



A systematic review of the empirical research on selected aspects of homeschooling as a school choice

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ABSTRACT

This article gives the demographic characteristics of the U.S. homeschooling population and the reasons that parents choose to homeschool, summarizes the findings of studies on the homeschool learner outcomes of academic achievement, social development, and success in adulthood, and proposes future research on parent-led home-based education. The majority of peer-reviewed studies on academic achievement reveal a positive effect for the homeschooled students compared to institutional schooled students, while a few studies show mixed or negative results. Regarding social and emotional development, a large majority of studies show clearly positive outcomes for the homeschooled compared to those in conventional schools. A majority of the studies on the relative success of the home-educated who later became adults show positive outcomes for the homeschooled compared to those who had been in conventional schools. I recommend that the existing literature be enhanced by well-controlled non-experimental designs to examine adults who were homeschooled in terms of an array of knowledge, attitudes and behaviors regarding lifelong learning, rates of public welfare dependency, and degree of personal agency or self-efficacy.

KEYWORDS

academic achievement;
college students;
homeschooling; social
development

Introduction

Parent-led home-based education is an educational choice that has existed for millennia around the globe. Most people today call it homeschooling. Focusing on the United States and its early history, the practice of parents being the main educators of their children went from being the norm in the colonial period to being the clear minority practice by 1900 (Ray, 2017a). In many developed western nations, homeschooling was nearly extinct by the mid-twentieth century.

The homeschool movement startled the U.S. public and the education establishment by mushrooming from only 13,000 K-12 students in the early 1970s to now roughly 2.4 million students (Lines, 1991; Ray, 2016; Redford, Battle, & Bielick, 2017). The reasons for this mammoth growth will be discussed in this article.

First, however, some perspective is needed regarding homeschooling as a school choice. Homeschool students represented only about 0.03% of U.S. school-age children in the mid-1970s (Lines, 1991). One of the most careful estimates of the size of the homeschool population placed it at 3.4% of school-age children in 2012 (Redford et al., 2017). This 113-fold growth occurred over roughly four decades. A nearly equal number of children are being homeschooled as are enrolled in Catholic schools (National Catholic Educational Association, 2014). By some estimates, there are only slightly more students in public charter schools than are being home educated (National Alliance for Public Charter Schools, 2017). Egalite and Wolf (2016) succinctly put the growth of homeschooling into perspective with the following comment:

Notably, all three of these choice mechanisms [homeschooling, public charter schools, and school voucher or tax-credit scholarship programs] have experienced remarkable growth in the past decade, a cause for alarm among school choice opponents and celebration among supporters. (p. 442)

With such growth in the homeschool option over the past thirty years, there has also come an accompanying burgeoning of research on the topic. It is therefore challenging to keep reviews of research on the topic current and meaningful. The base of scholarly research on homeschooling has grown from a handful articles and studies in the mid-1980s to now a plethora of theses, dissertations, chapters in books, books, and a quickly growing number of basic qualitative and quantitative studies. This rapid growth in research is offering more empirical evidence to help inform what have sometimes been highly theoretical or polemical articles on the merits or demerits of the homeschooling educational choice, and what research does or not tell us about the effects of homeschooling on students and society (Apple, 2006; Fineman, 2009; Murphy, 2012; Ray, 2013).

Many of the past surveys of research on homeschooling have not offered clear or tight guidelines for the inclusion of articles or studies for review. With that in mind, I have noticed a remarkable expansion of studies on homeschooling in peer-reviewed journals over the past five years and this fact has guided the approach for this review. Therefore, I am offering something new to the class of overviews of homeschool research. This article will be a systematic review that relies solely on peer-reviewed empirical studies for gaining an understanding of the effects of homeschooling on learner outcomes such as academic achievement, social development, and how well home-educated students are doing in life once they reach adulthood. Although there has been ongoing scholarly debate about the relative value of studies that appear in peer-reviewed research journals, peer review still holds high value in the academic world (Goldbeck-Wood, 1999; Jefferson, 2006; Jennings, 2006; Roberts, 1999; Sampson, 2014; Sieber, 2006). Besides

being a new approach to the inclusion of research on homeschooling for review, using this criterion serves as a reducing filter for an article that has only limited space available. Finally, such a selection criterion serves to keep conclusions about the effects of a currently minority approach to schooling conservatively bound and reduces the likelihood that any author will make biased claims in any direction about the value of home-based education (Roberts, 1999).

The purpose of this article is to offer (a) a brief glimpse of the demographic characteristics of the homeschooling population and the reasons that parents choose to homeschool; (b) a summary of specially selected studies on the homeschool learner outcomes of academic achievement, social development, and success in adulthood; and (c) some concluding remarks for future research on homeschooling.

Methods

To seed this review and address its purpose, I searched and scoured the entirety of the English-language set of homeschool research and scholarship. Key sources for the searches were the government-sponsored Education Resources Information Center (ERIC), Google Scholar and other online databases, and an annotated bibliography that focuses on homeschooling that has been continuously updated by Ray (2017b) since about 1983. Throughout the literature exploration process, I searched for terms such as homeschooling, home schooling, home education, unschooling, academic achievement, social development, reasons, and motivations. The reference lists from key texts that included reviews of homeschool research (e.g., Murphy, 2012; Rothermel, 2015), most of which the author was already aware of, were used to generate additional possibilities, and the reference lists from those texts were used in a snowballing process. At some point, the fact that no new relevant references appeared gave me a strong signal that no additional pertinent pieces were going to be found.

Only peer-reviewed sources were noted and included for the aspect of this review that deals with the selected learner outcomes of academic achievement, social development, and degree of success in adulthood. The purpose is to compare homeschool students to those who were educated in conventional or institutional schools such as traditional public, charter, or private schools.

This is the first review of homeschool research that I know of to use this approach. This tactic enhances discipline and consistency in the review. It reduces the opportunity for the reviewer to be arbitrary, capricious, or biased in what is selected for inclusion. It theoretically enhances the methodological soundness of the studies included in the overview, and thus makes the conclusions based on the data more dependable. The key effort regarding the learner outcomes studies is to provide succinct summaries of the studies

as data with minimal micro-evaluation of each individual study. The one exception to the peer-reviewed criterion for inclusion was that state-provided academic achievement data were included where they were available.

Observers of empirical research on the student outcomes of homeschooling have voiced various concerns and cautions. First, a continuous note for three decades has been that consumers of the studies should be careful about assigning causation to a form of schooling when it comes to significant differences in dependent variables such as achievement test scores, measures of social development, and college GPA (e.g., Murphy, 2012; Ray, 1986, 1988, 2000, 2013; Rudner, 1999). Confounding variables such as length of treatment, parental involvement, and demographics are often difficult, if not impossible, to control in studies comparing homeschoolers to others. Although researchers would like to establish causal relationships by randomly assigning students to homeschooling, public schooling, and institutional private schooling, this is not feasible. Further, most studies on homeschooling include convenience samples that are likely not representative of the targeted sample. With these methodological limitations in mind, however, at least some of the empirical studies in the review that follows use random selection (Green-Hennessey, 2014; Montes, 2015), key control variables, and student-matching approaches to partially control for possible confounders.

Second, researchers who do future studies on the effect of homeschooling on students and adults should work very hard to gather data on the length or authenticity of the treatment. That is, they should find out for how many years the subjects have been in homeschooling, private schooling, and public schooling. Such precision of data will help in understanding the different effects of schooling approaches.

Next, various scholars have noted that many, if not most, homeschool parents have different objectives and goals for their children than do institutional public and private schools and parents who choose them (e.g., Morrison, 2015). If this is true, then one might wonder why there is so much focus on standard measures of academic achievement, social development, and forms of socialization that are developed and normed with institutional school students and used for holding institutional state schools accountable to the taxpayer. In a similar vein, many homeschool parents are more focused on the spiritual and philosophical education of their children and therefore much of the studies on homeschool students are, as Cizek (1993) posited, “the mismeasure of home schooling effectiveness.” Further, some have argued that it is actually inappropriate, based on standards of the testing and measurement industry, to apply standardized testing to homeschoolers (Cizek, 1988).

There are many fascinating aspects of home-based education that will not be reviewed in this article; there is not enough space for them. The fact that the parents in over one million families in the United States – and a rapidly growing number in many other nations – are currently homeschooling their children raises serious issues such as who should be in charge of the

education of children? What gave rise to the modern homeschool movement? What services might parents better access via homeschooling rather than public schooling (Cheng, Tuchman, & Wolf, 2016)? What impact will private parent-led home-based education have on institutional schools and society in general? Scholarly works have addressed these questions, but a review of them is outside the scope of this effort.

Research evidence on the demographic characteristics of homeschoolers

Studies over the past three decades have given a clearer picture of the variety of demographic characteristics of homeschool families. One of the most-cited sources on their traits is from the U.S. Department of Education (Redford et al., 2017). Their 2012 nationwide survey revealed that 62% of homeschool students live in cities and suburban areas, while the others live in towns and rural areas. In terms of ethnicity/race, 32% of the children were minorities (Black/non-Hispanic; Hispanic; Asian or Pacific Islander, non-Hispanic; or other, non-Hispanic) while 68% were White, non-Hispanic. Twenty percent of the students were categorized as “poor” and the other 80% were noted as “nonpoor.”

Regarding their parents’ highest education level, 32% had a high school diploma or less, while 14% had attended graduate or professional school. Roughly one-fourth of the homeschool students were in each of the following grade-level categories: K-2, 3-5, 6-8, and 9-12 (Redford et al., 2017). For some comparative information, Ray’s (2010) nationwide study found homeschool families to be very close to median income compared to married-couple families with minor children living at home nationwide. It also appears that minorities have become an increasing proportion of the homeschool community since 2003 (U.S. Department of Education, 2014).

Research on the religious preferences and political affiliations of homeschool parents is limited. Both U.S. and Canadian nationwide studies (e.g., Ray, 2010; Van Pelt, 2003) and local studies provide evidence that the homeschool community is diverse on both variables. It is clear that parents who identify as liberal, progressive, conservative, and libertarian are all involved in homeschooling. Multiple studies indicate that home education is common among agnostics, atheists, Christians, Jews, Mormons, New Age adherents, and Roman Catholics. Internet searches quickly reveal plenty of homeschool support groups, organizations, and publications that appeal to each of these philosophical, religious, and political groups.

Research evidence on reasons for homeschooling

Research by the U.S. Department of Education has also become widely cited regarding the reasons that parents choose to homeschool their children,

because their surveys are nationwide and engage many statistical controls. Redford et al. (2017) reported the following:

In 2012, the most commonly selected reason was a concern with other schools' environments, which includes factors such as "safety, drugs, or negative peer pressure" at schools (91 percent). Other commonly reported reasons included, "a desire to provide moral instruction," "a dissatisfaction with academic instruction at other schools," and "a desire to provide religious instruction" (77%, 74%, and 64%, respectively). (p. 11)

Parents were also asked to select the reason their *most* important reason for homeschooling. "Concern about other schools' environments, desire to provide religious instruction, and dissatisfaction with academic standards were cited most frequently as most important" (p. 11).

Montes (2006) also used data from a federal survey and found that, in general, younger and older homeschooled students are educated at home for the same reasons: parents believe they can provide them a better education (47%) and for religious reasons (41%). Montes found, however, that younger homeschooled students are twice as likely as their older counterparts to be educated at home because the parents object to what the institutional school in their area teaches. Younger homeschooled students are three times as likely to be homeschooled as a way to develop character and morality than older homeschoolers.

Some researchers have begun to focus on why African-American parents choose homeschooling. Ray's (2015) quantitative study of black families produced results similar to those already noted. Further, about 40% of the parents gave as a reason that they want to "give the child more instruction on African American/black culture and history" and 20% said another reason they chose homeschooling is that they "desire to avoid racism in public schools."

Along similar lines, Fields-Smith and Kisura (2013) noted "the 'push-pull' factors that motivated black families in the Metro-Atlanta and Metro-DC regions to exit traditional schools in favor of homeschooling their children" (pp. 278–279). The researchers found that these black parents were "able to impart black cultural values to their children while exposing them to a global perspective ..." and the parents reported that "homeschooling also allowed them to 'slow down' their children's exposure to what could be deemed as unsavory elements of school socialization (e.g., racism, violence, drugs, etc.)" (p. 279). There are more studies on minorities' reasons for homeschooling (e.g., Mazama, 2016).

Research evidence on the academic achievement of the homeschooled

The literature search resulted in 14 peer-reviewed quantitative studies for inclusion for the topic of academic achievement. Most of the studies included, as dependent variables, students' scores on standardized academic achievement tests. A summary of the items and their findings is presented in Table 1.

Table 1. Academic achievement of homeschool and institutional school students compared.

Study (Author/Year)	Design	Subjects' Grade Levels or Ages	Background Variables Controlled?	Findings
Aram et al., 2016	Cross-sectional, explanatory	K	Yes	Literacy skills equal or lower for HS
Ray, 2015	Cross-sectional, explanatory	Grades 4–8	Yes	Reading, language, & math scores higher for HS by effect sizes 1.13, 0.65, & 0.60
Martin-Chang et al., 2011	Cross-sectional, explanatory; matched-pair	Ages 5–10	Yes	Letter-word, comprehension, word attack, science, humanities, & calculation scores higher than Public for structured HS (by 0.06 to 0.15 effect sizes) and lower for unstructured HS
Ray, 2010	Cross-sectional, descriptive	Grades K-12	No	Reading, language, math, social studies, & science scores higher for HS by effect sizes 0.79, 0.85, 0.85, 0.81, & 0.77
Barwegen, Falciani, Putnam, Reamer, & Stair, 2004	Cross-sectional, descriptive	High school	Yes, one	No difference in ACT (college admissions test) scores
Duvall, Delquadri, & Ward, 2004	Continuous baseline probe design	Grades 5–6	Yes	Reading & math scores higher for HS
Medlin & Blackmer, 2000	Cross-sectional, explanatory	Grades 4–8	Yes	Reading, math, social studies, & science scores higher for HS
Ray, 2000	Cross-sectional, descriptive	Grades K-12	No	Reading, language, math, social studies, & science scores higher for HS by effect sizes 0.84, 0.90, 0.87, 0.82, & 0.82
Rudner, 1999	Cross-sectional, descriptive	Grades K-12	No	Reading, language, math, social studies, & science scores higher for HS by effect size 0.67
Duvall, Ward, Delquadri, & Greenwood, 1997	Cross-sectional, explanatory, matched-pair	Grades 3–8	Yes	Language & math scores higher for HS
Russell, 1994	Cross-sectional, explanatory; path analysis	Grades K-12	Yes	Reading, language, math, & listening scores higher for HS
Wartes, 1990	Cross-sectional, descriptive	Grades K-12	No	Reading, language, math, & listening scores higher for HS by effect size 0.41
Frost & Morris, 1988	Cross-sectional, explanatory	Grades 3–6	Yes	Vocabulary, reading, language skills, work study skills, & mathematics scores higher for HS by effect sizes 0.05 to 0.64
Wartes (1988)	Cross-sectional, descriptive	Grades K-12	No	Reading, language, math, social studies, & science scores higher for HS, effect size 0.41

The research designs terms are largely from Johnson (2001), types of research obtained by crossing research objective and time dimension.

HS = homeschool.

Public = public school.

Private = private school.

Mixed = some findings more positive for homeschool and some more positive for conventional school.

n.r. = not reported or not readily usable/applicable for this type of summary table.

Six of the 14 peer-reviewed studies were cross-sectional, descriptive, seven were cross-sectional, explanatory in nature, and one was a continuous baseline probe design. In nonexperimental explanatory research, investigators try to develop or test a theory about a phenomenon or try to identify the causal factors (Johnson, 2001). In descriptive nonexperimental research, the researchers primarily describe the phenomenon or document the characteristics of the phenomenon (Johnson, 2001). In 11 of the 14 peer-reviewed studies, there was a definite positive effect on achievement for the home-schooled students. One of the 14 studies showed mixed results; that is, some positive and some negative effects were associated with homeschooling. One study revealed no difference between the homeschool and conventional school students, and one study revealed neutral and negative results for homeschooling compared to conventional schooling. Both state-provided data sets showed higher than average academic achievement test scores for the home educated.

Most of the studies did not explicitly use or present effect sizes. Effect sizes could be gleaned, however, from 8 of the 14 studies and both of the state datasets, ranging from 0.05 (small) to 1.13 (very large).

Some brief summaries of a few of the studies provide illustrations. Rudner (1999), in his classic cross-sectional, descriptive study, analyzed the standardized academic achievement test scores of 20,760 K-12 homeschool students from 11,930 families. He summarized his finding this way: “Within each grade level and each skill area, the median scores for home school students fell between the 70th and 80th percentile of students nationwide and between the 60th and 70th percentile of Catholic/Private school students” (pp. 28–29). Rudner was careful to describe the limitations of his study related to generalization and wrote that his “study simply shows that those parents choosing to make a commitment to home schooling are able to provide a very successful academic environment” (p. 29).

Ray’s (2015) was the first attempt at a quantitative study assessing the academic achievement of black homeschool children. He collected data from around the country and was able to control for two confounding variables, gender of the student and socioeconomic status of the family. The homeschool students were administered standardized tests by non-family members and their scores were analyzed. The black homeschool children outperformed their black public school peers in the areas of reading, language, math, social studies, and science with large effect sizes of 0.84, 0.90, 0.87, 0.82, and 0.82. Further, the black homeschool children scored the same or higher than all races/ethnicities in the general school-age public.

Two studies found some mixed or negative results related to homeschooling and both involved relatively young students. Aram, Meidan, and Deitcher (2016) studied formal school and homeschool Kindergarten students (matched on age and gender) and found “that there were significant

differences between the homeschooling and formal schooling groups in their letter knowledge and name writing, favoring the formal schooling group” (p. 1013). There were, however, no differences between the groups regarding phonological awareness. The authors pointed out that they were studying very young children and outcomes might change as they get older, as the Israeli school system might emphasize things that homeschoolers do not, and that the homeschool families tended to be unschoolers who do not focus on formal instruction.

The second study involved a careful matched-pair design with children of ages 5 to 10 (Martin-Chang, Gould, & Meuse, 2011). The researchers found that children from structured homeschool settings outperformed their conventional school peers, while children from unstructured homeschooling underperformed the institutional school students. The authors also noted the young ages they studied and pondered whether their test performance might change over time, especially in light of research on older homeschool students.

Some observers have also wondered what would be found if achievement test data were available from states where all or most homeschool students are required by law to be tested. Two U.S. state departments of education have made test data relatively easy to access which show that homeschool students’ test scores are consistently well above average (Oregon Department of Education, 1999; Washington State Superintendent of Public Instruction, 1985).

Research evidence on the social development of the home educated

The search for peer-reviewed reports on the social development of home-educated children and adults revealed 15 studies. Thirteen of the 15 showed clearly positive outcomes for the homeschooled compared to those in conventional schools. Two of those studies reported that some of the findings were more positive for homeschool students but some were more positive for institutional school students. Key details of these studies are presented in Table 2.

Most of the studies did not explicitly use or present effect sizes. Effect sizes could be ascertained, however, from five of the 15 studies, ranging from 0.08 (small) to 1.55 (very large).

Only a decade ago, very few large and national databases containing data on homeschool children or youth were available; it appears that this is quickly changing. One example is the study by Thomson and Jang (2016), which utilized data from the National Study of Youth and Religion. They were able to control for several potentially confounding variables, and found “homeschooled adolescents to be less likely to drink alcohol and, if they do, less likely to get drunk than their public and private high school counterparts” (p. 295).

Shyers (1992), in his classic cross-sectional, explanatory, matched-pair study of homeschool and conventional school 8- to 10-year-olds, found

Table 2. Social development of homeschool and institutional school students compared.

Study (Author/Year)	Design	Subjects' grade levels or ages	Background variables controlled?	Findings
Guterman and Neuman (2017)	Cross-sectional, explanatory; matched subjects	Ages 6–12	Yes	Lower depression for HS (0.08 effect), less externalizing problems for HS (0.15 effect); no difference in internalizing problems & attachment security
Thomson and Jang (2016)	Cross-sectional, explanatory	Ages 13–17	Yes	Less underage alcohol drinking by HS
Montes (2015)	Cross-sectional, explanatory	Ages 6–17	Yes	No difference in problem behaviors & social competencies; HS argue less than Conventional; mixed differences on participation in activities
Vaughn et al. (2015)	Cross-sectional, explanatory	Ages 12–17	Yes	Less use/abuse of tobacco, alcohol, & illicit drugs by HS
Green-Hennessey (2014)	Cross-sectional, explanatory	Ages 12–17	Yes	Stronger religious affiliation HS less substance abuse and delinquency than Conventional; weaker religious HS no differences
Drenovsky and Cohen (2012)	Cross-sectional, descriptive	College	No	Self-esteem no difference; lower depression for HS; higher GPA & college experience for HS
McKinley, Asaro, Bergin, D'Auria, and Gagnon (2007)	Cross-sectional, explanatory	Ages 8–12	No	Several variables (e.g., cooperation, assertion, self-control, conflict with others); some positive and some negative HS compared to Private; some positive for HS and some neutral HS compared to Public
Medlin (2006)	Cross-sectional, descriptive	Grades 3–6	No	Cooperation, assertiveness, empathy, & self-control higher for HS vs. Public, effect sizes 0.13 to 1.55
McEntire (2005)		Grades 7–12		Several life challenges variables (e.g., tension, sense of upbeatness, drug use; lying, alcohol use), some more positive for HS and some more positive for Conventional
Francis and Keith (2004)	Cross-sectional, explanatory; matched-pair	Ages 5–18		Social skills higher for HS than Conventional, effect size 0.12; no difference for problem behaviors
Sutton and Galloway (2000)	Cross-sectional, explanatory	College	Yes	More positions of leadership for HS
Tillman (1995)	Cross-sectional, descriptive	Ages 11–14	No	Family acceptance, academic competence, peer, & personal security higher for HS, effect size 0.61
Shyers (1992)	Cross-sectional, explanatory; matched-pair	Ages 8–10	Yes	Fewer problem behaviors (e.g., aggressive/passive) for HS; no difference self-concept
Smedley (1992)	Cross-sectional, explanatory	Grades K-12	No	Social maturity (communication, daily living skills, and the socialization domains) higher for HS, effect size .99
Kelley (1991)	Cross-sectional, descriptive	Grades 2–10	No	Self-concept higher for HS

The research designs terms are largely from Johnson (2001), types of research obtained by crossing research objective and time dimension.

HS = homeschool.

Conventional = public or private school.

Public = public school.

Private = private school.

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very few differences on his dependent variables. There were no differences between the two groups on student self-concept or passivity. Upon direct observation of the children's behaviors in play groups by research assistants blinded to the schooling identity of the children, however, they found that homeschool "students received significantly lower problem behavior scores than did their agemates from [a] traditional program" (p. 5).

Research evidence on the relative success of the homeschooled into college and adulthood

The search for peer-reviewed articles on the relative success of the home-educated who had moved on to adulthood, whether in college or life in general, revealed 16 studies. Eleven of the 16 showed positive outcomes for the homeschooled compared to those in conventional schools. One study found positive outcomes for conventional school students compared to homeschool students. Finally, four of the studies found no significant difference between those from homeschool backgrounds and the others from institutional school backgrounds. Most of the studies did not explicitly use or present effect sizes. In the one study in which an effect size could be ascertained, it was 0.62. Key features of these studies are displayed in [Table 3](#).

It is clear that since the modern homeschool movement is now into its fourth decade, significantly more adults in the U.S. population have been home educated than was the case only a decade ago. Thus, more data are available and more studies on them have been published. Cogan's (2010) was one of the first tightly designed comparative studies. The dependent variables were first-year GPA, fourth-year GPA, retention, and graduation rate and he was able to control for several demographic variables. Multiple regression analysis revealed that the college students who were homeschooled earn higher first-year and fourth-year GPAs when controlling for demographic, pre-college, engagement, and first-term academic factors. Further, there were no differences between homeschooled student's fall-to-fall retention and four-year graduation rates when compared to conventionally educated students.

Cheng (2014), in one of the most methodologically rigorous studies to date comparing college students from homeschool and other backgrounds, investigated their levels of political tolerance. He found that "those with more exposure to homeschooling relative to public schooling tend to be more politically tolerant" (p. 64) and students who attended private schools were at least as tolerant as students who attended public schools. Cheng concluded:

Both of the results conflict with the belief that a common system of public schools is essential not only for all students but particularly for religiously conservative students to learn political tolerance. Instead of decreasing political tolerance among students who are more conservative in their religious beliefs,

Table 3. Relative success in adulthood of homeschool and institutional school students.

Study (Author/Year)	Design	Subjects' grade levels or ages	Background variables controlled?	Findings
Almasoud and Fowler (2016)	Cross-sectional, explanatory; matched sample	College, ages 17–28	Yes	College final GPA higher for HS, effect size 0.62
Yu et al. (2016)	Cross-sectional, explanatory, matched sample	College	Yes	No difference first-year GPA & retention
Wilkens, Wade, Sonnert, and Sadler (2015)	Cross-sectional, explanatory	College	Yes	Calculus course grade higher for HS
Cheng (2014)	Cross-sectional, explanatory	College	Yes	HS more politically tolerant than Public; HS no different from Private
Snyder (2013)	Cross-sectional, descriptive	College	No	SAT & ACT scores & GPA higher for HS compared to Public & Catholic school
Drenovsky and Cohen (2012)	Cross-sectional, descriptive	College	No	Less depression, more positive college experience, & higher GPA for HS; no difference in self-esteem
Cogan (2010)	Cross-sectional, explanatory	College	Yes	Higher first- and fourth-year GPAs for HS; no difference in fall-to-fall retention & four-year graduation rates
Jones (2010)	Cross-sectional, descriptive	College	No	No differences in college entrance exam scores, GPA, & activities involvement
White, Moore, and Squires (2009)	Cross-sectional, descriptive	College	No	HS more agreeable, conscientious & open than Conventional; no difference in extraversion & neuroticism
Uecker (2008)	Cross-sectional, explanatory	Ages 13–17	Yes	Involvement in religious community & Private religiosity higher for HS
Qaqish (2007)	Cross-sectional, explanatory	College-bound	Yes	ACT math scores higher for Conventional
White et al. (2007)	Cross-sectional, explanatory	College	Yes	In college adjustment measures, HS less anxious than Conventional; no differences other 8 measures
Jones and Gloeckner (2004)	Cross-sectional, explanatory, match-sample	College	Yes	No differences in ACT scores, first-year GPA, retention, & first-year credit earned
Ray (2004)	Cross-sectional, descriptive	Ages 16–69	No	Various variables (e.g., civic involvement, life satisfaction) more positive for HS
Sutton and Galloway (2000)	Cross-sectional, explanatory	College	Yes	More positions of leadership for HS; no difference in GPA
Oliveira, Watson, and Sutton (1994)	Cross-sectional, descriptive	College	No	No differences in critical thinking skills

The research designs terms are largely from Johnson (2001), types of research obtained by crossing research objective and time dimension.

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homeschooling is associated with greater political tolerance, and private schooling is not associated with any less tolerance. (p. 64)

While Cogan (2010) found the home educated to be outperforming others, Yu, Sackett, and Kuncel (2016) used a cross-sectional, explanatory, and matched-sample design to explore the first-year GPA and retention rates of college students. They found no difference between the homeschooled and others.

Qaqish (2007), on the other hand, examined the ACT math scores of college-bound students and found, while controlling for background variables, that the conventionally schooled performed slightly better than the home educated. On average, conventionally schooled students performed better than the home educated by about two out of sixty items on the ACT mathematics test. Qaqish conjectured that the result might be due to different teaching/learning media used in teaching each of the two groups, different teacher/student interaction, or to the number of years homeschooled before taking the ACT mathematics test.

Discussion: thoughts on the future of research on homeschooling and the choice of home education

If this systematic summary of peer-reviewed empirical work on homeschooling had been conducted just one decade ago, about half of the studies in this review would have been missing. With the expansion of the homeschool population has come notably more research on the children and families engaged in it and on adults who were home educated, more support systems to encourage the practice of homeschooling, more media attention, more attention from policymakers, more attention from serious scholarly critics of this educational choice, and the general sense that it is much easier for U.S. parents to make the choice to homeschool than it was only ten years ago. In some ways, homeschooling is a very viable choice for mainstream Americans and a growing variety of Americans who are not in the mainstream.

It is easy to see, even in scholarly literature on the learner outcome effects of homeschooling, a strong current of polemic and contention about what the empirical research does or does not tell academics, policymakers, parents, and the public about homeschooling. Many relatively positive things are associated with homeschooling as compared to institutional public and private schooling. A short half-decade ago, Murphy (2012) presented an insightful survey of scholarship on homeschooling and noted that “we know more than some analysts suggest we do” and “we know a lot less than advocates of homeschooling would have us believe” (p. 140). Since his review of the body of research, several additional empirical studies have emerged. As the present review shows, we now know even more than both the cautious critics of homeschool research and advocates of home education knew back when

Murphy published. The evidence from the studies presented in a new way in this review shed notable light on the generally positive relationship between homeschooling and the three learner outcomes of academic achievement, social development, and relative success in adulthood.

Future researchers should consider a few key questions. Using matched-pair or other carefully controlled nonexperimental designs, how do the academic achievement and useful life skills of adults who were completely home educated compare to that of those who were fully public schooled? What are the differences in attitudes and behaviors regarding learning during adulthood between those completely homeschooled and those completely institutionally public schooled? Is there a difference in the rates of public welfare dependency between adults who were home educated and others? Finally, is there a difference in a sense of personal agency or self-efficacy between adults who were homeschooled and others? While conducting these studies, researchers should always be mindful to gather data on the authenticity and nature of the treatment, such as the number of years homeschooled, institutionally public schooled, and institutionally private schooled and the type of homeschooling and institutional schooling experienced by the student.

It appears that homeschooling is continuing to grow and will do so into the foreseeable future. The reasons why parents and teens home-school are fundamental and have been durable over the past 30 years. There is some evidence that those who were home educated choose to homeschool their own children at a higher rate than does the general public. With these factors in mind and the positive outcomes that empirical research shows are related to homeschooling, the movement and school choice is likely to continue to expand and the research base on it will continue to flourish.

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