
Changes in Completed Family Size and Reproductive Span in Anabaptist Populations

BY J. C. STEVENSON,¹ P. M. EVERSON² AND M. H. CRAWFORD³

Abstract The Anabaptist Amish, Hutterite and Mennonite peoples trace their origins to the Reformation. Although they share certain beliefs, such as adult baptism and the separation of church and state, each group is culturally unique. The Hutterite and Amish are highly fertile and their populations exhibit stable rates of growth. These demographic characteristics reflect communal living among the Hutterites and labor intensive farming practices among the Amish. The Mennonites are the most receptive Anabaptist group to outside socioeconomic influences and provide a demographic contrast to the more conservative Amish and Hutterites. Demographic data collected during a study of aging in Mennonite population samples from Goessel and Meridian, Kansas, 1980, and Henderson, Nebraska, 1981, formed the basis of a cohort analysis in order to assess fertility change over time.

Completed family size has decreased significantly in all three communities since 1870. Since the early 1900's the mean age of the mother at first birth has fluctuated but the mean age of mother at the birth of the last child is decreasing significantly for the communities of Goessel and Henderson, thus effectively shortening the reproductive span. The pattern is somewhat different for Meridian, the most conservative of the three communities.

The Amish, Hutterite and Mennonite peoples trace their origins to the Reformation (Dyck 1981). The three groups organized separately around the charismatic personalities of Jacob Ammann, Jacob Hutter and Menno Simons, respectively. All three Anabaptist groups advocate adult baptism and separation of church and state. The latter idea was considered treasonous in most areas of Europe in the 1500's. Adherence to this concept of separation of church and state resulted in persecution and

¹Department of Anthropology, Western Washington University, Bellingham, WA 98225

²Department of Anthropology, University of Washington, Seattle, WA 98195

³Laboratory of Biological Anthropology, University of Kansas, Lawrence, KS 66045

frequent forced migration. The movement began in Switzerland spreading to parts of Germany and Holland, then to Prussia, Czechoslovakia, later to Poland and Russia.

Migration to the Americas began in the 1600's (Dyck 1981). However, many Amish moved in the 1700's coming primarily from Switzerland. The ethnically German Hutterites migrated from Russia in the 1870's settling first in South Dakota. Although Mennonites were eventually tolerated in Europe during the late 1600's and 1700's, economic concerns due to discrimination and increasing militarism caused migration to North America. Migrants represented two categories: Swiss-South German and Dutch-Prussian-Russian. In the late 1600's, and continuing through the early 1800s, 10,000 to 15,000 Swiss and German Mennonites first settled in Pennsylvania. During the 1870's and the 1880's, approximately 55,000 Dutch-Prussian-Russians arrived in the United States Midwest and Canada. The cultural heterogeneity of the Mennonites may be partially responsible for the more liberal attitudes of many contemporary Mennonites relative to Hutterites and Amish.

Published demographic studies of Mennonites are few (Allen and Redekop 1967; Harder 1967; Yoder 1985), and there is little documentation of fertility change over time. Thus, in this study, reproductive histories for women, representing population samples from one Nebraska and two Kansas Mennonite communities, will be analyzed by cohort and compared to other Anabaptists.

The Amish and Hutterites, Anabaptist "cousins" of the Mennonites, are of considerable biological and demographic interest because of remarkably stable levels of mortality and fertility with little or no in or out migration from the group since the beginning of this century until the 1950s (Cook 1954; Cross and McKusick 1970; Eaton and Mayer 1953; Ericksen et al. 1979; Hamman et al. 1981; Sheps 1965; and Tietze 1957). Birth control is not condoned, so that fertility is high. The mean family sizes of 6.8 and 9.4 for the Amish (Ericksen et al. 1979) and Hutterites (Eaton and Mayer 1953), respectively, have remained unchanged for at least 60 or 70 years. In addition, mortality is low. Thus, growth rates of both groups are very high (Cook 1954; Cross and McKusick 1970; Eaton and Mayer 1953; Friedmann 1970; Laing 1980; Peter 1980). The constancy of this growth coupled with maximum or near maximum fertility, particularly of the Hutterites, has received much attention from social scientists interested in determining the limits of human fecundity or "natural fertility" (e.g. Espenshade 1971; Henry 1961; and Robinson 1986). Other researchers have utilized the excellent genealogical records of the Anabaptist groups and their relative isolation to explore either topics in medical genetics (e.g. McKusick 1978) or additional aspects of

population structure such as inbreeding, genetic drift and group fissioning (Hurd 1983, 1985a, 1985b; Mange 1964; McKusick et al. 1978; Morgan and Holmes 1982; Steinberg et al. 1967).

The Mennonites, can provide an interesting contrast to the Hutterites and Amish. Although a heterogeneous group, the Mennonites are, in general, the most receptive to the outside world (Dyck 1981). Today, except for Old Colony Mennonites in Mexico (Allen and Redekop 1967) and other conservative Mennonite groups, the fertility levels of the Mennonites are the lowest of the Anabaptists. Yoder (1985) found that 3.5 to 3.9 children was the average per married woman over the age of 50 in a census of the (Old) Mennonite church (Mennonite General Conference, organized 1898). When single women are averaged in, the mean drops to around 3 to 3.4 children per woman. Pollack (1978; also described in Hurd, 1985b) compared Old Amish, Mennonites and non-Mennonites and demonstrated the existence of a positive relationship between religious conservatism and number of live births per completed family in Plain City, Ohio. Thus, lower fertility is expected for the Mennonites relative to the Amish and Hutterites. The focus here will be on the pattern in completed family size and reproductive span in these groups over time.

The Populations Studied

Three communities are represented in this study: Goessel, and Meridian, located in Kansas, and Henderson, Nebraska. The three communities are related historically, but the composition of each is unique.

Goessel and Henderson Mennonites are descendants of peoples living in the 16th and 17th Century Netherlands primarily, plus Switzerland and southern Germany. Ancestry can also be traced to Prussia and Russia due to local conversions during their later travels (Crawford and Rogers 1982; Rogers 1984). Political and economic changes in Russia convinced many of the members of one Russian village, Alexanderwohl, of the Ukraine Molotschna Colony, to migrate to the U.S. in 1874. After arriving in the United States they split into factions, in part, because of competition between railroad agents for land sales. Thus, one group settled west of Lincoln, Nebraska, in today's town of Henderson. Another group, New Alexanderwohl, settled in the rural areas around today's Goessel, Kansas, in the counties of Harvey, Marion and McPherson.

Most of the individuals in this study are from churches affiliated with the General Conference Mennonite division which was founded in 1860 with the intent of uniting all of the American Mennonites

(Dyck 1981; Van Meter 1972). Not as strict as many of the smaller groups, they only require adherence to the fundamental doctrines of the Mennonite faith. New Alexanderwohl was the first congregation to affiliate in 1876 and was followed by Tabor, Hillsboro, Johannestal, Lehigh, Brudertal and Goessel. In this study, 83% of the participants from the Goessel community represent Alexanderwohl, Goessel and Tabor churches. Fifteen per cent are from other Mennonite churches, and 2% are non-Mennonites.

A few smaller groups have remained separate. One such church is the Holdeman or Church of God in Christ, represented in this study by the Meridian congregation, which is located near Hesston, Kansas. "Holdemans" are the most conservative Mennonites in this study with plain dress and beards worn by the men. All Meridian participants are members of this church and reside in rural areas surrounding the church or in the towns of Hesston or Moundridge, Kansas. Ethnically, the Holdeman members are a mixture of the descendants of the 1870 Prussian-Russian immigrants and American Mennonites from Indiana and Pennsylvania (Crawford and Rogers 1982).

The Henderson Mennonites of Nebraska are descendants of inhabitants from a number of Russian villages of the Molotschna colony including Alexanderwohl (Crawford and Rogers 1982; Rogers 1984; Voth 1975). Disputes about church worship soon surfaced, probably along village lines. The largest group organized the Bethesda Church (now General Conference), but a reform movement led to families breaking away to form the Evangelical Mennonite Brethren Church in 1882. In addition, an earlier reform predating the immigration from the Molotschna Colony led to the organization of the Mennonite Brethren in 1860. Presumably members from this church are descendants of Molotschna Colony immigrants and American Mennonites. Individuals in this study represent all three churches, respectively, in the following proportions: 74, 3 and 16%. Seven per cent are in a miscellaneous category which includes both non-Mennonites and out-of-state Mennonites.

Materials and Methods

The demographic data from the communities of Goessel and Meridian, Kansas, and Henderson, Nebraska, were taken as part of a larger interdisciplinary aging study which is described in Crawford and Rogers (1982). Interview and questionnaire data were collected at health clinics in Goessel and Meridian churches in Kansas, during January, 1980, and in the Bethesda Church of Nebraska during January, 1981. Merid-

ian was a small sample which included 54% of the adults residing in the community. However, 100% of the families were represented by this sample (Sirijaraya 1984). The Cornell Medical Index questionnaire provided reproductive histories for 233, 223 and 47 women from Goessel, Henderson and Meridian, respectively. The Goessel clinic sample included 47% of the entire Alexanderwohl church membership. This clinic sample was further supplemented by mailed questionnaires in order to obtain a larger sample of the community in 1981. The town of Henderson consisted of 971 persons and a total sample of 547 (56%) participated in the study. Mennonites from the three communities are culturally homogenous, and thus, sample sizes approximating 50% should be representative.

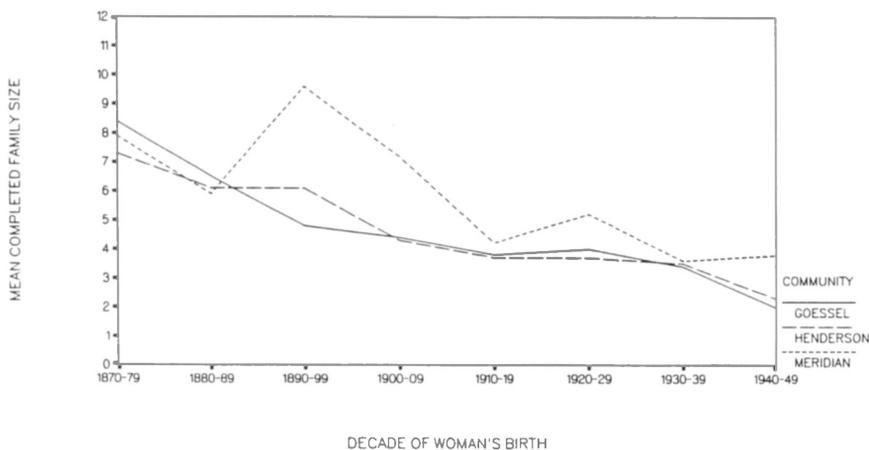
Household surveys provided additional information about natal and reproductive families of household heads and their respective spouses. Individuals were encouraged to consult family records in order to complete the household surveys. Complete family histories were then used to reconstruct families for individuals born as early as the 1870's, and these reconstructed families were used to calculate completed family size for ten-year cohorts. Reproductive histories were used to estimate mean age at menarche, mean age of mother at first and last child and mean reproductive span. Completed family size is calculated as the total number of children born to a married woman. Reproductive span is calculated by subtracting the birth year of the last child from the birth year of the first child and adding one (Tietze 1957). Mothers with a single child are given a reproductive span value of one. This measure of reproductive span is not a potential measure; rather, it is an estimate of the actual span of childbearing.

Results

The mean completed family size by community by decade, from 1870 to 1949, for Goessel, Henderson and Meridian are presented in Table 1 and graphically portrayed in Figure 1. Most of the women born in the 1940's have not completed their childbearing by 1980-1 so the figures for this cohort are conservative. In each of the three communities, Goessel, Henderson, and Meridian, the mean completed family sizes for the 1870-1879 cohort are significantly greater than the mean completed family sizes for the 1930-1939 cohort ($t = 7.53$, $p < 0.0005$, $t = 4.58$, $p < 0.0005$, $t = 5.35$, $p < 0.0005$, one-tail tests, respectively). There were no significant differences in comparisons of mean completed family size between Henderson and Goessel for the same cohorts. Sample sizes are smaller for Meridian so means fluctuate. However, the trend to

Table 1. Mean Completed Family Size, by Community, by Decade of Woman's Birth, 1870-1949

Decade of Woman's Birth	Goessel			Henderson			Meridian		
	N	\bar{X}	S.D.	N	\bar{X}	S.D.	N	\bar{X}	S.D.
1870-1879	74	8.4	4.34	32	7.3	4.54	7	7.9	3.39
1880-1889	54	6.5	4.02	56	6.1	3.08	9	5.9	5.61
1890-1899	49	4.8	3.88	37	6.1	3.49	12	9.6	3.40
1900-1909	55	4.4	2.89	33	4.3	2.64	5	7.2	5.54
1910-1919	57	3.8	1.81	64	3.7	2.13	9	4.2	1.72
1920-1929	44	4.0	1.72	56	3.7	1.85	10	5.2	2.20
1930-1939	47	3.4	1.51	33	3.5	1.18	7	3.6	1.40
1940-1949	26	2.0	0.89	26	2.3	1.34	6	3.8	1.60

**Figure 1.** Mean Completed Family Size, by Community, by Decade of Woman's Birth, 1870-1949.

decreasing family size is apparent in all three communities, decreasing from a high of 7 to 8 children among the women in the 1870-1879 cohort, to 3 to 4 children characterizing the women in the 1930-1939 cohort.

Summary measures of the reproductive span, by decade, of women born from 1900-1949 for Goessel and Henderson, and 1910 to 1949 for Meridian, are presented in Table 2. Statistical comparisons for Meridian could not be made due to the small sample sizes; however, trends are noted.

Table 2. Summary Measures of Reproductive Span, by Community, by Decade of Woman's Birth, 1900–1949.

<i>Decade of Woman's Birth by Community</i>	<i>Mean Age at Menarche</i>			<i>Mean Age at First Birth</i>			<i>Mean Age at Last Birth</i>			<i>Mean Reproductive Span</i>		
	N	\bar{X}	SD	N	\bar{X}	SD	N	\bar{X}	SD	N	\bar{X}	SD
1900–09												
Goessel	37	13.1	1.4	33	26.8	5.8	33	38.1	5.1	33	12.3	5.8
Henderson	14	13.3	1.6	18	22.6	3.7	18	31.8	5.4	18	10.2	5.0
Meridian	—	ID*	—	—	ID*	—	—	ID*	—	—	ID*	—
1910–19												
Goessel	60	12.9	1.5	52	28.0	4.9	52	36.4	4.1	52	9.4	4.0
Henderson	51	12.8	1.4	52	24.8	4.2	52	34.1	4.9	52	10.3	5.6
Meridian	4	14.0	0.8	8	24.1	5.7	8	34.0	5.7	8	10.8	4.9
1920–29												
Goessel	55	12.7	1.6	51	24.4	3.2	51	33.1	4.7	51	9.8	4.8
Henderson	57	13.5	1.1	56	22.9	2.6	56	32.3	4.8	56	10.4	5.1
Meridian	7	13.1	1.0	8	23.8	5.3	8	34.8	5.1	8	11.9	4.9
1930–39												
Goessel	36	12.5	1.4	34	23.7	4.3	34	29.4	4.2	34	6.7	3.5
Henderson	41	12.7	1.4	41	22.0	2.3	41	30.0	3.8	41	9.0	4.0
Meridian	8	12.9	1.2	4	25.0	3.4	4	33.5	5.0	4	9.5	3.1
1940–49												
Goessel	20	11.9	1.2	17	26.1	4.2	17	30.3	4.8	17	5.2	2.7
Henderson	29	12.6	1.5	29	23.9	2.3	29	30.5	3.4	24	7.6	3.1
Meridian	5	11.2	3.6	6	25.0	1.5	6	34.2	3.4	6	9.8	3.3

*ID Insufficient Data.

The mean age at menarche decreases in all three communities. Within Goessel the mean age at menarche decreases 1.3 years from 1900 to 1949. Thus, the mean age at menarche for the 1900–1909 cohort is significantly higher than the 1930–1939 and 1940–1949 cohorts ($t = 2.01, 3.37, p = 0.024, 0.0005$, one-tail tests, respectively), and the mean ages at menarche for the 1910–1919 and 1920–1929 cohorts are significantly higher than for the 1940–1949 cohort ($t = 2.75, 2.13, p = 0.0035, 0.018$, one-tail tests, respectively). Within Henderson, the mean age at menarche drops 0.7 years from 1900 to 1949 but fluctuates. There is a significant difference between the 1910–1919 and 1920–1929 cohorts when the mean age at menarche rises ($t = 2.77, p = 0.0035$, one-

tail test). However, the overall trend continues downward although the mean age at menarche for the 1920–1929 cohort is significantly higher than among the 1930–1939 and 1940–1949 cohorts ($t = 3.21, 3.34, p = 0.001, 0.0005$, respectively). Finally, the mean age at menarche for Meridian women decreases 2.8 years from 1910 to 1949.

The mean age at first birth has fluctuated since the early 1900's hovering in the mid-20's. There are no discernable trends within communities. However, Goessel women tend to be older than Henderson women at the birth of the first child for all cohort comparisons, 1900–1909, 1910–1919, 1920–1929, 1930–1939, 1940–1949 ($t = 2.75, 3.58, 2.60, 2.19, 2.32, p = 0.0014, 0.001, 0.0011, 0.032, 0.025$, respectively, two-tail tests).

The mean age at last birth fluctuates around the age of 34 for Meridian women, but decreases 7.7 and 1.6 years, respectively, from 1900 to 1949 for the women of Goessel and Henderson. Within Goessel the mean age at last birth drops significantly every decade for all but the last cohort, 1900–1909 versus 1910–1919, 1910–1919 vs. 1920–1929, 1920–1929 vs. 1930–1939, ($t = 1.67, 3.75, 3.68, p = 0.05, 0.0001, 0.0001$, respectively, one-tail tests). Within Henderson significant decreases are found between two pairs of cohorts, 1910–1919 vs. 1920–1929, 1920–1929 vs. 1930–1939, ($t = 1.92, 2.56, p = 0.029, 0.006$, respectively, one-tail tests). The mean age at last birth for Goessel and Henderson differ significantly only when the first two cohorts are compared, 1900–1909, 1910–1919, ($t = 4.08, 2.61, p = 0.0001, 0.01$, respectively, two-tail tests). Thus, Goessel and Henderson women become more alike over time with respect to mean age at last birth.

The mean reproductive span has shortened 7.1 and 2.6 years for Goessel and Henderson women over the period 1900–1949, and one year for Meridian women from 1910 to 1949. The most dramatic decreases occur among Goessel women during the periods 1900–1909 vs. 1910–1919, and 1920–1929 vs. 1930–1939, ($t = 2.78, 3.16, p = 0.0035, 0.001$, one-tail tests, respectively). Mean reproductive span in Henderson declines less so that significant differences are found only when the 1900–1909, 1910–1919, and 1920–1929 cohorts are compared to the 1940–1949 cohort ($t = 2.24, 2.36, 2.71, p = 0.015, 0.015, 0.004$, one-tail tests, respectively).

Discussion

Since the early 1900's, the mean age at menarche has decreased suggesting improved health and nutrition (Danker-Hopfe, 1986; Malina,

1979). The mean age at first birth has fluctuated slightly with no obvious trends although remaining consistently higher for Goessel when compared to Henderson women. The mean age at first birth increased slightly (although not significantly) for the women of Goessel and Henderson born during the decade 1910–1919, but these are women who bore children during the Depression and World War II. The mean age at menarche also rises for Henderson women during the depression years. The mean age at first birth decreased in later cohorts from both communities and significantly so for Goessel women although it is apparently rising again for women born in the 1940's. For Henderson, the mean age at marriage averaged 21.3, 23.7, 21.7, 20.0 and 21.8 years for women born in the decades 1900–1909, 1910–1919, 1920–1929, 1930–1939 and 1940–1949, respectively. The age at marriage also increased slightly for women born in the decade 1910–1919 and again for those born in the 1940's. However, the mean age at last child has decreased steadily (and most dramatically for the Goessel community) so that the reproductive span has decreased 56, 26 and 9% for Goessel, Henderson and Meridian, respectively. The mean completed family size, presented in Table 1, indicates how this shortened reproductive span has also resulted in reduced completed family size, although this is slightly more evident for Goessel and Henderson than for the more conservative community of Meridian. The subtle differences in measures of reproductive span between Goessel and Henderson women are not reflected in differences in mean completed family size. Further study should reveal if these consistent differences reflect cultural differences in achieving desired family size.

This demographic shift experienced by Mennonites in the last thirty or forty years is also being predicted for the more culturally buffered Amish and Hutterite populations (Laing 1980; Morgan 1983; Peter 1980). The demographic stability from approximately 1900 to the 1950's reflects the isolation and self-sufficiency of the Hutterites and Amish. Both practice an agrarian lifestyle, are relatively uniform in socioeconomic circumstances and receive adequate medical care, but there are significant differences. The Hutterites are communal and have utilized sophisticated farm machinery since the 1930's (Hostetler 1970, 1974). The Amish live as single families and resist such technological innovations as automobiles, telephones and electricity (Hostetler 1980). Refusal to practice birth control, coupled with a high standard of living, has led to a dramatic increase in the population size of both groups. The Hutterite population has increased from approximately 400 immigrants in 1879 to approximately 22,000 individuals residing in 247 colonies in 1977 (Peter 1980). In the Amish, the population growth has been

at a slightly slower rate but with similar results. For example, between 1945 and 1977, the number of Amish church districts in Lancaster County, Pennsylvania, increased from 19 to 57 (Ericksen et al. 1979). This population explosion has been supported among Hutterites by the communal acquisition of capital and the purchase of new land, followed by group fissioning. As needed, the Amish family also purchases additional farmland for its offspring. However, difficulty in obtaining land due to its scarcity, inflation, and increasing political restrictions has led several researchers to predict a decline in the fertility of both the Hutterites and Amish (Eaton 1952; Eaton and Mayer 1953; Ericksen et al. 1979, 1980; Peter 1966).

There are a limited number of positions of responsibility in a Hutterite colony and the inability to create new positions through group fissioning is likely to produce internal discontent (Clark 1977; Peter 1966). This dissatisfaction may result in a decline in family size, and seems to be happening for North American Hutterites. Peter (1980) demonstrates a decrease in the population growth rate from 4.12% per year to 2.9%. In an analysis of census data for Alberta Hutterites, Laing (1980) demonstrates that the crude birth rate declined from 45.9 per thousand in 1950 to 38.4 per thousand in 1971. Laing also found a decrease in the age-specific fertility of the Hutterite women. The conversion to contemporary farm technology has reduced the need for labor, and thus, the average size of Hutterite colonies has been reduced. A number of strategies have been adopted to reduce fertility. Hutterite women married at 22.0 and men at 23.5 years in 1950 (Cook 1954), whereas, Laing (1980) estimated that in 1971 mean age at marriage for Alberta Hutterite women had risen to 24.9 years and for men 26.0 years. Peter (1980) has predicted a greater increase in the ages at marriage in order to account for the 1.4% reduction in the birth rate from 1964–1977. However, Boldt and Roberts (1980) argue that Peter's predictions may be too high and that other means of reducing fertility may be in use, such as birth control. In addition, the percentage of never-married women is increasing, and women who do marry are having fewer children (Laing 1980). The age specific rates decline most in women over the age of 30 years.

There is little evidence for a decline in Amish fertility over time except for those who leave the congregation (Ericksen et al. 1980). The mean age at marriage is below 22 years for the Amish women who marry by age 45 and is over 23 for their husbands (Ericksen et al. 1979). Amish men tend to marry earlier, while Amish women marry at the same time as their U.S. neighbors. There has been little or no change since the late 1800's although Smith (1960) finds a slight decrease in age of marriage for

southeastern Pennsylvanian Amish men and women. Amish fertility has been lower than that of Hutterites due primarily to a more rapid decline in fertility for Amish women at older ages. Sterilization and abstinence are likely explanations for this fertility differential.

Thus, the fertility decline is not yet evident for the Amish. An age/sex distribution from a "Nebraska" Amish population of Mifflin County, Pennsylvania, for December, 1980 (Hurd 1985b) does not differ significantly from the age/sex distribution for Holmes County, Ohio, Amish in 1964 (n = 902) (Cross and McKusick 1970). The impact of population pressure is probably more immediately felt in Hutterite colonies rather than in the individual families of the Amish. The Amish have more job opportunities due to labor intensive practices (Ericksen et al. 1980). Because land may be more difficult to obtain among the Amish, individuals may be initially absorbed into occupations such as carpentry, cabinet-making, blacksmithing and harness repair. Thus, fewer Amish families depend directly on farming before there is a change in fertility. About 70% of Holmes County Amish are either part or full-time farmers, whereas, Ericksen et al. (1980) find that only 50% of Amish males of Lancaster County, Pennsylvania, are directly involved with farming. The Amish may be temporarily buffered from the demographic changes being experienced presently by the Hutterites. Ericksen et al. (1980) observed that it is difficult to give up farming and to remain Amish. There is an increasing rate of defection from the Amish church in families least able to purchase more land. In addition, those who defect exhibit a slight decrease in fertility. To counteract this trend, remaining Amish are either going to have to locate new families outside of Lancaster County (which causes additional problems because it is difficult to maintain family ties and thus Amish identity), and/or reduce fertility.

From the late 1800's to the 1960's, a period of time when Amish and Hutterite fertility has remained stable, mean completed family sizes for the three Mennonite communities of this study have been decreasing. During that time Mennonite fertility has also been sensitive to changes in the outside world. For example, note the later mean age at first birth (and for mean age at marriage for Henderson women) for women born in the years 1910 to 1919 and the associated drop in mean completed family sizes for the communities of Goessel and Henderson. Women born in the 1940's are reducing family size, and the mean age at first birth is slightly higher. Reduction in completed family size is also occurring through a reduced reproductive span, and like the Hutterites and Amish, the reduction is primarily at the end of the childbearing years. The mean age at last child has lowered dramatically in Goessel and has been relatively low in Henderson since the early 1900's. Thus, Mennonites

reduce fertility in the later years more and sooner than do the Hutterites and Amish. Meridian, the most conservative Mennonite community of the three, does not exhibit this pattern. The reduction in mean completed family size is due primarily to a slight elevation in the age of mother at first birth rather than due to a decreased mean age of mother at the birth of the last child.

Presumably, the most "liberal" Mennonites of this study, the Goessel and Henderson communities, are more similar to their non-Mennonite neighbors. However, there are no comparable measures available for the 1980 Kansas-Nebraska census population. The census does provide an indirect measure of fertility, "children-ever-born". This measure enumerates the number of children ever born per married woman 35 to 44 years of age. For the Kansas-Nebraska census population, these age groups consist of individuals who were born in the decades 1906–1915, 1916–1925, 1926–1935, and 1936–1945, with values of 2.6, 2.7, 3.2, and 3.0, respectively (U.S. Bureau of Census 1963, 1973, 1983). Thus, the reduction in fertility of the Goessel Mennonites makes them more similar to their non-Mennonite neighbors.

In addition, Mennonite women of Goessel, Henderson and Meridian are using the contraceptive pill in order to both delay the birth of the first child and decrease the fertility of their later reproductive years (see Table 3). Most of the women born in the late 1930's and 1940's have used the pill in the later reproductive years, and virtually all of the women born in the 1950's are using the pill in order to delay the birth of the first child. A small percentage (2-3%) of women born in the 1930's and 1940's have also had tubal ligations. Eaton and Mayer (1950) predicted that Hutterite women might eventually adopt birth control as they acculturated to American values, and Boldt and Roberts (1980) have suggested the use of contraception in order to explain the recent decrease in the rate of growth of the Hutterites. However, to date, there is no published information to support the use of birth control by either Amish or Hutterite women. The use of the birth control pill by the more conservative Meridian women suggests that the pill may also be employed by contemporary Amish and Hutterite women.

Another artificial means of reducing the length of the reproductive span is through the surgical removal of the ovaries and/or uterus. Table 4 presents the proportions of women having hysterectomies by decade of birth, and the percentages are relatively high for all three communities. Of those Goessel and Henderson women who also gave their ages at the time of the surgery, 32 to 75% were 45 years old or younger. These high frequencies suggest voluntary birth control. Eaton and Mayer (1950) also noted high rates of hysterectomies in Hutterite women.

Table 3. Use of Birth Control Pills, by Community, by Decade of Woman's Birth, 1900-1959.

<i>Decade of Woman's Birth, by Community</i>	<i>% Have Used</i>	<i>Sample Size</i>
1900-1909		
Goessel	0.0	23
Henderson	0.0	39
Meridian	0.0	3
1910-1919		
Goessel	3.0	63
Henderson	2.0	61
Meridian	0.0	9
1920-1929		
Goessel	27.0	66
Henderson	30.0	56
Meridian	37.5	8
1930-1939		
Goessel	56.0	45
Henderson	65.0	37
Meridian	37.5	8
1940-1949		
Goessel	94.0	32
Henderson	50.0	22
Meridian	67.0	6
1950-1959		
Goessel	87.0	23
Henderson	70.0	27
Meridian	44.0	9

Conclusions

A cohort analysis indicates that the reproductive span of Mennonite women has been shortened. The mean age of the mother at first birth is rising, while the mean age of mother at the birth of the last child is decreasing for the communities of Henderson and Goessel. Thus, the reproductive span for both communities is being shortened most dramatically as a result of a decrease in the age of the mother at the birth of the last child. Meridian is the most conservative of the three Mennonite communities and the women in that sample have not reduced either the completed family size or the reproductive span by as much as the women

Table 4. Hysterectomies, by Community, by Decade of Woman's Birth, 1900-1949.

<i>Decade of Woman's Birth by Community</i>	<i>% Total Hysterectomy</i>	<i>Sample Size</i>	<i>% < Age 45</i>	<i># with Age</i>
1900-1909				
Goessel	44	39	50	12
Henderson	50	24	70	10
Meridian	ID*	ID	ID	ID
1910-1919				
Goessel	47	62	32	22
Henderson	20	66	54	13
Meridian	60	10	ID	ID
1920-1929				
Goessel	39	56	50	20
Henderson	37	67	42	24
Meridian	38	8	ID	ID
1930-1939				
Goessel	23	35	75	8
Henderson	32	44	43	14
Meridian	25	8	ID	ID
1940-1949				
Goessel	10	29	ID	ID
Henderson	3	32	ID	ID
Meridian	17	6	ID	ID

*ID Insufficient Data

in the Goessel and the Henderson samples. The slight reduction in the mean length of the reproductive span for Meridian women was accomplished primarily through the increase of the mother's age at first birth. The birth control pill is also utilized, plus there is a high rate of hysterectomies for women 45 years and younger. The demographic shift for these three Mennonite communities begins for women born in the 1930's and 1940's. Although a similar demographic transition in the Amish and Hutterites is anticipated as a result of the social changes accompanying population pressures due to historically high fertility, the preliminary evidence for this shift is apparent only for the Hutterites. In sum, the fertility measures of contemporary Mennonite women indicate that demographically they are beginning to resemble the Kansas-Nebraska census population, instead of the other more conservative Anabaptist groups.

Acknowledgements This research was supported in part by N.I.H. grant AG01646-03 and a P.H.S. Research Career Development Award K04DE0028-05.

We are grateful to the Goessel, Meridian and Henderson congregations, without whose support and participation this study would not have been possible. We also wish to thank Ms. Meredith Uttley and Dr. Laurine Rogers for their assistance in data analysis and data collection, and Mr. Lucky Tedrow and Mr. Gene Hoerauf of Western Washington University for their assistance in preparing the figure. Ms. Eileen Smith's help in preparation of the final manuscript is acknowledged.

Literature Cited

- ALLEN, G. and C. REDEKOP 1967 Individual differences in survival and reproduction among Old Colony Mennonites in Mexico: Progress to October 1966. *Eug. Quart.* **14**:103–111.
- BOLDT, E. D. and L. W. ROBERTS 1980 The decline of Hutterite population growth: causes and consequences—a critique. *Can. Ethnic Stud.* **12**:111–117.
- CLARK, P. 1977 Leadership succession among the Hutterites. *Canadian Rev. Sociol. and Anthropol.* **14**:294–302.
- COOK, R. C. 1954 The North American Hutterites: a study in human multiplication. *Pop. Bull.* **10**:98–107.
- CROSS, H. E. and V. A. MCKUSICK 1970 Amish demography. *Soc. Biol.* **17**:83–101.
- CRAWFORD, M. H. and L. ROGERS 1982 Population genetic models in the study of aging and longevity in a Mennonite community. *Soc. Sci. & Med.* **16**:149–153.
- DANKER-HOPFE, H. 1986 Menarcheal age in Europe. *Yearbook of Physical Anthropology*, **29**:81–112.
- DYCK, C. J. 1981 (1967) *Mennonite History: A Popular History of the Anabaptists and the Mennonites*. Herald Press, Scottsdale, PA.
- EATON, J. W. 1952 Controlled acculturation: a survival technique of the Hutterites. *Am. Sociol. Rev.* **17**:331–340.
- EATON, J. W. and A. J. MAYER 1953 The social biology of very high fertility among the Hutterites. The demography of a unique population. *Human Biol.* **25**:206–264.
- ERICKSEN, E. P., J. A. ERICKSEN and J. A. HOSTETLER 1980 The cultivation of the soil as a moral directive: population growth, family ties, and the maintenance of community among the Old Order Amish. *Rural Soc.* **43**:49–68.
- ERICKSEN, J. A., E. P. ERICKSEN, J. A. HOSTETLER and G. E. HUNTINGTON 1979 Fertility patterns and trends among the Old Order Amish. *Pop. Stud.* **33**:255–276.
- ESPENSHADE, T. J. 1971 A new method for estimating the level of natural fertility in populations practicing birth control. *Demography*, **8**:525–536.
- FRIEDMANN, R. 1970 A Hutterite census for 1969: Hutterite growth in one century, 1874–1969. *Menn. Quart. Rev.* **44**:100–105.
- HAMMAN, R. F., J. I. BARANCIK and A. LILIENFELD 1981 Patterns of mortality in the Old Order Amish. *Am. J. Epidem.* **114**:845–861.
- HARDER, L. 1967 *Comparative Demographic Analysis: Mennonite Church and General Conference Mennonite Church*. Elkhart, Indiana.

- HOSTETLER, J. A. 1970 Total socialization: modern Hutterite educational practices. *Menn. Quart. Rev.* **44**:72–84.
- HOSTETLER, J. A. 1974 Hutterite Society. The Johns Hopkins University Press, Baltimore.
- HOSTETLER, J. A. 1980 Amish Society. The Johns Hopkins University Press, Baltimore.
- HENRY, L. 1961 Some data on natural fertility. *Eug. Quart.* **8**:81–91.
- HURD, J. P. 1983 Kin relatedness and church fissioning among the “Nebraska” Amish of Pennsylvania. *Soc. Biol.* **30**:59–66.
- HURD, J. P. 1985a Kissing cousins: frequencies of cousin types in “Nebraska” Amish marriages. *Soc. Biol.* **32**:82–89.
- HURD, J. P. 1985b Sex differences in mate choice among the “Nebraska” Amish of central Pennsylvania. *Ethol. Sociobiol.* **6**:49–57.
- LAING, L. M. 1980 Declining fertility in a religious isolate: the Hutterite population of Alberta, Canada, 1951–1971. *Human Biol.* **52**:288–310.
- MALINA, R. M. 1979 Secular changes in size and maturity: Causes and effects. *Monogr. Soc. Res. Child Dev., Serial No.* **179**:59–102.
- MANGE, A. P. 1964 Growth and inbreeding of a human isolate. *Human Biol.* **36**:104–133.
- MCKUSICK, V. A., J. A. HOSTETLER and J. A. EGELAND 1978 Genetic studies of the Amish: background and potentialities. *In*: V. A. McKusick (ed.), *Medical Genetic Studies of the Amish*, The Johns Hopkins University Press, Baltimore, pp. 3–25.
- MORGAN, K. 1983 Mortality changes in the Hutterite Brethren of Alberta and Saskatchewan, Canada. *Human Biol.* **55**:89–99.
- MORGAN, K. and T. M. HOLMES 1982 Population structure of a religious isolate: the Dariusleut Hutterites of Alberta. *In*: M. H. Crawford and J. H. Mielke (eds.), *Current Developments in Anthropological Genetics, Volume 2, Ecology and Population Structure*, Plenum Press, New York, pp. 429–448.
- PETER, K. A. 1966 Towards a demographic theory of Hutterite population growth. *Variables*, **5**:28–37.
- PETER, K. A. 1980 The decline of Hutterite population growth. *Can. Ethnic Stud.* **12**:97–110.
- POLLACK, R. 1978 Genetic demography of an Amish-Mennonite population. *Abstract. Am. J. Phys. Anthropol.* **48**:427.
- ROBINSON, W. C. 1986 Another look at the Hutterites and natural fertility. *Soc. Biol.* **33**:65–76.
- ROGERS, L. A. 1984 Phylogenetic identification of a religious isolate and the measurement of inbreeding. Ph.D. Dissertation. University of Kansas.
- SHEPS, M. C. 1965 An analysis of reproductive patterns in an American isolate. *Pop. Stud.* **19**:65–80.
- SIRIJARAYA, S. 1984 Inbreeding in the Meridian Mennonites of Kansas. Unpublished M.A. Thesis, University of Kansas, Lawrence, Kansas.
- SMITH, E. L. 1960 Studies in Amish Demography. The Research Council of Eastern Mennonite College, Harrisonburg, Virginia.
- STEINBERG, A. G., H. K. BLEIBTREU, T. W. KURCZYNSKI, A. O. MARTIN and E. M. KURCZYNSKI 1967 Genetic studies on an inbred human isolate. *In*: J. F. Crow and J. V. Neel (eds.), *Proceedings of the Third International Congress of Human Genetics*, The Johns Hopkins Press, Baltimore, pp. 267–289.
- TIETZE, C. 1957 Reproductive span and rate of reproduction among Hutterite women. *Fertil. Steril.* **8**:89–97.
- UNITED STATES 1963 18th Census of Population, 1960. Volume 1, Characteristics of the Population. Chapter C, General Social and Economic Characteristics, Pt. 18, Kansas,

- PC60-10C18 and Pt. 29, Nebraska, PC60-1-C29. U. S. Department of Commerce, Bureau of Census, Washington. Government Printing Office.
- UNITED STATES 1973 19th Census of Population, 1970. Volume 1, Characteristics of the Population. Chapter C, General and Social and Economic Characteristics, Pt. 18 Kansas, PC70-1-C18, Pt. 29 Nebraska, PC70-1-C29. U. S. Department of Commerce, Bureau of Census, Washington. Government Printing Office.
- UNITED STATES 1983 20th Census of Population, 1980. Volume 1, Characteristics of the Population. Chapter B, General Population Characteristics, Pt. 18, Kansas, PB80-1-B18, and Pt. 29, Nebraska, PC80-1-B29. U. S. Department of Commerce, Bureau of Census, Washington. Government Printing Office.
- VAN METER, S. 1972 Marion County, Kansas: Past and Present. M. B. Publishing House, Hillsboro, KS.
- VOTH, S. E. (ed.) 1975 Henderson Mennonites, From Holland to Henderson. Henderson Centennial Committee, Service Press, Inc., Henderson, Nebraska.
- YODER, M. L. 1985 Findings from the 1982 Mennonite census. *Menn. Quart. Rev.* 59:307–349.