Amish Population Pyramids: Demographic Patterns across Affiliations in the Holmes County, Ohio, Settlement

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Abstract: Research indicates demographic trends within the Amish community remain stable over time, even as Amish populations proliferate. However, most of the research on demographic trends fails to examine variation across affiliations. We use data from *Ohio Amish Directory, Holmes County and Vicinity, 2010* to construct age-sex population pyramids for three different affiliations. Population pyramids render the growth, decline, and stability of populations visible. Andy Weaver (or Dan) and Old Order churches present expanding pyramids implying rapid growth, while New Order churches render a stationary pyramid indicating slower growth. Sociologists of religion consistently find that strict churches, cultivating separation from the outside world, tend to grow faster than those that foster accommodation with the outside world. We argue that the data presented in this article suggests a similar dynamic at work in Plain Anabaptist communities.

Fundamentals of Demography

Demography derives from Greek roots: demos (δῆμος), meaning "the people" or "common population," and graphy (γραφία), meaning field of study (Cox, 1976). Analyses of population growth, decline, and movement by Adolphe Quetelet, Augustus Comte, Emile Durkheim, and other nineteenth-century pioneers established a foundation for modern social science (Hacking,

1990). These thinkers looked for patterns. They linked measurements from one point in time to those at another and, in doing so, hypothesized the laws of human populations. Contemporary demographers use these measures to forecast future population growth and decline. They show how fertility, mortality, migration, and fluctuating age distributions shape people's lives (Cox, 1976).

Human behavior also takes place within the confines of social institutions. The family, a universal human institution formed through kinship bonds, bestows security, support, and socialization (Reiss, 1988). Families transmit financial, social, and cultural capital to their members. They foster comfort as well as conflict. Accordingly, demographic analyses should consider the influence of family factors on population projections. At what age do people marry? What factors limit mate selection? When, on average, do they have children? How many children does a typical marriage produce? As they age, do children live near extended family or do they move away?

Families expand through marriage. In most cultures of the modern West, families grow through monogamous heterosexual unions. Under this cultural arrangement, opposite-sex couples mutually and exclusively commit to each other for life. Several social processes mediate mate selection, leading some scholars to describe these dynamics as "marriage markets" (Becker, 1973; Carbone & Cahn, 2014; Qian & Lichter, 2018). Supply and demand operate at the heart of these processes, wherein people compete for partners. Since marriage is not mandatory in a strict sense, people exercise preference. "Each person tries to find the best mate, subject to the restrictions imposed by market conditions" (Becker, 1973, p. 814). Religious factors shape these conditions. Members of orthodox closed religious communities who wish to remain in good standing rarely marry outside the fold (Brinkerhoff & Mackie, 1986; McCutcheon, 1988; Phillips, 1999; Sherkat, 2004). For many, such an option is unthinkable. This preference constricts the supply of marriageable partners.

Consider the experience reported by a young woman who grew up in a conservative Swartzentruber Amish community in Kentucky. She describes "searching for Mr. Right" over several years, never being satisfied with her options. "Mem said I was just too picky for my own good and I should settle for someone close to our settlement" (Schrock, 2018, p. 69). While many of her sisters did "settle" (in her opinion), the memoirist resolved to keep searching. "Looking for a man outside the Swartzentruber Amish church was out of the question. If I should go astray, I might be tempted to leave the church and end up in the bad place" (Schrock, 2018, p. 70). Her reticence illustrates the principles of homophily, homogamy, and endogamy that structure marriage markets (McClendon, 2016; McPherson et al., 2001).[1] Potential partner pools were limited to the men in their early 20s living in her community or those in nearby settlements directly linked to her church by fellowship and affiliation. The memoirist, frustrated by her lack of options at home, recalls looking for mates at weddings in distant states and Canada. As she aged, she also

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[1] Homophily refers to the tendency of people to associate with others who are like themselves. Homogamy and endogamy extend this concept to marriage unions. Homogamy emphasizes broadly construed cultural constraints while endogamy limits marriage by specific ethnic, religious, or cultural boundaries.

relaxed her selection criteria to avoid designation as an "old maid." This concern over status demonstrates how demographic patterns intersect with cultural practices in shaping behavior. Demographic factors constrained her pool of potential mates, forcing her to cast a broad geographic net to marry. Ultimately, she found her partner while visiting a sibling who lived in a Swartzentruber settlement hundreds of miles from her home.

Social scientists assess the conditions of these marriage markets through demographic snapshots. The total number of men and women in specific age categories sets the framework. Most Amish marriages occur when the partners are in their early 20s, with the man a few years older than the woman (Hostetler, 1993; Stevick, 2014). Thus, the ratio of men to women in these age brackets shapes the dynamics of local marriage markets. A community with an excess of men relative to women in the 20–35-year-old demographic provides women with more choices. But localities oversupplied with women relative to men limits their selection. This demographic structure has outsized consequences, including delayed marriage, migration, and apostasy. These factors shape future reproductive patterns. Delayed marriage translates to delayed reproduction, which can reduce the total yield of children from the union. If women cannot find a suitable partner, they may migrate to other communities or leave the faith entirely, taking potential offspring with them. Thus, demographic structures shape the lives people live.

While some demographic models rely on intimidating equations and complicated computations, we can examine the contours of marriage markets with simple tabulations and graphs. Pyramid graphs present the distribution of two population characteristics (such as age and sex) in an intuitive way. Traditionally, demographers use age-sex pyramids to visualize fertility and mortality trends. This paper presents preliminary analyses of person-level micro data extracted from the 2010 Ohio Amish directory (Wengerd, 2009). We draw on a sample of records from 30 church districts (10 "Old Order" churches, 10 "New Order" churches, and 10 "Andy Weaver" congregations) to compare variation in demographic patterns across affiliations. Our analysis suggests that patterns of population growth and decline of Plain communities follow principles established by the theory of religious economies (Stark & Finke, 2000).

Amish Population Studies

Much of the research on Amish population studies focuses on the population's growth (Cooksey & Donnermeyer, 2013; Donnermeyer, 2015, 2021; Donnermeyer & Cooksey, 2010; Greska, 2002; Meyers, 1991). Many of these studies use broad population characteristics, such as counts of people in various age brackets, to estimate or forecast aggregate trends. Fewer studies examine fertility, mortality, and age structure due to limited data. Those exploring more detailed population demographics typically restrict attention to a particular settlement or community and extrapolate findings broadly to all Amish or Old Order Mennonites. The rare study explores how affiliation might matter regarding demographic trends (Wasao & Donnermeyer, 1996).

These macro-level population studies are valuable. We know, for instance, that the Amish population grows at an exponential rate. Donnermeyer's work (2015, 2021) indicates the Amish population doubles in size every 20 years. The Young Center for Anabaptist and Pietist Studies at

Elizabethtown College (2021) estimates that the North American Amish population increased by more than 103% between 2000 and 2021. Data presented by other researchers support these estimates (Colyer et al., 2017; Greska, 2002; Hewner, 1998). In fact, in some communities, the population grew even faster. For example, the population tripled in a New York Amish community between 1950 and 1970 (Hewner, 1998).

These growth rates appear driven by spectacularly high fertility (Ericksen et al., 1979; Greska, 2002). Women, on average, bear many children who survive infancy, leading to youth-laden population structures. Dr. Harold Cross, who compiled the first detailed household census of Amish residents in Holmes County, Ohio, first documented these fertility effects (Cross, 1967; see also Nolt, 2020). Later, Cross and McKusick (1970) reported that nearly half the population (41%) was fifteen years old or younger. Subsequent research documented similar patterns in other Amish communities (Cooksey & Donnermeyer, 2013; Greska, 2002; Hewner, 1998). Hewner (1997, 1998) found that high fertility and parity sustained upstate New York Amish communities.

Fertility, mortality, and migration all shape the population's structure. Amish have high birth rates, with the average woman giving birth seven times (Greska, 2021).[2] Long lifespan and high rates of retention in the community drive population growth. The consistency of the population structure highlights the importance of fertility driving population growth (Hewner, 1997, 1998). Other high fertility groups have similar population structures, as evident in Hurd's (2006, 2011) study of horse-and-buggy Mennonite groups.

Studies exploring sex ratios of Amish populations report inconsistent findings. Some find aggregate parity between the sexes (Cross & McKusick, 1970; Greska, 2002). However, differences emerge when we examine the data broken into age cohorts. Cross and McKusick (1970) found that women outnumbered men in the 30–54 age group, but men outnumbered women (by a ratio of 1.2 men for each woman[3]) in the 55-and-older cohort, suggesting that men outlived their wives. Greska (2002) found a different pattern in his 1993 Geauga, Ohio, settlement directory analysis. There, the sex ratio for those older than 50 indicates women outlived men. While this pattern reflects U.S. society, the differences across time and settlement are prominent. While Hewner (1997, 1998) did not report specifically on sex ratios, she presented tabulated population data for the New York Amish community, indicating that women outnumber men. Her analysis supports Greska's observation that females outlive males.

Out-migration also affects the structure of the population, including people relocating to a different Amish settlement and people defecting from the Amish faith. Meyers (1994) found migration rates in the Elkhart-LaGrange, Indiana, Amish community relatively stable across birth cohorts at 5%. Greska and Korbin (2002) reported similarly low migration rates in the Geauga

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[2] However, the evidence suggests that this total fertility rate is declining for younger cohorts. Greska (2021) found that in Geauga County, Ohio, the average total fertility has declined by approximately one child for each woman in the cohorts born after 1937. Colyer and colleagues (2017) documented a similar decrease in their study of the Holmes County settlement.

[3] Unless otherwise noted, the sex ratios reported in this paper always report the number of men in relation to the number of women. A ratio of 1.0 implies perfect parity while a ratio of 2.0 implies two men for every woman and a ratio of 0.5 implies two women for every man.

County, Ohio, settlement, where less than 10% of the population moved. Kraybill (2001) reported that as many as 15% of the Amish born in Lancaster, Pennsylvania, migrated to other settlements. Defection rates are also low, and research consistently shows a decrease in defection rates across time and settlements in Ohio, Pennsylvania, and Indiana (Greska & Korbin, 2002; Kraybill, 1994; Meyers, 1994; Troyer & Willoughby, 1984). Men tend to defect more often than women (Kraybill et al., 2013; Meyers, 1994; Stevick, 2014). However, Greska and Korbin (2002) did not find sex differences in defection rates in their study of the Geauga County settlement.

While most studies on Amish communities/settlements note the importance of fertility and out-migration, few examine how cultural factors tied to affiliation might impact these demographic factors. In one of the few studies on fertility to consider these factors, Wasao and Donnermeyer (1996) found that the New Order churches in Holmes County had smaller families than the Old Order and Andy Weaver congregations. The authors suggest that the more progressive groups of Amish may be more likely to consider new ideas and practices, in this instance, related to family planning. This research suggests differences across affiliations provide insight into the structure of Amish populations.

Varying Affiliations

Old Order Amish migrants moving west from Somerset County in Pennsylvania established the Holmes County settlement in 1809. Disagreements over beliefs, practices, and church doctrines slowly fractured the community into different affiliations. By 2010, researchers taxonomized 11 distinct affiliation groups in the settlement, though most people belong to one of the four largest (Hurst & McConnell, 2010). Arranged from the most orthodox to the most progressive, these include the Swartzentruber groups, Andy Weaver groups (also known as the Dan churches), Old Order groups, and New Order groups. Conservative Amish practice strict discipline maintaining greater separation from the non-Amish world. This conservatism spectrum, however, is not unidimensional. For instance, the more "progressive" New Order groups impose fewer technological restrictions but still maintain a conservative theological doctrine (Hurst & McConnell, 2010).

Schisms sorted Anabaptists into Amish, Amish-Mennonite, and other affiliations in the nineteenth century (Yoder, 1991). Disputes over church discipline were at the heart of these divisions. Conservatives embraced stability and tradition. For them, the church *Ordnung* (rules) was timeless, providing ongoing guidance to the church. Progressives insisted that tradition should adapt to the vicissitudes of social change. These doctrinal disagreements eventually led to a major division. Those embracing the more conservative viewpoint became known as Old Order Amish, while the Amish-Mennonites followed a more progressive path (Hurst & McConnell, 2010; Yoder, 1991).

Conflict within the Old Order ranks continued well after "the great schism" of the 1860s (Yoder, 1991). Disagreements over the practice of shunning led to another split between Old Order Amish and the Swartzentruber group in the early 1900s (Hurst & McConnell, 2010; Wasao &

Donnermeyer, 1996).[4] The Swartzentruber Amish practiced strict shunning. They refused to fellowship with members who broke the church rules. Wayward members remained banished until they reconciled with the congregation. Shunned members could not escape the ban by relocating or joining a new church district. Old Order groups supported a more lenient form of the practice, lifting the ban when a shunned member established fellowship in another Amish or Mennonite church. The two groups were unable to compromise on this issue, leading to schism. Today, the Swartzentrubers are the most orthodox and conservative of the Amish affiliations. They aggressively maintain cultural fences between their community and the broader non-Amish world. People in the Swartzentruber districts often isolate themselves from other Amish communities. They do not provide information for directories (Hurst & McConnell, 2010); therefore, we do not include them in this study.

Differences over shunning practices in the 1930s also motivated the split between the Andy Weaver group (locally known as Dan churches) and the Old Order Amish (Hurst & McConnell, 2010; Wasao & Donnermeyer, 1996). Over time, the Andy Weaver Amish also diverged from the Old Order churches in their resistance to technological progress. Whereas many Old Order churches allowed farmers to harness technological innovation (such as motorized hay balers and milking machines), Andy Weaver churches held firm in prohibiting these tools. Similarly, the Andy Weaver churches refused to permit gasoline-powered lawn tools or bicycles, which were becoming ubiquitous in Old Order districts (Hurst & McConnell, 2010). By maintaining a stricter *Ordnung*, Andy Weaver churches impose more control over individual members' lives than the more progressive churches.

The New Order groups, while representing the most progressive point on our conservatism scale, view themselves as reviving the intentions of Jacob Amman, the original leader of the Anabaptist movement in the 1600s for whom contemporary Amish derive their name. This affiliation split off from the Old Order church in the 1940s and '50s when some ministers felt God calling for spiritual renewal in their church. They accepted the evangelical interpretation of salvation and embraced outreach to those outside the Amish community. Their church practices reflected these beliefs. New Order churches instituted Bible studies and Sunday schools. Members expressed personal testimony and openly discussed their convictions. These differences bred changes to religious doctrine, eventually leading the New Order groups to pull away from the Old Order Amish in 1968 (Hurst & McConnell, 2010; Kraybill, 1994). While the New Order Amish embrace some progressive ideals, most remain off the electrical grid and rely on horses and buggies for transportation (Hurst & McConnell, 2010).

The more conservative affiliations tend to encourage members to subordinate their individuality to the community. They embrace the doctrine of *Gelassenheit* (giving way) (Kraybill,

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[4] Excommunication and shunning occupy a central place in historical Anabaptist doctrine. The Dordrecht Confession of Faith (1632) instructs churches to exclude "offensive members" and "open sinners" to facilitate repentance. "The Dordrecht Confession of Faith of 1632 has been the most universally accepted among Mennonites from the times of its inception to the present. It is in use by all present day Amish" (Beachy, 2011, p. 19).

1994). In contrast, the more progressive New Order Amish groups allow for greater degrees of individualism. Everything from the *Ordnung* to church worship practices and dress reflects individualism (Hurst & McConnell, 2010; Kraybill, 1994). Wasao and Donnermeyer (1996) discovered smaller families in New Order communities compared to their more conservative counterparts, suggesting they are more open to worldly ideas such as family planning. Thus, church doctrine appears to influence demographics directly. The multitude of affiliations in the Holmes County Amish community provides an arena to explore how varying cultural commitments and constraints shape demographics.

Hypotheses from the Sociology of Religion

In a classic book, *Why Conservative Churches Are Growing*, Dean Kelley (1986) discovered that, since the 1950s, mainline Protestant denominations lost members while the most conservative Protestant denominations grew. These trends continue (Iannaccone et al., 1995; Stark & Finke, 2000; Stark & Iannaccone, 1997; Thomas & Olson, 2010). Some social scientists reason that costly demands facilitate "buy-in" or engagement, which translates to communal vitality (Iannaccone, 1994; Kelley, 1986). Moreover, these churches supply members with theology and worldviews that help people make sense of their lives. Effort and engagement with doctrine and the church community pay existential dividends for its members. Embracing the church's costly demands helps members demonstrate commitment to God, further reinforcing their bond to the church community. In sociological terms, strict religious communities foster solidarity anchored to a collective agreement of the sacred (Durkheim, 1912/1995; Kelley, 1986).

Iannaccone (1994) extended the strictness framework in recognizing that churches provide collective goods. Beyond caring for the soul, churches facilitate a variety of social, emotional, and material support. The quality of these goods depends upon contributions from members. That is, the members themselves create the goods. Thus, congregations face the classic free-rider problem when people consume costly goods without sharing maintenance burdens (Olson, 1971). Iannaccone (1994) argued that strictness screens out free riders. The benefits of membership go only to those invested in their upkeep. These benefits include increased confidence in their religious beliefs and social, cultural, and emotional capital (Abel, 2005; Corcoran, 2013; Lavrič & Flere, 2010, 2011; Stark & Bainbridge, 1980; Stark & Finke, 2000; Wellman, 2008).

Congregations that rely upon within-group interaction may discourage members from interacting with outsiders, creating isolation. Research suggests that intense within-group interaction promotes social encapsulation, bonding, and solidarity, facilitating the congregation's growth (Abel, 2005; Iannaccone, 1994). Other studies suggest that strict churches tend to grow because of selection factors. The people who join these churches typically bear more children, starting earlier than those joining less restrictive fellowships (Hout et al., 2001). Thomas and Olson (2010) tested many of these competing explanations and concluded that strictness, fertility, theology, and denominational identity all significantly predict growth net of each other.

Amish churches generally fit the profile of "closed religious communities" (Corcoran et al., 2022; Stein et al., 2021, 2022). They facilitate intense connections with other members. But the

Amish are not culturally monolithic. The variety of affiliations and diverging *Ordnung* of Holmes County Amish offer an ideal scenario to explore how religious strictness interacts with population demography. Churches vary in the extent to which they encourage, or discourage, engagement with the broader non-Amish world (Wasao & Donnermeyer, 1996). Church doctrine may play an essential role in membership retention as well. Indeed, Kraybill (1994) found that members from New Order communities were more likely to leave the Amish church and join less restrictive Mennonite or Amish-Mennonite churches than were members of more orthodox (or strict) affiliations. Differences in population structures across affiliations, however, remain empirically unexamined. We remedy this deficiency using population pyramid models.

Data and Methods

Traditional efforts to measure and describe the demographics of Amish and other Plain communities rely on tabulated data presented in summary form. Many researchers rely on tabulations of settlements, districts, and estimated populations released annually by the Young Center for Anabaptist and Pietist Studies at Elizabethtown College (Young Center, 2021). David Luthy (2003, 2009) also compiled and published lists of settlements and their population for years. Donnermeyer and Cooksey (2010) drew on these aggregate materials to estimate settlement growth and survival curves. Our approach differs. We take advantage of an extraordinary trove of detailed information about individual people living in Amish settlements published in directories. Micro data sets compile measurements on characteristics of units of a population, such as individuals, households, or establishments, collected by a census, survey, or experiment.

We use information from *Ohio Amish Directory: Holmes County and Vicinity, 2010* (Wengerd, 2009). This 967-page volume contains detailed information on approximately 50,000 different people across more than 1,000 families distributed in hundreds of church districts. Information printed in directories enables us to calculate various demographic indices and compare them across people, families, districts, and even settlements.

Household directories of Amish families in Holmes County, Ohio, began circulating in the 1940s. At first, they contained hand-drawn maps plotting family locations within each church district. In the early 1950s, a young Amishman named Ervin Gingerich began selling mimeographed directories of church districts, reporting membership counts, marriages, deaths, and information about parochial schools. In the mid-1960s, researchers from Johns Hopkins University, Yale University, and Penn State University began to study health and genetic factors in endogamous Amish communities (Nolt, 2020). In 1964, John Cross, a physician and doctoral student in medical genetics who grew up in an Amish family, began compiling medical surveys of Amish families in Holmes County. He completed a genealogy of the settlement in 1965 (Cross, 1967). The Division of Medical Genetics at Johns Hopkins University, in collaboration with Gingerich, published Cross's data as the first modern Ohio Amish directory in 1965 (Cross & Gingerich, 1965). They printed and sold an updated volume in 1973 (Gingerich, 1973). Gingerich then assumed sole responsibility for the directories, overseeing books in 1981 and 1988. A new publisher, Marvin Wengerd, took over in 1996, managing updates every subsequent five years

(2000, 2005, 2010, 2015, and 2020). While various studies draw data samples from these materials, no one successfully harvested all the information in one place until a doctoral student in sociology at Pennsylvania State University initiated an ambitious dissertation project.

Benjamin Allen McKune (1980–2014) was fascinated by the intersections of religion, demography, and broader social change. McKune scanned the documents into digital form and wrote software to parse the text. He used genealogical software (Personal Ancestral File) to create a person-level "census" of the Holmes County settlement for the past half-century. This data file contains information on age, sex, marriage, offspring, occupation, and household linkages for 48,710 people (Colyer et al., 2017). McKune's source files include plain ASCII text extractions from the directory pages and spreadsheets organized into church districts, which allow us to identify their affiliation.[5]

Following the analyses of Kraybill (1994) and Hurst and McConnell (2010), we use affiliation as a proxy for orthodoxy or strictness (see also Stein et al., 2022). The 2020 Ohio Amish directory (Wengerd, 2020) classifies each church district into one of three categories: New Order, Old Order, and Andy Weaver or Dan. Swartzentruber churches do not provide data to the enumerators or participate in the directory process. We presume that New Order churches are the least strict while Andy Weaver churches are the most orthodox in a rough typology (Stein et al., 2022). Since the 2020 data are not available in digital form, we used the 2020 directory to identify the affiliation of districts. Then, using the district's name, identifying number, and bishop, we located the same communities in the 2010 directory.

We randomly selected ten church districts[6] from each category (New Order, Old Order, and Andy Weaver) from McKune's digital scan of the 2010 directory to provide a sample across each affiliation for the current study. Then we extracted the sex, birthdates, and child status of all the people listed in these communities. Since optical character recognition algorithms are imperfect, we anticipated some distortion in the data. We checked dates for consistency and manually verified apparent errors. Though some distortion likely remains in the data, we are confident it does not skew our results. From this information, we constructed age-sex pyramids calculating age as of December 31, 2010.

Population Pyramids of Holmes County

Population pyramids intuitively visualize a community's age and sex structure. The graphs stack age categories on the vertical Y-axis and display the portion of men and women in those age categories on the horizontal X-axis. A line drawn down the middle divides men from women. Each step up the pyramid reflects a different age category, typically beginning with 0–5 and increasing in 5-year increments up the pyramid. Age and sex structures tend to manifest in one of three patterns. Expansive plots, those with broad bases and narrow tops, identify growing populations. Communities with high fertility and lower life expectancy render expansive pyramids. In contrast,

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[5] We thank Roger Finke and the family of Benjamin McKune for granting us access to these source files.
[6] Selecting 10 church districts within each category helps guard against potentially anomalous cases distorting the results, which is more likely to happen had we only used a couple of church districts.

constrictive pyramids present narrow bands at or near the base. This "top-heavy" pattern reflects a pending population decline. Finally, stationary pyramids reflect relatively "flat" or homogenous bands across the age distribution. These plots imply that populations are in equilibrium. They balance.

In addition to summarizing overall population stability, these pyramids highlight gender symmetries. As discussed, the uneven distribution of men and women in crucial age brackets destabilizes the population structure. Guttentag and Secord's (1983) pathbreaking research established that sex ratio influences gender roles across time, geography, and culture. As the ratio of women to men increases above parity, rates of marriage decrease (along with societal norms for chastity, monogamy, and homogamy). Even in cultures that sustain traditional norms and values (such as the Amish), unbalanced sex ratios disrupt marriage markets, forcing people to seek mates outside the community. From Guttentag and Secord's (1983) observations, we hypothesize that gender symmetry will influence the Amish population structure.

Harold Cross and Victor McKusick (1970, p. 85) published a hand-drawn population pyramid for Holmes County Amish in their pathbreaking study of Amish demography. We reproduced this pyramid with software based on their table of the Holmes County population by age and sex in December 1964 (Cross & McKusick, 1970, p. 85).

Figure 1

*Holmes County, Ohio, Amish Age-Sex Pyramid, December 1964*
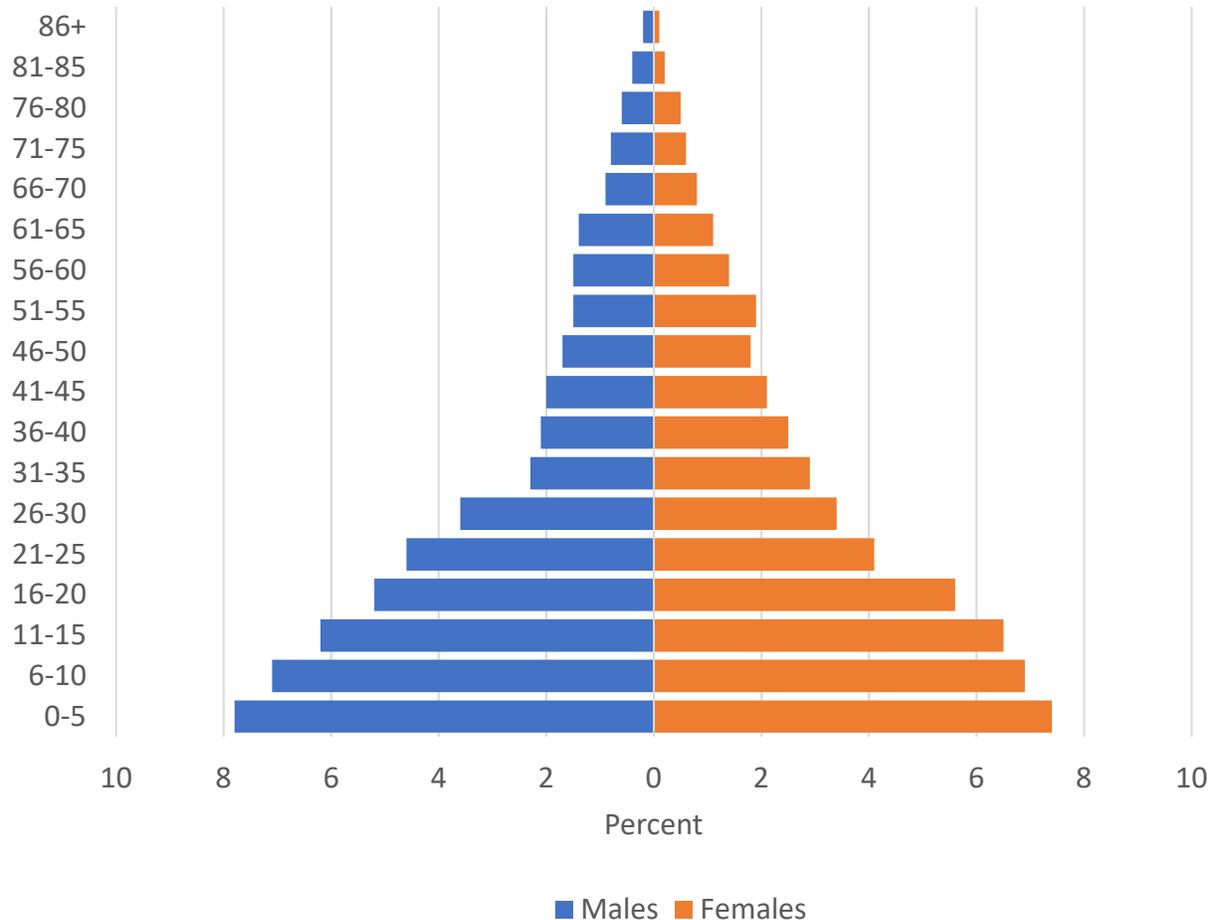
The pyramid's shape indicates a broad base and narrow top. Expansive pyramids project future population growth. Children and adolescents constitute a larger share of the total population than adults, particularly those aged 35 and older. At least in the first half of the twentieth century, the Holmes County Amish population dynamics were comparable to those in the developing world, marked by high fertility and relatively short life expectancy. Cross and McKusick modeled the entire known population in 1964, and we rely on their data to establish a baseline for comparison. Other demographers studying different locales at different times found similar population distributions (Greska, 2002; Hewner, 1997, 1998).

Cross and McKusick's graph also implies relative parity between the sexes for young people (until the mid-20s). Equal numbers of men and women stabilize marriage markets, creating favorable conditions for larger birth cohorts over the next 20 years. As the population ages, however, the sex ratio becomes unbalanced. Men outnumber women by a ratio of 1.2 to 1 in the cohort of 55 and older. This ratio suggests that men outlive their wives, a pattern divergent from demographic trends in the broader society.

We compared Cross and McKusick's pyramid with data published in the 2010 Ohio Amish directory (Wengerd, 2009). Figure 2 presents these data as an age-sex pyramid.

Figure 2

Holmes County, Ohio, Amish Age-Sex Pyramid, 2010
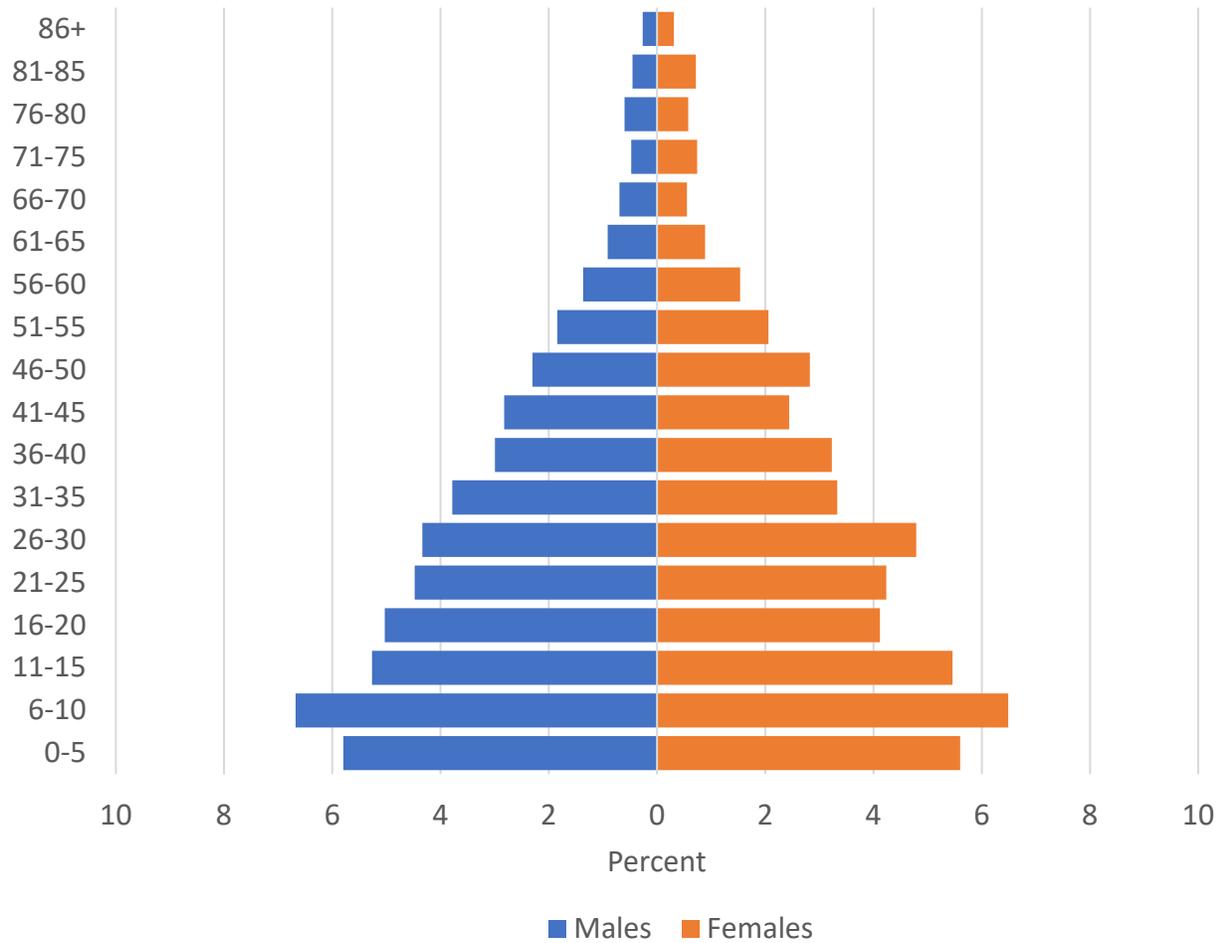
The pyramid for 2010 data, while still demonstrating expansive categories, presents a greater proportion of middle-aged and older adults than in 1964. However, the sample still represents a relatively young population. Fully one third are 15 years of age or younger. The size of this youth cohort implies future growth. Also, the overall sex ratio is 1.00, indicating near-perfect parity. But the sex proportions differ across age categories. The sex ratio for those 45 years and older is 0.87, meaning there are more women than men, which is consistent with Greska's (2002) findings from Geauga County and Hewner's (1997, 1998) findings from New York state.

Variation by Affiliation

Figures 3, 4, and 5 present population pyramids for our samples of Andy Weaver (Dan), Old Order, and New Order churches.

Figure 3

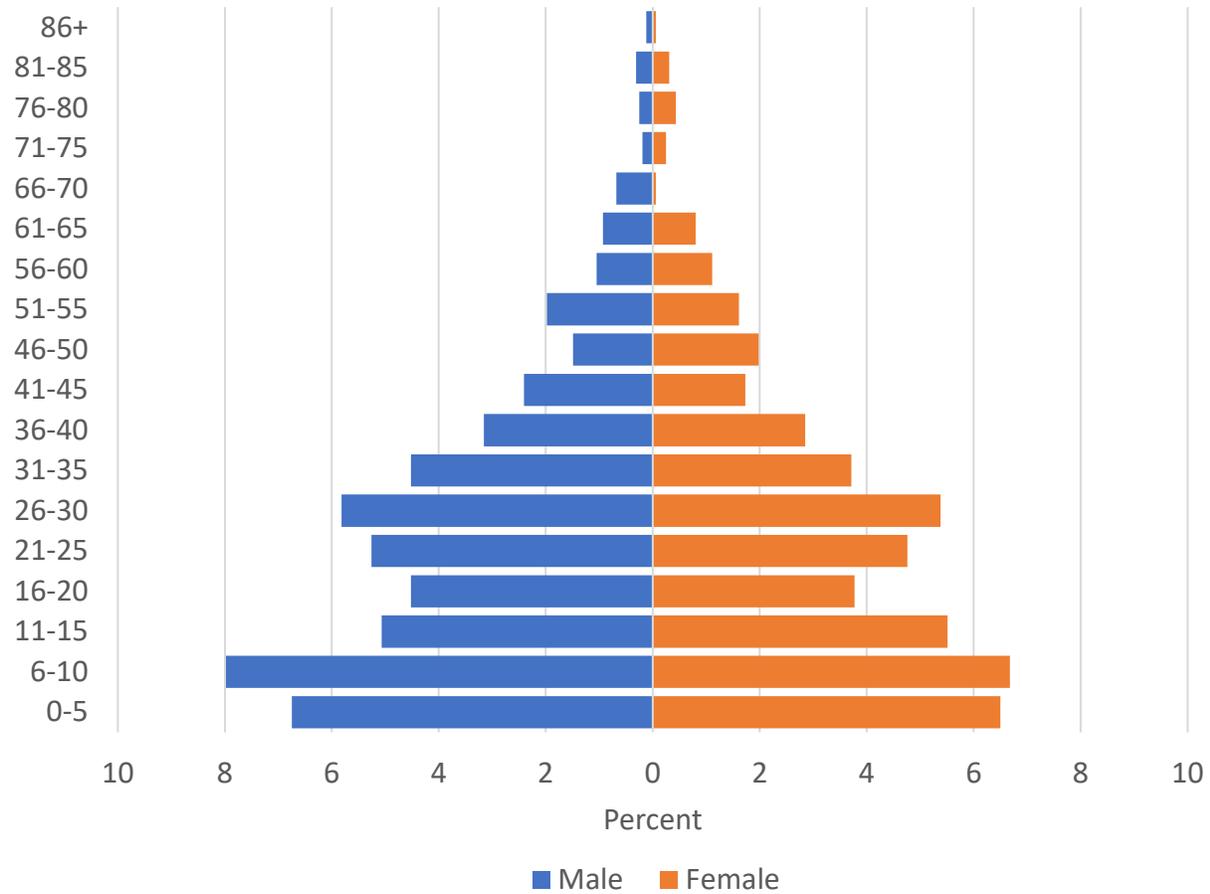*Holmes County, Ohio, Andy Weaver Churches, Age-Sex Pyramid, 2010*

Figure 4

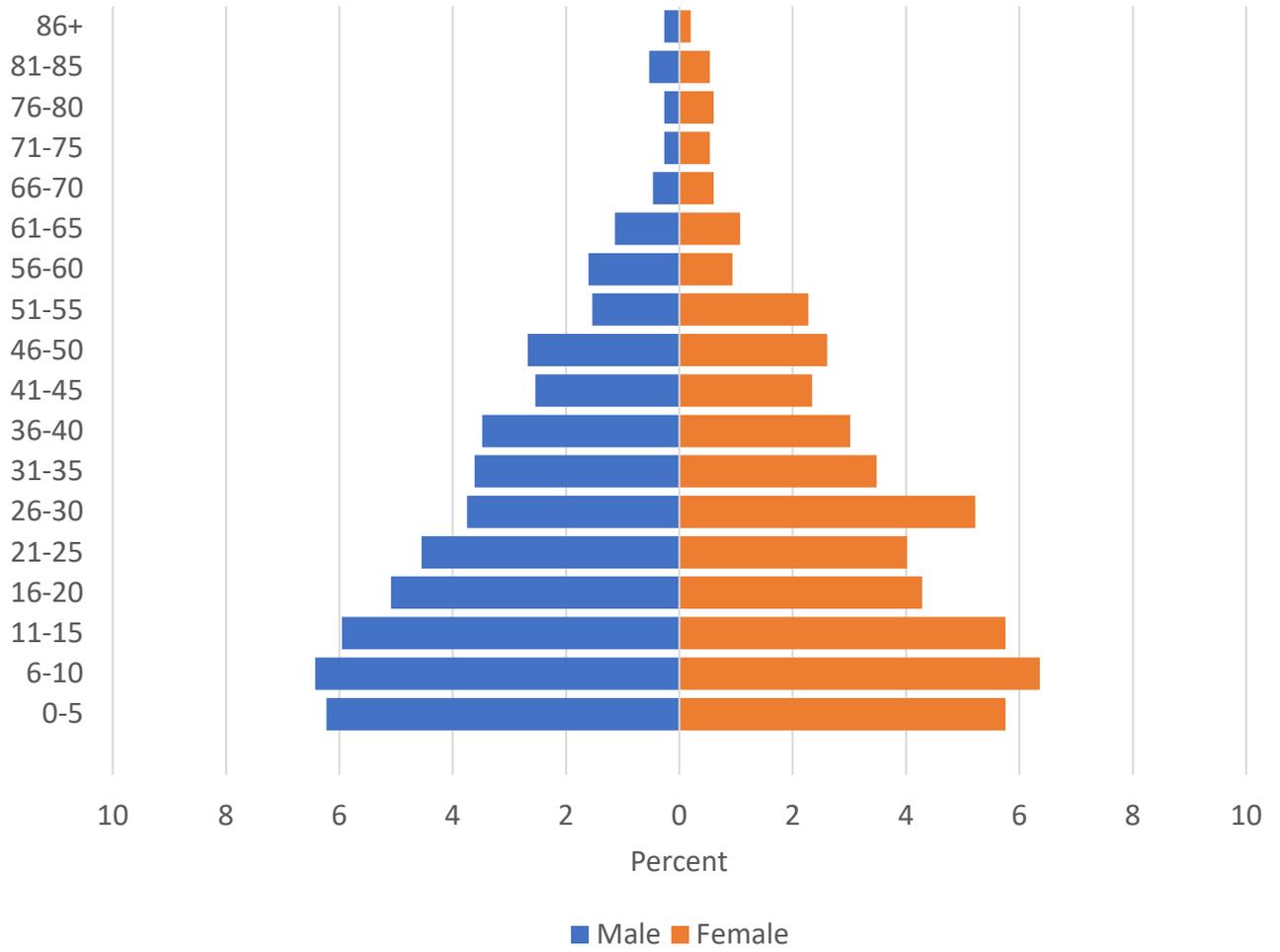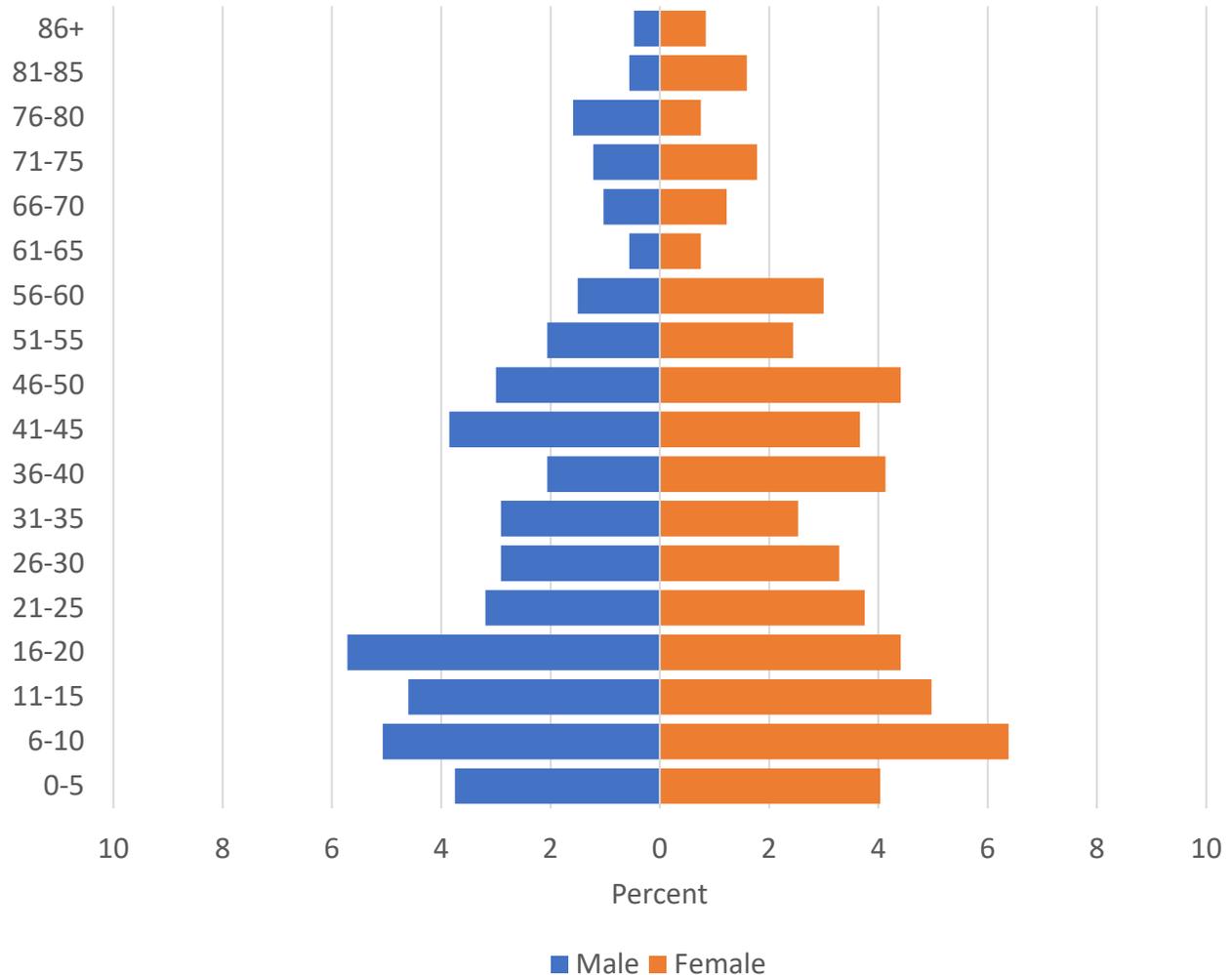*Holmes County, Ohio, Old Order Churches, Age-Sex Pyramid, 2010*

Figure 5

Holmes County, Ohio, New Order Churches, Age-Sex Pyramid, 2010

The Andy Weaver and Old Order church plots are remarkably similar and reflect the trends presented in the pyramid for the full sample in 2010. The Andy Weaver population includes 1,616 people (848 males and 768 females). The pyramid for the Old Order population consists of a total of 1,494 people (753 males and 741 females). The samples for these affiliations fit the expansive model characteristic of the original 1964 plot created by Cross and McKusick. These are youthful populations, with 36% of the Old Order population and 38% of the Andy Weaver population 15 years of age or younger. The age structure presented here is similar to that reported in other expansive locales (Greska, 2002, 2021; Hewner, 1997, 1998). These pyramids show random variation across age cohorts and sex, likely an artifact of the small sample size. While the sample includes over 1,000 people per affiliation, the number of people in each age cohort category, subdivided by sex, is relatively small. Consequently, minor fluctuations in the number of boys or girls born in a particular age cohort can disturb the pyramids' shape. We anticipate that a larger

sample would produce smoother transitions across the ages. Even with slight distortion, the samples of Old Order and Andy Weaver church members presented here establish pyramids similar to other expanding populations.

The population pyramid for the New Order churches differs considerably. Based on a sample of 1,066 people (491 male and 575 female), the New Order population has lower birth and mortality rates. Consequently, they grow more slowly than the Andy Weaver or Old Order communities. Notably, only 29% of the New Order population is 15 or younger. Similar to the Andy Weaver and Old Order pyramids, these data reflect some random variation across age cohorts and sex categories, likely a function of the sample size as it breaks down across age and sex categories. Still, the shape discerned from the overall pattern differs considerably from the other pyramids.

There are fewer young people in the New Order communities compared to the more traditional Old Order and Andy Weaver congregations. Moreover, the percentage of older people in the New Order communities is more significant than the same age cohorts in Andy Weaver and Old Order communities. These differences are most visible when presented as the stacked bar chart in Figure 6.

Figure 6

Age Structure Across Three Affiliations, 2010
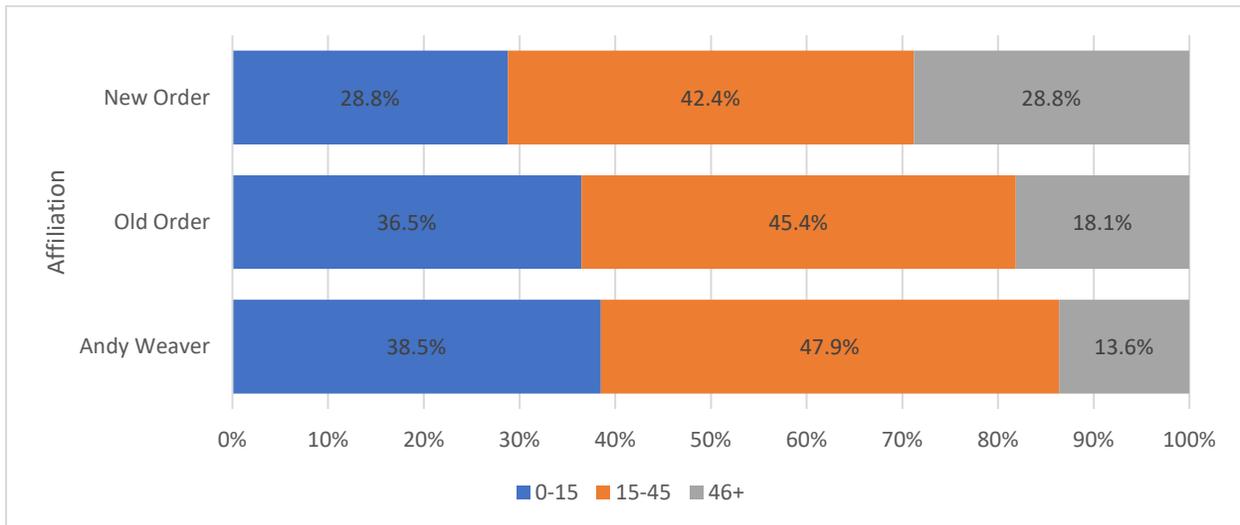
The chart presents the population of these three affiliations broken into three age groups. The leftmost rectangles represent youth (those under age 16), the rightmost rectangles represent people older than 45, and the central rectangles present people within the bounds of typical reproductive age. The patterns are unmistakable. The childbearing share of the population is greatest in the Andy Weaver churches and lowest in the New Order churches. The percentage of the people too old to bear children in New Order churches is double that of the Andy Weaver groups.

Sex Ratios

The population pyramids also suggest differences in sex ratios. To render these differences visible, we calculated sex ratios for the population and within each age category from Figure 6. Table 1 presents the results. Except for the New Order churches, the aggregate sex ratio for each affiliation is close to parity. But the New Order churches have more women than men. Differences emerge when analyzed across age cohorts.

Table 1

Sex Ratios

	Cross & McKusick 1964	Andy Weaver 2010	Old Order 2010	New Order 2010
Children (0–15)	1.01	1.06	1.04	0.87
Reproductive age (16–45)	0.96	1.16	1.02	0.95
Older (46+)	1.08	1.94	0.93	0.76
Total Population	1.00	1.10	1.01	0.85

Table 1 presents the ratio of men to women in three age brackets (children, people of reproductive age, and older people) in the 1964 baseline from Cross and McKusick and the three affiliations. While Cross and McKusick identified a shift in patterns to reflect a larger female population in the 16–45 age category, we do not find evidence of this trend continuing in the Andy Weaver or Old Order churches in 2010. Indeed, the Andy Weaver churches have more men than women across the categories. The higher percentage of men in the 46+ category in the Andy Weaver sample is consistent with Cross and McKusick's findings for the 1964 population. But the fact that there are more men than women in each Andy Weaver category suggests that sex structure remains stable across the life course.

Moreover, this sex structure is consistent with cultures that sustain "traditional" gender roles and stable monogamous marriage patterns (Guttentag & Secord, 1983). Within the Old Order churches, the sex ratio is close to parity for younger people and then becomes unbalanced, with more women than men for those older than 45. This pattern suggests that females outlive males in the Old Order churches, which is consistent with broader demographic trends in the United States.

In contrast to the other groups, the New Order congregations present apparent gender asymmetry. They have more women than men across the age cohorts. While the presence of more females in the 16–45 category corresponds to Cross and McKusick's 1964 data, it deviates from the pattern of contemporary Andy Weaver and Old Order congregations in 2010. The prevalence of females in the 46+ category is consistent with the Old Order pattern in 2010. However, the disparity is much more prominent in the New Order groups. The New Order churches are asymmetrical by gender, which may affect marriage markets and youth retention. Amish elders encourage their youth to "avoid close association with those who are not members of the church" (*1001 questions*, 1992, p. 55), and most churches demand strict endogamy (Stevick, 2014).

"Stayers" and "Leavers"

Most studies that use pyramid graphs to analyze population structure lack data to sufficiently decompose sources for population loss. The Holmes County settlement directory, however, includes valuable data on the status of children. Offspring of all household heads receive a code indicating the child's residential and church membership status, including adult children who did not join an Amish church. Table 2 presents the distribution of adult children who remained in the congregation, left the community for another congregation, or defected from the Amish faith.

Table 2

Distribution of Amish Youth "Stayers" and "Leavers," 2010

	Andy Weaver			Old Order			New Order		
	M	F	Total	M	F	Total	M	F	Total
Remain	95.9	95.9	95.9	88.1	93.5	90.6	75.1	79.2	77.2
Left community	1.3	1.8	1.5	2.7	0.7	1.8	2.1	3.1	2.6
Left the Amish	2.8	2.3	2.5	9.2	5.8	7.6	22.9	17.7	20.2

Studies consistently indicate that Amish churches retain their youth (Foster, 1984; Hostetler, 1993; Kraybill et al., 2013). The data from 2010 reinforce those observations. More than 90% of Andy Weaver and Old Order youth remained in their congregations, while a small percentage moved to new congregations or defected. The retention across affiliations, however, is most telling. Children in Andy Weaver communities were the least likely to defect. Indeed, more than 97% of the Andy Weaver sample remained Amish. The percentage of defectors in Old Order churches is slightly higher, with just under 6% of the sample exiting the Amish. The exit patterns are consistent across affiliations, with more males leaving Andy Weaver and Old Order groups.

The most marked difference in exit patterns is evident in the New Order communities. Fully one-fifth of the New Order youth defected. This rate represents a tenfold increase in New Order youth who defect compared to the Andy Weaver groups (and a threefold increase over Old Order groups). The percentage of New Order Amish who migrated to other communities is similar to other affiliations; however, there are significant sex differences. New Order females are twice as likely to leave their community for other Amish communities (likely due to marriage market congestion). We also note that males are more likely to exit the New Order community than the most conservative groups, which might indicate a lack of available marriage partners for those females remaining.

Discussion

The general population structure of the Holmes County Amish settlement has not changed substantially in a half-century. The population represented as an expansive pyramid by Cross and McKusick in 1970 suggests growth. Our sample drawn from the 2010 directory renders a similarly shaped pyramid, indicating the Amish population in the Holmes County settlement is still growing. Like Hewner's (1997, 1998) study of changes in an Amish community in New York over 40 years,

our comparison of the Holmes County community in 1964 and 2010 shows relative stability in population structure, even though the population has grown approximately eight times over.

The population pyramid representing the entire population, however, conceals substantial variation across Amish affiliations in the Holmes County settlement. These patterns conform to those predicted by the religious economies theory from the sociology of religion. The most conservative (or strict) Amish groups grow. While secularization theories predicted that modernity would decrease religiosity (Berger, 1967; Stark & Finke, 2000), particularly for more conservative groups, the religious economies theory draws attention to the many benefits of strict religion (Iannaccone, 1994; Stark & Finke, 2000). Strict churches offer their members social benefits in the form of tight-knit communities of like-minded believers with strong collective identities and substitutes for secular activities. The boundaries between the strict church and non-members make group membership distinct and valuable, whereas the boundaries between more progressive groups and the outside world are more penetrable (Iannaccone, 1994; Smith, 1998; Stark & Finke, 2000). As more progressive groups begin to look increasingly like secular society, members and youth may question why they attend at all, leading to increased defection. The findings of this paper support strict church theory and align with results from studies of non-Amish religious groups (Thomas & Olson, 2010).

The Andy Weaver and Old Order congregations generate expansive population pyramids. Few of their youth defect or migrate to other communities. These trends imply that the conservative or orthodox church communities will continue to increase. Additionally, the sex structure within these groups represents stability, with more males than females in the population (Guttentag & Secord, 1983). In contrast, the more progressive New Order churches grow less quickly. Their population structure graphs as a stationary pyramid with the youth population similar in size to the elderly cohorts. This structure is not conducive to growth at a pace matching the Andy Weaver and Old Order churches. Instead, the New Order population is relatively static. Examining out-migration and exit patterns provides insight into why the population structures look different across affiliations. As the literature suggests, churches with relaxed rules are less likely to retain members (Stark & Finke, 2000; Thomas & Olson, 2010). This is evident in the New Order groups, whose members defect at a much higher rate than those in the more conservative groups in the Holmes County settlement.

Increased out-migration rates paired with the pattern of New Order parents having fewer children (Wasao & Donnermeyer, 1996) suggest that New Order groups will continue to grow at a slower rate than Old Order and Andy Weaver affiliations. The fact that men exit the New Order communities at higher rates than women also renders the marriage markets less stable. There are consistently more females than males across all ages, indicating mates are in short supply. As a result, females may delay marriage, change affiliation to find a spouse, or even refrain from marriage altogether.

Statistical analysis of directory records offers a promising route for future demographic analyses of Amish communities. Our study presents preliminary results from a sample of records published more than a decade ago. Future work should draw upon more current and complete

directory data, incorporating larger sample sizes or complete directories to smooth out the transitions across age cohorts within the pyramids. Despite the limitations, our research makes a strong case for considering affiliation's effects on Amish populations. While aggregate population trends remain stable over time within the Holmes County settlement, our analysis suggests interesting differences across affiliations. Future research might also consider using the New Order Amish directory as a resource to explore New Order districts across states. The distinct cultural practices embedded in different Amish groups appear to shape their population dynamics. Some practices promote growth, while others seem to discourage it. Future research should carefully examine these dynamics.

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