drunken Negroes roaming the countryside in search of white ladies and innocent children were propagated to push restrictive drinking laws and curtail the personal freedoms of African Americans.

In the North, equally strong fears were evident about the new waves of immigration and the presence of foreign customs. "Besodden Europe," was feared to be sending to the US "her drink-makers, her drunkard makers, and her drunkards, or her more temperate and habitual drinkers, with all their un-American and anti-American ideas of morality and government" (Morone, 2003: 304).

While it is impossible to deny the significance the "Other" played in pushing temperance reform in the late 19th century United States, early temperance activities in New York were not characterized by such acerbic and coercive sentiments towards either African Americans or then recent immigrants. Evidence of such accounts are not seen on a large scale until the mid nineteenth century, after the issue of temperance was usurped for political ends.

Hypothesis II: Variables associated with the "Others" theory are insignificant predictors of the numbers of New York county temperance societies.

Sex Distribution

The US temperance movement is often credited with instigating the first US feminist movement. Early leaders of the first feminist movement, such as Susan B. Anthony, Elizabeth Cady Stanton, and Amelia Bloomer were all extremely active in the US temperance movement during the mid nineteenth century. Stanton, for example, founded the Daughters of Temperance, the first female led US temperance organization, after she was prohibited from speaking on behalf of temperance at a meeting for the Sons of Temperance in 1849. Stanton also wrote for *Lily*, the first woman-owned newspaper in the United States, which was edited by Bloomer. However, women not only led separate women-specific temperance organizations, but also "dominated the rosters of temperance societies" overall (Young, 2001: 683). Mary Ryan's excellent and exhaustive histories of the roles women filled in public arenas underscore the sexual

politics of the early nineteenth century. The association of women with the private sphere and domestic functions was pervasive, and effectively excluded them from the "public realms where men spoke and acted authoritatively for the whole community" (Ryan, 1990: 5). The participation of women in early nineteenth-century public affairs was almost exclusively limited to their function as passive and respectable symbols of femininity (Ryan, 1990). However, a major influence of the Second Great Awakening was the growing "public celebration of the virtues of private life" (ibid, 37). And because it was believed that "God gave woman a more spiritual nature," it soon became a woman's moral duty to hone her "skills that lay outside the realm of domesticity" and into public moral affairs (Morone, 2003: 225). By the mid 1840s New York temperance societies were proclaiming "'that we solicit the influence of female laborers of every description and that we will make their interests our own'" (Ryan, 1990: 138). Ryan continues, saying that temperance meetings throughout the late 1830s and 1840s were "effusive in their invitations to women," who were given "special seats in the galleries" and at times even led the singing and reciting of temperance pledges (137).

Despite overwhelming evidence that women played instrumental roles in the US temperance movement, I do not believe they had as a significant effect on the formation of the earliest temperance societies. Similar to the timing of the "Others'" role, the influence of women on the early temperance movement may have been minimal. "The rise of the common man and the political exclusion of women proceeded in tandem between 1825 and 1840" and the composition of the public remained quite masculine (Ryan, 1990: 135). Not until the late 1830s did the participation of women in the US temperance movement really take off. Furthermore, county-level data prohibit the

analysis of women's participation in individual temperance societies. These data include only crude measures of sex ratios and percents of women married, which, even with a stretch of the imagination, provide only loose accounts of the numbers of women that might possibly have been active in public affairs. The best one can hypothesize is that the more women there were in a population, the more likely it was for that population to have had women active in the early temperance movement.

Hypothesis III: Sex ratios are insignificantly associated with numbers of New York county temperance societies.

Political Status

Some temperance scholars acknowledge religion's role in organizing temperance activities, but they caution one to interpret the motivations of religious and temperance leaders in the social and political context of the times. Paul Gusfield asserts that "religious motives and moral fervor do not happen in vacuo" and that "in its earliest development, Temperance was one way in which a declining social elite tried to retain some of its social power and leadership" (Gusfield, 1986: 5).

"The aims and doctrine of the early movement reveal its function as an attempt to control the newly powerful electorate… The movement was not viewed primarily as self-reform but as the reform of others below the status and economic level of the organizational adherents" (Gusfield, 42). Gusfield's assertion of the early movement's intent is a direct

contradiction of the Second Great Awakening authors' claims. The early movement was not a religious undertaking to absolve oneself of the sin of intemperance but rather to condemn the culture of the masses, whose new grabs at political power threatened the position of the established order. Gusfield believes these elites "were men who felt the demise of the traditional values of their social class and, in trying to restore those values, attempted to recoup their dwindled status" (41). Moreover, and of particular interest of this paper, Gusfield believes "they turned to the Whigs for legislative support" (41).

Hypothesis IV: Variables associated with high political status, such as the prevalence of the Whig Party in a county, are insignificant predictors of the numbers of New York county temperance societies.

Economic Change

Often included in the discussion of nineteenth-century US politics, religion, or culture is the economic transformation from rural agricultural markets into industrial-capitalism. Thanks to the development and expansion of transportation and communication technologies, New York in particular experienced rapid industrialization and growth in interstate commerce. Rochester, for example, in addition to being a site of great revival fervor was a definitive western boomtown. Anecdotal evidence from a young traveler in 1825 noted, "The town is almost a city. In 1812 it was a forest. Now it contains 5,000 people…Passengers are continually going and coming. There is a constant clatter of mechanics and laborers" (Truesdale, 5). Additional commentary was

made by Thomas L. McKinney, head of the US Bureau of Indian Affairs in 1826, during his first visit to the growing economic center. "[Rochester] is in such motion, and is so unmanageable as to put it out of one's power to keep it still long enough to say much about it. It is like an inflated balloon rolling and tumbling along the ground, and which the grapple itself cannot steady" (Truesdale, 8).

The development of urban and industrial institutions and the emergence of new cultural expressions and lifestyles are said to have fueled the growth of a strong middle class. Many temperance scholars argue that this emerging middle class played an important role in the temperance movement since "these actors [were] relatively detached from political and material concerns" and "held an intermediary social position between the populist practices of upstart sects and the elite institutions of orthodoxy" (Young, 2001: 666). I, however, believe that after controlling for other ecological characteristics, variables associated with both the level of economic development and economic change are insignificant predictors of temperance activity.

Hypothesis V: The degree to which a county is "rural" and "preindustrial" is an insignificant predictor of the numbers of New York county temperance societies.

Hypothesis VI: Industrialization is an insignificant predictor of the numbers of New York county temperance societies.

Data

Fifty-five counties as defined by their borders in 1825 are analyzed over the period from 1825 to 1835. However, because changes to county borders were made during this time several recodes were necessary to ensure data were assigned accordingly and remained consistent. Chemung County data from the 1835 New York State Census and ICPSR 1 were merged with Tioga County to ensure data were consistent with 1825 borders. Likewise, Fulton County data from the 1835 New York State Census and ICPSR 1 were merged with Montgomery County to ensure consistency as well.

Outcome Variable

The number of temperance societies per county for the years 1828, 1833, and 1834 were documented and published in annual temperance reports by the New York state branch of the American Temperance Society. Additionally, counts of temperance societies in 1829 and 1831 were obtained from the Journal of Humanity, published April 21, 1831. These data were obtained from the New York State Archives by Dr. Michael Young, and presented to me for this investigation.

Census Data

Many of the models' predictors were recorded from the New York State Censuses of 1825 and 1835, and the US Censuses of 1830 and 1840. Dr. Michael Young obtained

the New York State Censuses from the state archive in Albany, New York and the US Censuses were obtained from the Interuniversity Consortium of Political and Social Research (02896) (referred from here on as ICPSR).

ICPSR 1

The ICPSR 1 dataset contains county-level historical election data for 90 percent of the presidential, gubernatorial, and congressional races in United States between the years 1824 and 1968. I selected the sub-dataset DS41 that contains only the county-level data for New York State between 1824 and 1854. From this smaller dataset I selected only the number of votes received for select parties in each county for the gubernatorial elections of 1828 and 1834.

ICPSR 7754

The ICPSR 7754 dataset was compiled by John L. Hammond and documents the 1,952 religious revivals that took place in New York State between the years 1825 and 1835.

All data were hand entered as county-level data into an MSExcel spreadsheet for preliminary analysis. The data were cleaned and checked for consistency, and then loaded into SAS where they were transformed into county-period data for proper longitudinal analyses. The original MSExcel data were also loaded into Stata and kept in county-level form for descriptive analysis.

Methodology

Figure I: Growth of New York County Temperance Societies, 1828-1834.

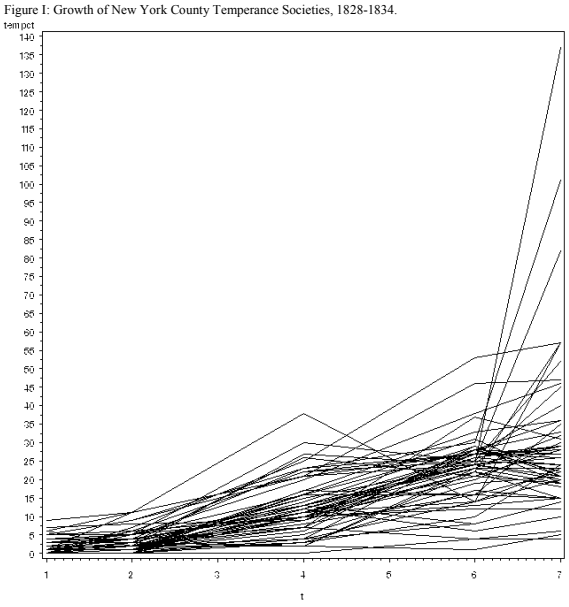


Figure II: Growth of New York County Temperance Societies per 10,000 persons, 1828-1834.

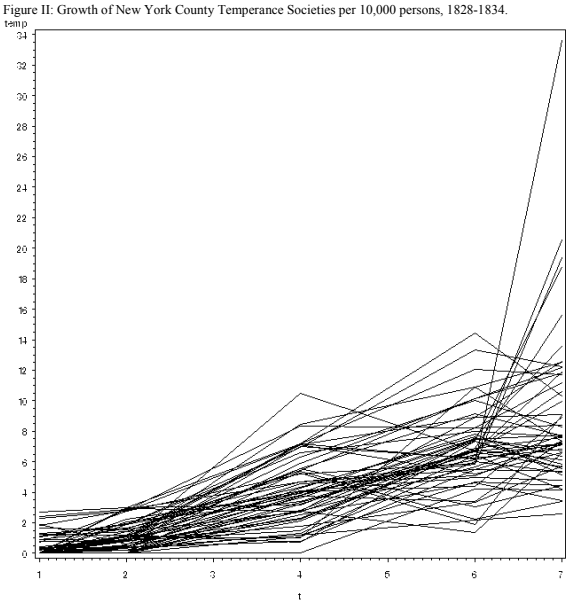


Figure I shows the actual growth trajectories of New York county temperance societies between 1828 and 1834, and Figure II shows the ratios of New York county temperance societies per 10,000 persons across the same time period. The trajectories reveal several patterns worth noting. First, as expected the data are truncated at low levels near the beginning of the time period. As displayed in Table II, the average number of temperance societies per county in 1828 was only 1.4, and the average rate of temperance societies per 10,000 persons in 1828 was only .443. Because there is little variation in the number of temperance societies when time is equal to zero I center all models on time = 4 (1831). This does not affect the estimated rate of growth, but eases the interpretation of each model's intercept. With time centered on 1831 the intercept is interpreted as the predicted number of temperance societies in 1831 when all predictors are equal to zero.

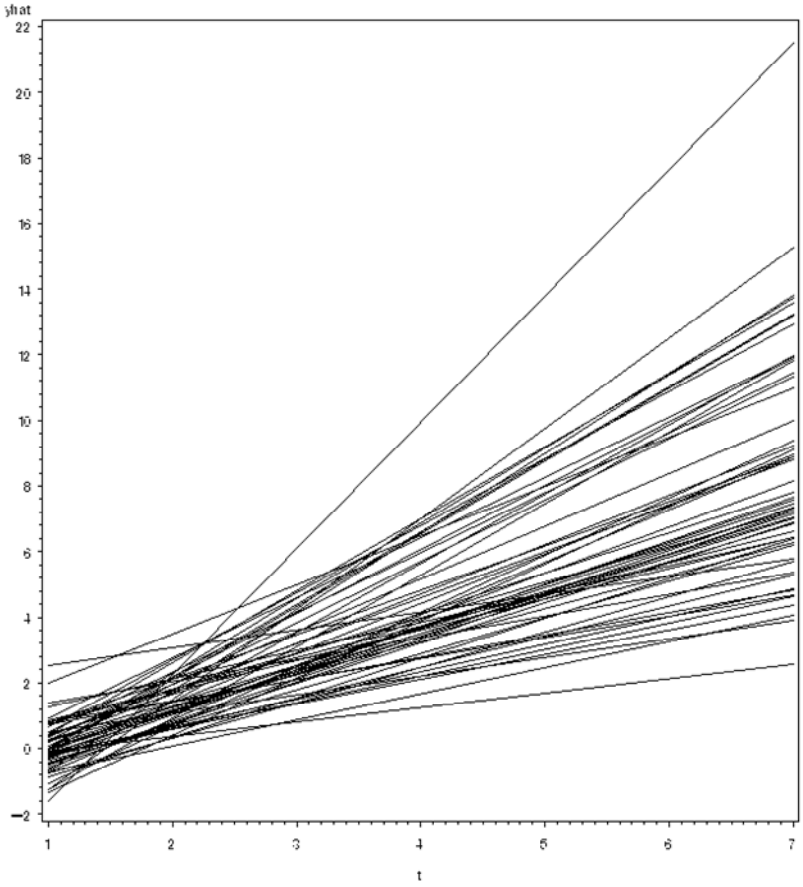
Table II: Descriptive Statistics

Variable	Mean	S	Minimum	Maximum
'28 Temperance Societies	1.400	2.233	0	9
'29 Temperance Societies	3.364	2.990	0	11
'31 Temperance Societies	13.073	7.958	0	38
'33 Temperance Societies	22.418	9.746	1	53
'34 Temperance Societies	30.709	22.875	4	137
'28 Temperance Rate	.443	.715	0	2.681
'29 Temperance Rate	1.111	.901	0	2.981
'31 Temperance Rate	4.147	2.303	0	10.480
'33 Temperance Rate	6.794	2.693	1.344	14.412
'34 Temperance Rate	8.918	5.178	2.588	33.617
'28 Population	32666	25176	6597	187113
'29 Population	33740	26129	6835	194697
'31 Population	35723	28502	7200	214582
'33 Population	37533	31577	7441	240741
'34 Population	38509	33304	7565	254993
'30 % Counties with Urban Population	16.36	37.34	0	1
'25 Distilleries	20.527	17.402	0	94
'25 Blacks per 10,000 Population	208.162	280.472	3.733	1226.698
% Change in Black Population	4.880	82.610	-51.722	555.251
'25 Unnaturalized Foreigners per 10,000 Population	179.162	244.202	13.299	1133.509
% Change in Unnaturalized Foreign Population	180.377	258.423	-59.438	1261.677
'25 Sex Ratio	105.060	5.327	96.44	119.83
% Change in Sex Ratio	-.789	3.711	-9.441	6.047
'25 % Females 16-45 Married	61.958	8.273	25.982	77.928
'25 % Males Registered to Vote	37.213	3.788	19.581	42.192
'28 % Gubernatorial Votes Anti-Mason	12.400	15.800	0	62.500
'34 % Gubernatorial Votes Whig	47.400	8.100	26.900	69.100
'25 Yd^3 Domestic Wool per 10,000 Population	21971.200	8607.621	33.838	36561.910
% Change in Domestic Wool Production	-38.443	33.791	-100	150.471
'25 Stock Animals per 10,000 Population	4244.395	1335.666	101.260	6681.230
% Change in Stock Animals	-1.111	39.831	-48.008	194.657
'28 Number of Home Missionaries	3.382	4.931	0	24
'28 Cumulative Revivals per 10,000 Population	3.239	2.872	0	17.200
'29 Cumulative Revivals per 10,000 Population	3.378	2.748	0	16.277
'31 Cumulative Revivals per 10,000 Population	7.673	4.747	.445	23.303
'33 Cumulative Revivals per 10,000 Population	9.232	5.240	.540	25.340
'34 Cumulative Revivals per 10,000 Population	9.542	5.325	.510	25.756

Second, we can see that the rapid growth of temperance societies is quite evident, especially after the midpoint of 1831. It is revealed in Table II that the mean number of temperance societies per 10,000 persons grew over 20 times in just seven years, from .443 temperance societies per 10,000 persons in 1828 to 8.918 temperance societies per 10,000 persons in 1834. General OLS regression was also used in exploratory analyses to plot general predicted trends in temperance growth as well. These predicted growth

trajectories of temperance societies per 10,000 persons as functions of time are plotted in Figure III, and reveal similar conclusions about temperance growth.

Figure III: OLS Predicted Growth of New York County Temperance Societies per 10,000 persons, 1828-1834.



The predicted intercepts are quite low, and there is little variation about them at early time points. Furthermore, the predicted slopes are all positive, and as with the intercepts there appears to be little variation about them as well.

Table III: Exploratory Models of New York Temperance Societies per 10,000 Population, 1828-1834

	OLS	Means Model	Mixed Model, Random b0	Mixed Model, Random b0 b1
b0	1.096	1.096	1.096	1.096
b1	.400	---	.400	.400
Var(b0)	.130	0	.083	.085
Var(b1)	.010	0	0	.001
Cov	-.032	---	---	-.008
Var(res)	.224	1.145	.232	.224
I.C.C.	---	0	.264	
R^2	.725	---	.839	.850

Table III presents simple exploratory models of change in ratios of temperance societies per 10,000 persons between 1828 and 1834. I include it in the discussion to point out several patterns. First, the assumption I made from Figures I through III of little variance about the slope is confirmed. In all four simple models we see very little to zero variance about b1. We have minimal to zero evidence that variation in the rates of temperance growth exists between counties. Second, there is some variance about b0 and letting the intercept vary significantly improves a model's overall fit. The pseudo-R^2s in both mixed models are significantly greater than the R^2 of the simple OLS model. Third, while there is no evidence of variance about the slope of temperance growth, the intraclass correlation coefficient (I.C.C.) of the mixed model with a random intercept is .264. Loosely translated, this means that about 26 percent of the total variation in the ratio of New York temperance societies per 10,000 persons between 1828 and 1834 was due to level-II (between-county) variance.

Three different linear models of change are used to compare the explanatory power of variables associated with the Second Great Awakening with the explanatory power of variables associated with other hypotheses of temperance activity: (1) the multilevel growth curve model, (2) the Poisson regression model, and (3) the negative

binomial regression model. It is of utmost importance to correctly specify the appropriate statistical model in order to ensure accurate inferences about variable relationships. Within each of the three statistical models I run eight models of comparison to determine the Second Great Awakening model's relative goodness-of-fit. I also compare the findings of all three statistical models and assess their assumptions' fit to the data in order to conclude which of the three is the proper analytical tool. Without an appropriate model, I have little confidence that results convey useful information about associations being compared.

Growth Curve Model

The first analytic model used is the multilevel growth curve model. The multilevel model essentially postulates two sub-models: (1) The level-1 "within" model that describes how each county changes over time, and (2) The level-2 "between" model that describes how these changes differ across counties over time (Singer and Willet, 2003). The basic structure of the multilevel growth curve model is as follows:

$$\log(Y_{ij}) = \pi_{0i} + \pi_{1i} TIME_{ij} + \varepsilon_{ij}$$
$$\pi_{0i} = \gamma_{00} + \zeta_{0i}$$
$$\pi_{1i} = \gamma_{10} + \zeta_{1i}$$

where

$$\varepsilon_{ij} \sim N(0, \sigma_{\varepsilon}^2) \text{ and } \begin{bmatrix} \zeta_{0i} \\ \zeta_{1i} \end{bmatrix} \sim N\left(\begin{bmatrix} 0 \\ 0 \end{bmatrix}, \begin{bmatrix} \sigma_0^2 & \sigma_{01} \\ \sigma_{10} & \sigma_1^2 \end{bmatrix} \right)$$

The ratio of temperance societies per 10,000 persons for county *i* at time *j* is said to be a log-linear function of time. This model assumes that a straight line sufficiently represents each county's true change in the ratio of temperance societies over time and that any deviations from this line result from random measurement error, ε_{ij}. The two subscripts *i* and *j* identify counties and occasions, respectively. For these data, *i* runs from 1 to 55 and *j* runs from 1 to 5. Because the data are not distributed in a normal fashion – as can be seen in Figure IV – the data are logged to satisfy the assumptions of normality. The resulting logged distribution is presented in Figure V.

Figure IV: Distribution of New York County Ratios of Temperance Societies per 10,000 Persons, 1828-1834

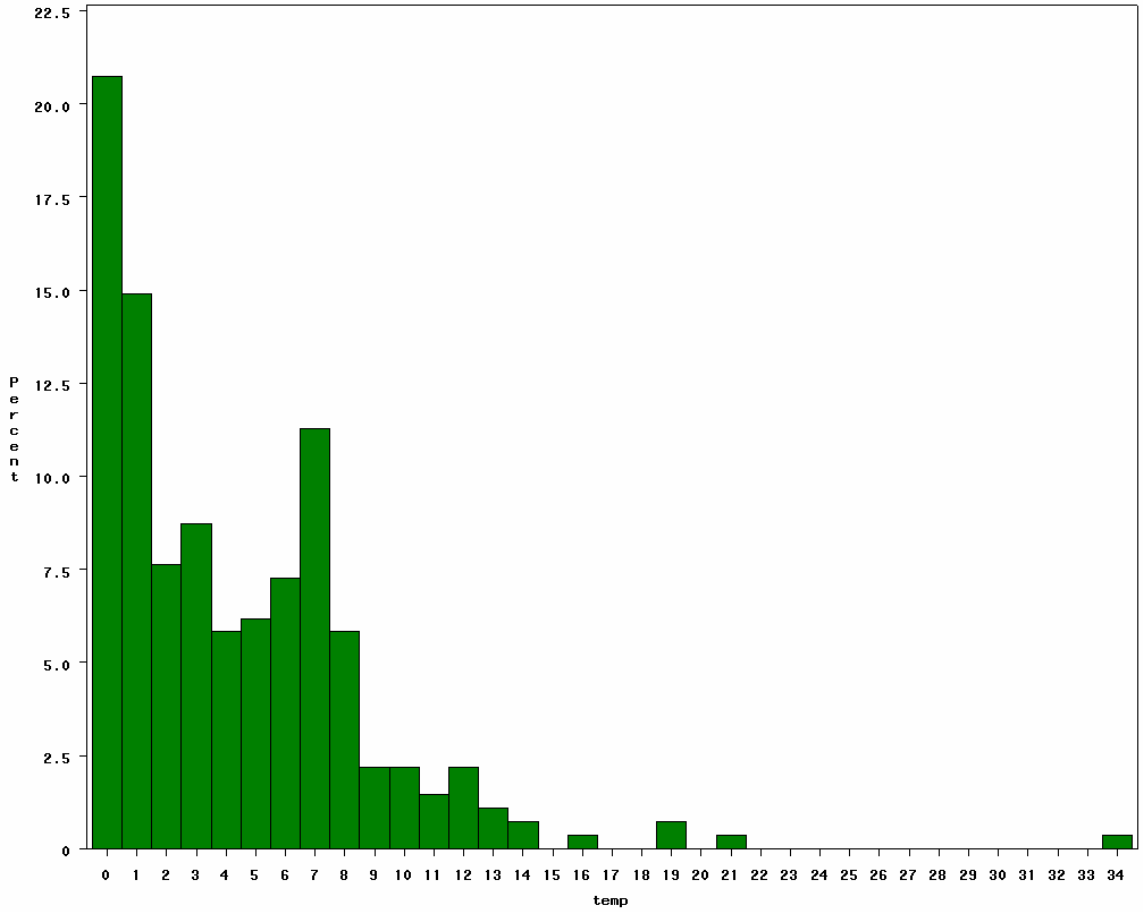
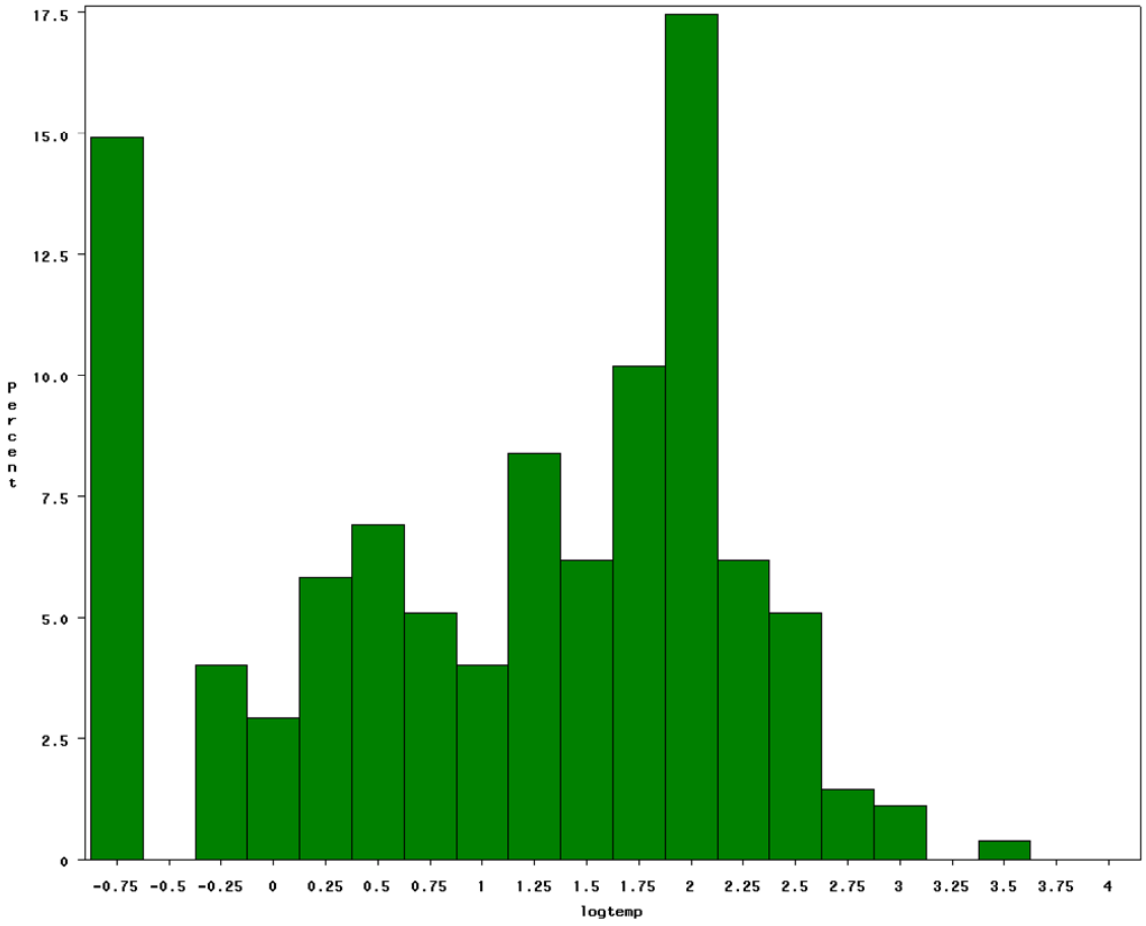


Figure V: Logged Distribution of New York County Ratios of Temperance Societies per 10,000 Persons, 1828-1834



Eight multilevel growth curve models were run on the logged distribution to test the competing hypotheses. The eight tested models are as follows.

Restricted Model:

$$\log(Y_{ij}) = \gamma_{00} + \gamma_{10}*TIME_{ij} + (\zeta_{0i} + \zeta_{1i}*TIME_{ij} + \varepsilon_j)$$

Where, once again, $TIME_{ij}$ is coded as time-4 such that γ_{00} is the centered intercept at 1831. The restricted model provides a baseline for all other models to be compared to.

Control Model:

$$\log(Y_{ij}) = \gamma_{00} + \gamma_{10}*TIME_{ij} + \gamma_{20}*POP_{ij} + \gamma_{30}*URB_i + \gamma_{40}*DIST_i + (\zeta_{0i} + \zeta_{1i}*TIME_{ij} + \varepsilon_j)$$

Where the model is extended to control for a county's time-varying population size (POP_{ij}), whether or not a county has a major urban center (URB_i, yes=1, no=0), and the number of distilleries per 10,000 persons that were operating in 1825 ($DIST_i$). These same control variables are included in all subsequent hypothesis models. This standard use of controls ensures that all subsequent models share the same original model and allows us to compare the relative improvements in model fit. Because the models are nested I use a likelihood ratio procedure to test the various hypotheses.

Others Model:

$$\begin{aligned}\log(Y_{ij}) = {} & \gamma_{00} + \gamma_{10}*TIME_{ij} + \gamma_{20}*POP_{ij} + \gamma_{30}*URB_i + \gamma_{40}*DIST_i \\ & + \gamma_{50}*B25_i + \gamma_{60}*BCHG_i + \gamma_{70}*F25_i + \gamma_{80}*FCHG_i \\ & + (\zeta_{0i} + \zeta_{1i}*TIME_{ij} + \varepsilon_j)\end{aligned}$$

The others model tests the association between log-levels of temperance societies per 10,000 persons and the percent of a county's population that is Black in 1825 ($B25_i$), the percent change in the percent of a county's Black population between the years 1825 and 1835 ($BCHG_i$), the percent of a county's population that was composed of unnaturalized foreign-born residents ($F25_i$), and the percent change in the percent of a county's

unnaturalized foreign-born population between the years 1825 and 1835 ($FCHG_i$) while controlling for the effects of population, urban centers, and distilleries. This model uses the black and foreign-born population as proxies for Morone's "others," testing Morone's hypothesis that underlying Puritan sentiments in America's moral tradition pits responsible and virtuous citizens ("Us") versus sinners who "impoverish themselves and diminish their community" ("Them") (Morone, 2003: 13). It must be emphasized again that I am testing only the hypothesis's application to the time between 1828 and 1834, and therefore results cannot support or deny the hypothesis's applicability to other times.

Sex Distribution Model:

$$\log(Y_{ij}) = \gamma_{00} + \gamma_{10}*TIME_{ij} + \gamma_{20}*POP_{ij} + \gamma_{30}*URB_i + \gamma_{40}*DIST_i$$
$$+ \gamma_{50}*SR25_i + \gamma_{60}*SRCHG_i + \gamma_{70}*MAR25_i$$
$$+ (\zeta_{0i} + \zeta_{1i}*TIME_{ij} + \varepsilon_j)$$

Unfortunately, county-level data do not permit an adequate measure of the sexual and gender politics at work during the temperance movement. Only crude measures of the sex ratio and percent of young women married were obtained for county-level measures. Therefore, the sex distribution model tests the association between log-levels of temperance societies per 10,000 persons and the sex ratio of a county in 1825 ($SR25_i$), the percent change in a county's sex ratio between 1825 and 1835 ($SRCHG_i$), and the percent of women ages 16 to 45 who were married in 1825 ($MAR25_i$) while controlling for the effects of population, urban centers, and distilleries. The variables are included primarily

for control purposes in the full model. Furthermore, since large units of women had not yet enlisted in the temperance struggle in the 1820s the variable $SR25_i$ should be held with even more caution. Therefore, as Hypothesis II states, I believe there will be an insignificant association between the sex ratio in 1825 and the numbers of New York county temperance societies.

Political Status Model:

$$\log(Y_{ij}) = \gamma_{00} + \gamma_{10}*TIME_{ij} + \gamma_{20}*POP_{ij} + \gamma_{30}*URB_i + \gamma_{40}*DIST_i$$
$$+ \gamma_{50}*MV25_i + \gamma_{60}*AMAS28_i + \gamma_{70}*WHIG34_i$$
$$+ (\zeta_{0i} + \zeta_{1i}*TIME_{ij} + \varepsilon_j)$$

The political status model tests the association between log-levels of temperance societies per 10,000 persons and the percent of the 1825 male population registered to vote ($MV25_i$), the percent of votes received by the Anti-Mason 1828 Gubernatorial candidate, Soloman Southwick ($AMAS28_i$), and the percent of votes received by the Whig 1834 Gubernatorial candidate, William Henry Seward ($WHIG34_i$). The Anti-Mason variable is included as a counter to Gusfield's political status argument. The US Anti-Mason party is said to be the first third party in American national politics, and appealed to a broad socioeconomic base as an anti-elitist front. It was established in 1828 in upstate New York after the disappearance of William Morgan, who threatened the Masonic order with publications of membership secrets (Rupp, 1988). The Anti-Mason predictor is included in the model because of the party's emphasis on direct action and their introduction of

"previously non-political issues" into the political arena (Rupp, 1988: 260). They helped bring many issues to the attention of the masses and exemplified organized agitation of the people for both political and nonpolitical reasons. Furthermore, the "Anti-Masons acted in a manner of revivalists by insisting 'on a narrow choice between right and wrong and on the necessity of coming out for right'" (Rupp, 1988: 275). If the early US temperance society was indeed a movement perpetuated by threatened elites, the Anti-Mason variable should either insignificant or a negative predictor of New York county temperance societies. The Whig party was established in 1832 as an opponent to the established Jacksonian powers. It lasted until 1856, and was ultimately brought down by an internal fissure created over moral and legal questions of slavery (). While in existence, the Whig party was often solicited by temperance activists to politicize the issue of intemperance (Gusfield, 1986). Yet the relationship between temperance leaders and the Whigs was not unidirectional. As Michael Holt writes, "far more Whigs than Democrats turned to nonpartisan or apolitical voluntary associations to achieve certain morally oriented goals: Bible societies, Sunday School reform, temperance associations" (Holt, 2003: 32).

Economic Change Model:

$$\log(Y_{ij}) = \gamma_{00} + \gamma_{10}*TIME_{ij} + \gamma_{20}*POP_{ij} + \gamma_{30}*URB_i + \gamma_{40}*DIST_i$$
$$+ \gamma_{50}*WOOL25_i + \gamma_{60}*WOOLCHG_i + \gamma_{70}*STOCK25_i + \gamma_{80}*STOCKCHG_i$$
$$+ (\zeta_{0i} + \zeta_{1i}*TIME_{ij} + \varepsilon_j)$$

The economic change model tests the association between log-levels of temperance societies per 10,000 persons and the cubic yards of domestically-produced wool per person in 1825 ($WOOL25_i$), the percent change in the amount of domestically-produced wool per person between 1825 and 1835 ($WOOLCHG_i$), the number of stockyard animals per person in 1825 ($STOCK25_i$), and the percent change in the number of stockyard animals per person between 1825 and 1835 ($STOCKCHG_i$). The development and maturation of the American economy brought with it tremendous political, cultural, and demographic change. Development of infrastructure such as the Erie Canal and newly established markets transformed the United States from a "localized, rural, seaboard economy" into a "modern, national, industrial economy" (Rorabaugh, 1979: 88). The idea that the US temperance movement was born to rural, agrarian-based populations

Second Great Awakening Model:

$$\log(Y_{ij}) = \gamma_{00} + \gamma_{10}*TIME_{ij} + \gamma_{20}*POP_{ij} + \gamma_{30}*URB_i + \gamma_{40}*DIST_i + \gamma_{50}*MISS28_i + \gamma_{60}*REV_{ij} + \gamma_{70}*REV_{ij}*TIME_{ij} + (\zeta_{0i} + \zeta_{1i}*TIME_{ij} + \varepsilon_j)$$

The Second Great Awakening model tests the association between log-levels of temperance societies per 10,000 persons and the number of home missionary societies in a county in 1828 ($MISS28_i$), the time-varying number of cumulative revivals per 10,000 persons (REV_{ij}), and the association between the time-varying number of cumulative revivals per 10,000 persons and the rate of temperance growth ($REV_{ij}*TIME_{ij}$).

Total Model:

$$\log(Y_{ij}) = \gamma_{00} + \gamma_{10}*TIME_{ij} + \gamma_{20}*POP_{ij} + \gamma_{30}*URB_i + \gamma_{40}*DIST_i$$
$$+ \gamma_{50}*B25_i + \gamma_{60}*BCHG_i + \gamma_{70}*F25_i + \gamma_{80}*FCHG_i$$
$$+ \gamma_{90}*SR25_i + \gamma_{100}*SRCHG_i + \gamma_{110}*MAR25_i$$
$$+ \gamma_{120}*MV25_i + \gamma_{130}*AMAS28_i + \gamma_{140}*WHIG34_i$$
$$+ \gamma_{150}*WOOL25_i + \gamma_{160}*WOOLCHG_i + \gamma_{170}*STOCK25_i + \gamma_{180}*STOCKCHG_i$$
$$+ \gamma_{190}*MISS28_i + \gamma_{200}*REV_{ij} + \gamma_{210}*REV_{ij}*TIME_{ij}$$
$$+ (\zeta_{0i} + \zeta_{1i}*TIME_{ij} + \varepsilon_j)$$

This model is used to evaluate the strength of the Second Great Awakening's association with the log-levels of temperance societies per 10,000 persons in New York between 1828 and 1834 while controlling for the effects of all competing variables. It is a composite of all models, and therefore no variables have been added or dropped due to insignificance in the previous models.

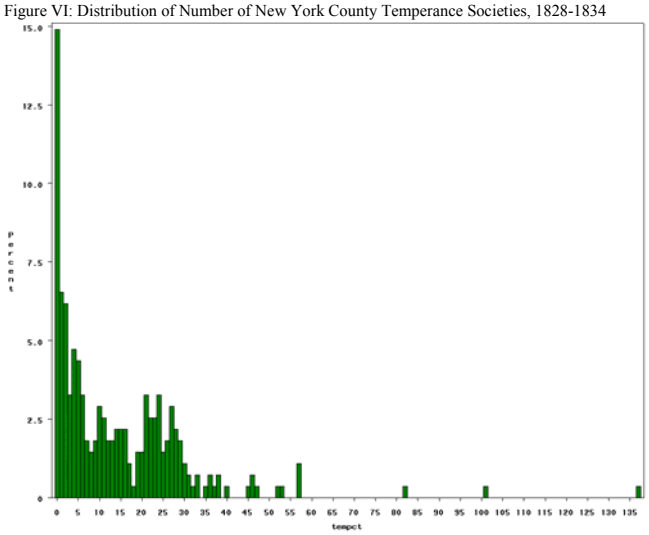
Two major shortcomings of the multilevel growth curve model make it an unattractive choice for fitting the New York county temperance data. First, the emergence and growth of temperance societies over a defined period of time is best expressed as a process of counts. The outcome in the above multilevel models is actually a ratio, in that I am simply dividing the number of temperance societies by a county's population. To best describe the emergence of temperance societies absolute counts should be fit to a Poisson distribution or a negative binomial distribution. Second, as evident in Table III, the variance about the slopes is very small and insignificant. The

power of the multilevel growth curve model rests in its ability to numerically evaluate the magnitude of level-I and level-II variance components by measuring the variance of both the slope and intercept. If the variance about the slope is insignificant, then the model does not allow us to conclude with certainty that growth in temperance societies differed between counties. The slopes of the predicted growth trajectories are all estimated to be the same, preventing us from trying to explain the differences of slopes with ecological factors. These two shortcomings of the multilevel growth curve model suggest that the models should be run using Poisson regression.

Poisson Model

The Poisson distribution arises when counts of events or occasions occur across time or over an area. This distribution is naturally a better fit for counting the number of temperance societies in New York than the normal distribution that is assumed by the multilevel growth curve model. Figure VI displays the skewed distribution of New York temperance societies between 1828 and 1834.

Figure VI: Distribution of Number of New York County Temperance Societies, 1828-1834



The Poisson regression is written as:

$$\log(\mathrm{E}(Y_i)) = \log(\mu) = \beta' \mathbf{x_i}$$

OR

$$\mathrm{E}(Y_{ij}) = \mu = \exp(\beta' \mathbf{x_i})$$

where β is a vector of regression coefficients, and $\mathbf{x_i}$ is a vector of covariates for subject i.

The Poisson regression automatically incorporates observed heterogeneity into the distribution function. As μ increases the conditional variance of Y_i increases and the proportion of predicted zero decreases. As a result, the distribution around $\mathrm{E}(Y_i)$ becomes approximately normal (Stat/Math, 2005).

Two empirical checks of these assumptions can be easily is that the expected value of the outcome variable Y_i for subject i is equal to its variance:

$$\mu = \mathrm{E}(Y_i) = \mathrm{Var}(Y_i)$$

If this assumption is violated then the distribution suffers from overdispersion, or extra-variability that arises due to the fact that the cases are not independent. Overdispersion can also arise from the threat of contagion within counties, whereby establishing a temperance society in one county increases the probability of establishing more

temperance societies within that same county even after conditioning on covariates $\mathbf{x_i}$. Major consequences can arise by running Poisson regressions on distributions with severe cases of overdispersion. While estimates will still be consistent, they will be inefficient and therefore underestimate standard errors. As a consequence, inferences about the significance of predictors cannot be entirely trusted. We account for overdispersion by introducing a dispersion parameter $\varnothing$ into the mean's relationship with the variance:

$$\text{Var}(Y_i) = \varnothing\mu$$

The multilevel growth curve model controls for population size by modeling temperance societies per 10,000 persons as the outcome variable. This ratio, however, is inappropriate for count analyses and therefore we must transform the outcome variable back to the absolute number of temperance societies. To control for population size under these different circumstances we must offset population size in the equation. I do so as follows:

$$\log\left(\frac{\text{Temperance Societies}_{ij}}{\text{Population}_{ij}}\right) = \beta'\mathbf{x_i}$$

$$\log(\text{Temperance Societies}_{ij}) - \log(\text{Population}_{ij}) = \beta'\mathbf{x_i}$$

$$\log(\text{Temperance Societies}_{ij}) = \beta'\mathbf{x_i} + \log(\text{Population}_{ij})$$

Thus, all models using Poisson regression are offset by population and therefore standardized.

All competing models of temperance levels described in the multilevel growth model section are rerun as Poisson regressions. I therefore will save the trouble and space of rewriting the covariates included in each model. For descriptions of variables used in the Poisson regression models, refer to the multilevel growth curve models above.

While I believe the Poisson regression models are better than the multilevel growth curve models at fitting the distribution of New York temperance societies, they might not be the best fit. Even when corrected for overdispersion, Poisson regressions have been shown to perform more poorly than the negative binomial regression model (White & Bennetts, 1996). I therefore test the fit of the negative binomial regression model to the New York county temperance data against both the multilevel growth curve model and the Poisson regression model.

Negative Binomial Model

The last of the three models used is the negative binomial model. Its distribution is described by two parameters, the mean (m) and a dispersion parameter (k). The probability of observing a specific value of x is:

$$\Pr(X = x) = \left(\frac{k + x - 1}{k - 1}\right)\left(\frac{m}{k}\right)\left(1 + \frac{m}{k}\right)^{-(k+x)}$$

where $m, k > 0$, $x = 0, 1, 2, \ldots$

The distribution approaches a Poisson distribution as k approaches ∞ (White & Bennet, 1996). However, k need not approach ∞ for negative binomial regression to be an effective model. An advantage of the negative binomial distribution is that it relaxes the assumption of spatial independence. Spatial autocorrelation poses fewer problems with negative binomial regression since the dispersion parameter, k, is interpreted as the degree of "clumping" in the population.

Therefore, when high levels of overdispersion are present in a distribution the negative binomial regression model is generally the preferred alternative to the Poisson regression model. This is due, again, to the presence of the k parameter that grants the negative binomial distribution the flexibility to handle a wide variety of spatial patterns. It also does better than the Poisson distribution at fitting highly skewed data, such as the distribution of New York county temperance societies. This is because the k parameter frees the negative binomial distribution from Poisson's requirement that the mean equals the variance. The relationship between the variance and mean in a negative binomial distribution is:

$$\text{Var}(Y_i) = \mu + k\mu^2$$

Since k is always greater than 0, the variance of the negative binomial model will always be greater than the variance of a Poisson model. It is this feature of the negative binomial distribution that naturally accounts for overdispersion, and therefore makes it preferable over the Poisson model in cases when overdispersion is high. The SAS option to specify the distribution *dist = nb* in the model statement accounts for possible residual

overdispersion by adding the scale parameter $\varnothing$ to the relationship between the mean and its variance (Pedan, et al.):

$$\text{Var}(Y_i) = \varnothing(\mu + k\mu^2)$$

The negative binomial model outperforms the Poisson model if we observe smaller values of the parameter, and higher values of the log-likelihood.

Results and Discussion

Models of Measurement

Results from the multilevel growth curve models are displayed in Table III. My assumption about this statistical model's inappropriate fit is confirmed by quickly reviewing the models' variance components. No variance about the slope is detected in any model, although the Second Great Awakening model and the Full model double σ^2_1 from .001 to .002 by including the level-II predictor revivals per 10,000 persons. This difference is insignificant at all commonly used α-levels, although the effect of the predictor is itself significant. Nevertheless, the multilevel growth curve is a poor model for fitting the growth of New York county temperance societies. As mentioned above, the strength of the multilevel growth curve model rests in its ability to determine and account for the level-I and level-II variance components. Since no level-II variation exists in these data, there is no need to use the multilevel growth curve model to partition the outcome variation into the two levels. Consequently, I reject the use of the multilevel growth curve model for fitting the distribution of New York county temperance societies between 1828 and 1834 and move to the outcome from the Poisson regression models found in Table IV.

The shortcomings of the multilevel growth curve model are further confirmed by reviewing the output from the Poisson regression models. The scale and φ parameters reveal strong evidence that the distribution is highly skewed and overdispersed. Thus, all

results and the strength of hypotheses are discussed using the negative binomial regression model. Its results are displayed in Table VI.

Hypothesis I

My hypothesis about the relationships between variables associated with the Second Great Awakening and the numbers of New York county temperance societies is supported by the results. First, the Second Great Awakening model is the best fitting model of those using only 12 parameters. By using only three more parameters this model improves upon the control model by 24.37, fitting better than any other model with 12 parameters and nearly matching the improvement made by the Economic Change model (27.82), which uses 13 parameters. Second, within the Full model the effect of revivals on the number of temperance societies is significant, strong, and positive. The coefficient associated with revivals is .133, and can be interpreted as the increase in the log-rate of temperance societies for every additional revival per 10,000 persons. Additionally, the effect of revivals differs significantly over time. The interaction term between time and revivals has a significant negative coefficient of -.019 indicating that revivals' influence on temperance numbers diminishes over time. This, however, is not a setback to the hypothesis. Rather, it is a confirmation of my belief that revivals had their strongest effect on temperance activities at the earliest stages of the movement. The effect of revivals is strongest during the late 1820s, when temperance societies were just starting to form. And by the end of the study's period the effect of revivals on temperance societies was considerably weak. For example, holding the effects of all

other factors constant, the net effect of revivals per 10,000 persons in 1828 was a .114 increase in the log-rate of temperance societies for every additional revival per 10,000 persons. Yet by 1834 the net effect of revivals per 10,000 persons was 0. The fact that revivals' influence on the numbers of temperance societies was greatest in the earliest stages of the temperance movement strengthens the hypothesis that the Second Great Awakening was imperative for the movement's beginning. The diminishing effect of revivals might possibly reflect the process of the movement becoming more popular, politicized, and reaching greater swaths of the public as it grew into the mid 1830s. That revivals had their strongest effect on temperance numbers at the earliest stages of the movement supports the hypothesis that they were important to the movement's takeoff. And finally, the Second Great Awakening hypothesis is the only one fully confirmed in the Full model. Although the effect of the number of Home Missionary Societies is no longer significant, the predictive power of revivals actually increases. Compared to other hypotheses, the Second Great Awakening does very well in the Full model. The Political model and Economic Change model actually reversed their findings, the Others model loses nearly all significance, and the Sex Distribution model was unconfirmed to begin with.

Hypothesis II

Results from both the Others model and Full model partially reject my second hypothesis, but not in the way suggested by Morone. The Others model makes a significant moderate improvement over the Control model, and the individual effects of

all covariates are significant. What is most surprising about this model, however, is that the effects of all covariates are negative. Counties with larger 1825 populations of Black residents and foreign residents, for example, are predicted to have had fewer temperance societies. Likewise, increasing the proportion of a county's Black and foreign population between 1825 and 1835 decreases the number of temperance societies.

The covariates do not hold well when controlling for other county factors. In the Full model the effects of 1825 Black population, 1825 foreign population, and change in Black population are all lost. Each has a predicted of effect of .000 and is insignificant at all commonly used α-levels. The change in a county's foreign population between 1825 and 1835, however, remains significant.

Hypothesis III

As expected, my third hypothesis is supported by the results. Sex ratios are crude approximations of the number of active women in a county and therefore were not expected to relate to temperance activity. Results from both the Sex Distribution model and the Full model show them to have no significant association with the numbers of New York county temperance societies. The Full model, however, reveals an interesting negative association between the percent of women married in a county and temperance numbers (-.029, α-level .01). This relationship initially supports the idea that unmarried women, not confined by marriage and domesticity were freer to explore "new commitments, associations, and identities that were compelling and contentious" (Young, 2001: 684).

Hypothesis IV

Findings regarding my fourth hypothesis are very interesting. Output from the Political Status model would seem to reject my hypothesis and possibly support Gusfield's theory that political status played a significant and substantial role in the development of the early US temperance movement. The percent of a county voting for the Whig Party in 1834 is a very strong, positive, significant predictor of the number of county temperance societies (1.334, χ^2=4.65). Furthermore, the variable I included as a counter to Gusfield's hypothesis, the percent of a county voting for the Anti-Masonic Party in 1828, is insignificant. These results could certainly be used to support Gusfield's argument that the US temperance movement was merely a political tool used by a weakened elite to condemn the culture of the masses. However, the results of the Full model support an entirely different argument. After controlling for the effects of other predictors, the Political Status predictors tell a different story. No longer is the Whig Party predictor significant, and the strength of its effect was more than halved (.587, χ^2=.89). Further damaging Gusfield's hypothesis is the effect of the Anti-Masonic Party predictor. In the Full model the percent of a county voting for the Anti-Masonic Party in 1828 is a very strong, positive, significant predictor of the number of county temperance societies (1.304, χ^2=5.95).

Hypothesis V

Results support my hypothesis that New York temperance activities were not specifically rural and pre-industrial phenomena. All three variables used as proxies for rural and preindustrial forces are insignificant in both the Full and Economic Change models. Counties with urban centers were no more or no less likely than other counties to have had higher numbers of temperance societies. Likewise, the ratio of stock animals to 10,000 persons was also an insignificant predictor of temperance societies in both models. Lastly, the amount of wool that a county domestically produced also had no substantial impact on the number of temperance societies. While significant at the .o1 α-level in both models, the effect of the variable is reported to be zero.

Hypothesis VI

My hypothesis about the association between industrialization and numbers of temperance societies is incorrect. While the rural and preindustrial levels in New York counties had no relationships with temperance activity, results suggest that level of economic *change* appears to have been significantly associated with the numbers of temperance societies. However, similar to my Others hypothesis, the results also do not support the most popular hypotheses about the relationship between economic change and temperance. Results show that increases in domestic wool production are positively associated with growth in temperance numbers (.010, α-level .01). This appears to counter the idea that a growing middle class, with the option to pursue post-material

interests, filled the ranks of temperance societies. Increasing domestic production of wool textiles should be a strong proxy for economic stagnation at the most, or slow industrialization at the least. In either case, it should be negatively correlated with a growing middle class. Similarly, a positive change in the ratio of livestock to 10,000 persons is negatively associated with temperance numbers (-.006, α-level .01). Yet this relationship is more difficult to interpret. Increases in the level of livestock may be correlated with a growing dependence on agriculturally based rural economies, or they may be an indication of a growing meat industry with specialized markets.

Table IV: Log-linear Rates of New York Temperance Societies per 10,000 Persons, 1828-1834.

Parameters		**Restricted**	**Control**	**Others**	**Sex Distribution**	**Political**	**Economic**	**2nd G.A.**	**Total**
Fixed Effects									
Intercept	π_{0i}	1.096***	1.262***	1.458***	1.985	.528	.851***	1.031***	6.444***
		(.049)	(.079)	(.084)	(1.405)	(.558)	(.168)	(.087)	(1.373)
Population		---	-.037**	-.024	-.049***	-.032*	-.028*	-.046***	-.054***
			(.016)	(.0155)	(.017)	(.017)	(.015)	(.017)	(.016)
Urban		---	-.161	-.099	-.202	-.193	-.051	-.267**	-.263**
			(.133)	(.114)	(.132)	(.128)	(.115)	(.118)	(.098)
Distilleries		---	.000	-.003	.000	-.002	-.004	-.003	-.005**
			(.003)	(.002)	(.003)	(.003)	(.003)	(.002)	(.002)
Black '25		---	---	-.0005***	---	---	---	---	-.0004
				(.0001)					(.0003)
Black Change		---	---	.000	---	---	---	---	.001
				(.000)					(.001)
Foreign '25		---	---	-.0002	---	---	---	---	.0003
				(.0002)					(.0003)
Foreign Change		---	---	-.0004**	---	---	---	---	-.0004***
				(.0002)					(.0001)
Sex Ratio '25		---	---	---	.0006	---	---	---	-.045***
					(.015)				(.013)
Sex Ratio Change		---	---	---	-.028	---	---	---	.000
					(.018)				(.016)
% Married '25		---	---	---	-.012	---	---	---	-.012
					(.008)				(.007)
% Males Vote '25		---	---	---	---	.005	---	---	-.001
						(.013)			(.015)
% Anti-Mason '28		---	---	---	---	.350	---	---	.929***
						(.316)			(.289)
% Whig '34		---	---	---	---	1.110*	---	---	.793
						(.612)			(.493)
Domestic Wool '25		---	---	---	---	---	.240***	---	-.076
							(.077)		(.110)
Domestic Wool Change		---	---	---	---	---	.0002	---	.004
							(.002)		(.003)
Livestock '25		---	---	---	---	---	-.200	---	-.700
							(.550)		(.560)
Livestock Change		---	---	---	---	---	.001	---	-.004*
							(.001)		(.002)
Mission Societies '28		---	---	---	---	---	---	.021**	.009
								(.010)	(.009)
Revivals		---	---	---	---	---	---	.101***	.097***
								(.020)	(.019)
Time	π_{1i}	.399***	.403***	.402***	.404***	.403***	.402***	.426***	.430***
		(.013)	(.013)	(.013)	(.013)	(.013)	(.013)	(.022)	(.022)
Revivals		---	---	---	---	---	---	-.013***	-.013***
								(.003)	(.003)
Variance Components									
Within-county	σ^2_ε	.224	.224	.224	.224	.224	.224	.199	.199
Intercept	σ^2_0	.085	.074	.039	.073	.055	.042	.054	.006
Rate of Change	σ^2_1	.001	.001	.001	.0009	.001	.001	.002	.002
Covariance		-.008	-.012	-.011	-.014	-.011	-.012	-.012	-.009
Goodness-of-fit									
-2Log-likelihood		431.5	421.2	401.3	416.8	411.7	400.8	387.8	346.9
parameters		6	9	13	12	12	13	12	26
N		275	275	275	275	275	275	275	275

Note: numbers in parentheses are standard errors.
Coefficients associated with population, domestic wool, and livestock are expressed per 10,000 persons
**** p<.01 ** p<.05 * p<.1*

Table V: Generalized Log-Linear Poisson Regressions of New York Temperance Societies, 1828-1834.

Parameters	**Restricted**	**Control**	**Others**	**Sex Distribution**	**Political**	**Economic**	**2nd G.A.**	**Total**
Intercept	2.246*** (.058)	1.873*** (.075)	2.104*** (.084)	2.400* (1.234)	-.243 (.628)	1.079*** (.176)	1.516*** (.097)	4.260*** (1.655)
Population	---	-1.000*** (.000)	-1.000*** (.000)	-1.000*** (.000)	-1.000*** (.000)	-1.000*** (.000)	-1.000*** (.000)	-1.000*** (.000)
Urban	---	-.026 (.112)	.060 (.106)	-.075 (.111)	-.062 (.111)	.118 (.104)	-.212* (.109)	-.155 (.116)
Distilleries	---	.0081*** (.002)	.005** (.002)	.008*** (.002)	.006*** (.002)	.004 (.003)	.006*** (.002)	.000 (.003)
Black ‘25	---	---	-.0008*** (.0002)	---	---	---	---	.000 (.000)
Black Change	---	---	-.0006 (.0006)	---	---	---	---	.000 (.000)
Foreign ‘25	---	---	-.0007*** (.0002)	---	---	---	---	.000 (.000)
Foreign Change	---	---	-.0004* (.0002)	---	---	---	---	-.0005** (.0002)
Sex Ratio ‘25	---	---	---	.007 (.013)	---	---	---	-.009 (.015)
Sex Ratio Change	---	---	---	-.028* (.016)	---	---	---	-.019 (.020)
% Married ‘25	---	---	---	-.02*** (.006)	---	---	---	-.036*** (.009)
% Males Vote ‘25	---	---	---	---	.034** (.015)	---	---	-.002 (.020)
% Anti-Mason ‘28	---	---	---	---	.313 (.258)	---	---	.884*** (.329)
% Whig ‘34	---	---	---	---	1.602*** (.548)	---	---	.935 (.618)
Domestic Wool ‘25	---	---	---	---	---	.000*** (.000)	---	.000** (.000)
Domestic Wool Change	---	---	---	---	---	.000 (.002)	---	.010*** (.003)
Livestock ‘25	---	---	---	---	---	.000 (.000)	---	.000 (.000)
Livestock Change	---	---	---	---	---	.002** (.001)	---	-.006*** (.002)
Mission Societies ‘28	---	---	---	---	---	---	.023*** (.008)	.000 (.010)
Revivals	---	---	---	---	---	---	.057*** (.010)	.107*** (.023)
Time	.417*** (.024)	.410*** (.022)	.406*** (.020)	.412*** (.021)	.407*** (.021)	.408*** (.020)	.448*** (.034)	.471*** (.032)
Revivals*Time	---	---	---	---	---	---	-.012*** (.004)	-.014*** (.004)
Scale	2.477	2.262	2.131	2.213	2.142	2.038	2.105	1.861
Goodness-of-fit								
Log Likelihood	1263.07	1542.11	1757.51	1620.80	1739.04	1934.03	1805.38	2352.44
φ	6.136	5.120	4.542	4.895	4.586	4.155	4.429	3.464
Parameters	6	9	13	12	12	13	12	26
N	275	275	275	275	275	275	275	275

Note: numbers in parentheses are standard errors.
Coefficients associated with domestic wool and livestock are expressed per 10,000 persons
**** p<.01 ** p<.05 * p<.1*

Table VI: Generalized Log-Linear Negative Binomial Regressions of New York Temperance Societies, 1828-1834.

Parameters	**Restricted**	**Control**	**Others**	**Sex Distribution**	**Political**	**Economic**	**2nd G.A.**	**Total**
Intercept	2.188*** (.047)	1.666*** (.0853)	2.014*** (.094)	2.835* (1.424)	-.105 (.567)	.902*** (.186)	1.393*** (.098)	5.705*** (1.689)
Population	---	-1.000*** (.000)	-1.000*** (.000)	-1.000*** (.000)	-1.000*** (.000)	-1.000*** (.000)	-1.000*** (.000)	-1.000*** (.000)
Urban	---	.0250 (.127)	.114 (.120)	.005 (.126)	.026 (.125)	.188 (.118)	-.171 (.118)	-.113 (.119)
Distilleries	---	.011*** (.003)	.005** (.003)	.012*** (.003)	.007*** (.003)	.003 (.003)	.006** (.003)	.001 (.003)
Black ‘25	---	---	-.0008*** (.0002)	---	---	---	---	.000 (.000)
Black Change	---	---	-.0006 (.0006)	---	---	---	---	.000 (.001)
Foreign ‘25	---	---	-.0007*** (.0002)	---	---	---	---	.000 (.000)
Foreign Change	---	---	-.0005* (.0002)	---	---	---	---	-.0006** (.0002)
Sex Ratio ‘25	---	---	---	-.003 (.015)	---	---	---	-.024 (.016)
Sex Ratio Change	---	---	---	-.031 (.019)	---	---	---	.002 (.020)
% Married ‘25	---	---	---	-.014 (.042)	---	---	---	-.029*** (.009)
% Males Vote ‘25	---	---	---	---	.029** (.013)	---	---	-.006 (.020)
% Anti-Mason ‘28	---	---	---	---	.550* (.319)	---	---	1.304*** (.355)
% Whig ‘34	---	---	---	---	1.334** (.619)	---	---	.587 (.622)
Domestic Wool ‘25	---	---	---	---	---	.000*** (.000)	---	.000** (.000)
Domestic Wool Change	---	---	---	---	---	.000 (.002)	---	.010*** (.003)
Livestock ‘25	---	---	---	---	---	.000 (.000)	---	.000 (.000)
Livestock Change	---	---	---	---	---	.000 (.001)	---	-.006** (.002)
Mission Societies ‘28	---	---	---	---	---	---	.033*** (.010)	.006 (.011)
Revivals	---	---	---	---	---	---	.063*** (.011)	.133*** (.022)
Time	.475*** (.022)	.465*** (.021)	.462*** (.019)	.465*** (.020)	.462*** (.020)	.461*** (.019)	.522*** (.034)	.525*** (.029)
Revivals*Time	---	---	---	---	---	---	-.018*** (.004)	-.019*** (.004)
k	.434	.331	.263	.314	.283	.234	.253	.150
Goodness-of-fit								
Log Likelihood	8203.61	8228.19	8248.13	8231.74	8240.71	8256.01	8252.56	8291.58
φ	1.229	1.249	1.269	1.273	1.275	1.284	1.258	1.341
Parameters	6	9	13	12	12	13	12	26
N	275	275	275	275	275	275	275	275

Note: numbers in parentheses are standard errors.
Coefficients associated with domestic wool and livestock are expressed per 10,000 persons
**** p<.01 ** p<.05 * p<.1*

Conclusion

Results from these analyses are consistent with the work of temperance scholars who argue that religious institutions significantly and substantially influenced the early US temperance movement. Past research has documented the strong individual-level ties between churches and the leaders of early US temperance societies, and this present research has shown significant county-level associations between Second Great Awakening activity and numbers of temperance societies in New York State. The early stages of the New York temperance movement were particularly influenced by the effects of religious revivals, even when controlling for demographic, political, and economic influences. Furthermore, the strength of the Second Great Awakening hypothesis was largely confirmed while several other contesting hypotheses were rejected. Findings support Young's contention that the temperance movement was a form of life politics that drew power from the "cultural mechanisms" provided by nineteenth-century religious institutions.

Beyond being a series a religious crazes and camp meetings, the Second Great Awakening provided unity and organization during times of great social strain (Mathews, 1969). Changing economies and social instability certainly fueled fears for the future, but the Second Great Awakening offered social institutions that gave meaning and direction to a populace lacking political leadership. The "confessional protest" grew out of the Second Great Awakening to fuse "personal and social transformation" in the New York temperance movement, and religious institutions provided strong catnets necessary to sustain the modular forms of collective action (Young, 2001: 684).

Future work should include church numbers as well as better control variables to further investigate the link between religious institutions and temperance activity. For example, scholars have stressed the importance of US post offices in the dissemination of new ideas during the nineteenth century, and it probably played a tremendous role in rallying new members to the temperance cause (Morone, 2003; Skocpol, 1997). Lastly, actual temperance membership should be modeled as an alternative outcome to the number of temperance societies. Membership numbers can be modeled as true rates, and may be a superior indication of temperance strength. The number of temperance societies may be susceptible to untapped factors such as interdenominational rivalries, gender politics, and the general merging and fracturing of societies over time.

Bibliography

Barnes, Joseph W. 1974. "Obediah Dogberry: Rochester Freethinker," *Rochester History* 36(3).

Calhoun, Craig. 1993. "'New Social Movements' of the Early Nineteenth Century," *Social Science History* 17(3): 385-422.

Coon, Anne C. 1995. "The Magnetic Circle: Stanton, Bloomer, and Douglass," *Rochester History* 57(3).

Gusfield, Joseph R. 1986. Symbolic Crusade: Status Politics and the American Temperance Movement – Second Edition. University of Illinois Press Urbana and Chicago.

Hanagan, Michael P., Leslie P. Moch, and Wayne Te Brake, editors. 1998. Challenging Authority: The Historical Study of Contentious Politics, Social Movements, Protest, and Contention – Volume 7. University of Minnesota Press Minneapolis.

Holt, Michael F. 2003. The Rise and Fall of the American Whig Party: Jacksonian Politics and the Onset of the Civil War. Oxford University Press, USA.

Johnson, Curtis D. 1995. "Supply-side and Demand-side Revivalism? Evaluating the Social Influences on New York State Evangelism in the 1830s," *Social Science History* 19(1): 1-30.

Kett, Joseph F. 1981. "Review Essay/Temperance and Intemperance as Historical Problems," *The Journal of American History* 67(4): 878-885.

Mathews, Donald G. 1969. "The Second Great Awakening as an Organizing Process, 1790-1830: An Hypothesis," *American Quarterly* 21(1): 23-43.

Merrill, John L. 1988. "The Bible and the American Temperance Movement: Text, Context, and Pretext," *Harvard Theological Review* 81(2): 145-170.

Morone, James A. 2003. Hellfire Nation: The Politics of Sin in American History. Yale University Press New Haven & London.

Pedan, Alex. 2005. "Analysis of Count Data Using the SAS System," *Vasca Inc.* Paper 247-26, 1-6. http://www2.sas.com/proceedings/sugi26/p247-26.pdf

Perkins, Dexter. 1939. "Rochester One Hundred Years Ago: The City and Its People," *Rochester History* 1(3).

Rorabaugh, W.J. 1979. The Alcoholic Republic: An American Tradition. Oxford University Press, Inc.

Singer, Judith D. and John B. Willet. 2003. Applied Longitudinal Data Analysis: Modeling Change and Event Occurrences. Oxford University Press, Inc. New York.

Skocpol, Theda. 1997. "The Tocqueville Problem: Civic Engagement in American Democracy," *Social Science History* 21(4): 455-480.

Skocpol, Theda, Marshall Ganz, and Ziad Munson. 2000. "A Nation of Organizers: The Institutional Origins of Civic Voluntarism in the United States," *American Political Science Review* 94(3): 527-542.

Stat/Math Center University of Indiana. 2005. "Regression Models for Event Count Data Using SAS, STATA, and LIMDEP."
http://www.indiana.edu/~statmath/stat/all/count/count1.html

Tarrow, Sidney. 1998. Power in Movement: Social Movements and Contentious Politics. Cambridge University Press, Cambridge, UK.

Tarrow, Sidney. 1993. "Cycles of Collective Action: Between Moments of Madness and the Repertoire of Contention," *Social Science History* 17(2): 281-304.

Tocqueville, Alexis de. 1847. Democracy in America (vol. 2). Vintage Classics, New York.

Truesdale, Dorothy S. 1954. "American Travel Accounts of Early Rochester," *Rochester History* 16(2).

White, Gary C. and Robert E. Bennetts. 1996. "Analysis of Frequency Count Data Using the Negative Binomial Distribution," *Ecology* 77(8): 2549-2557.

Young, Michael P. 2002. "Confessional Protest: The Religious Birth of U.S. National Social Movements," *American Sociological Review* 67: 660-688.

Data Sources

1. New York State Census, 1825
2. New York State Census, 1835
5. US Census, 2000
6. www.mynewyorkgenealogy.com
7. ICPSR 7754, Revivals in New York and Ohio, 1825 – 1835
8. ICPSR 1, United States Historical Election Returns, 1824 – 1968, DS41
9. 4th Annual Report of NYS Temperance Societies, February 1833
10. 5th Annual Report of NYS Temperance Societies, August 1834
11. Journal of Humanity, April 21, 1831