What Determines the Number of Children a Woman Has?

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Background

As more and more women begin to prioritize their careers and financial stability over raising a family, the number of kids a woman has, and family structures have changed. The Pew Research Center in 2015 found that mothers between the age 40 - 44 who only had one child doubled from 11 percent in 1976 to 22 percent in 2015. They point to increasing education attainment and labor force participation as some reasons why, while noting racial disparities in children bearing and family structures. Black children and children with less educated parents seem to be less likely to be living in two-parent households (Pew Research Center 2015). Another New York Times article by Claire Miller asked many women why they were having less kids with the many responses being issues of money and time. Static wages, working more, and prioritizing education over starting families have all contributed to the decline in the number of children. The Total Fertility Rate in US has dropped to 1.8, below the replacement level of 2. This decline in fertility rate combined with transformations in the American family structure could have profound effects on the working force, labor market, and raises concerns about the growing elderly population and a declining working population (Miller 2018). With this in mind, I am using the American Census Survey to look at how income, education levels, time spent working, race and marital status might affect the number of children a person has and the type of household they live in.

Data and Methods

The data were collected through the 2017 American Census Survey which is an annual survey of people living in the United States that is used to determine how federal and state funds are distributed across the nation (American Census Survey 2017). In this survey, it asked a wide array of questions from demographics to job information to living costs. Over 3 million households were surveyed in this census but for our purposes, Professor Bailey randomly sampled 3000 observations.

Due to the nature of my research, I limited my population of interest to adult women (18+) and only selected variables of interest: number of own children, age, race, education, marriage status, income, household type. To clarify some variables: own children is defined by the US census as "sons and daughters of householder, including stepchildren and adopted children, of the householder" (United States Census Bureau 2019). Household Type has been split up into traditional family household and nontraditional nonfamily household based on the definitions given by the American Census Survey (American Census Survey, 2017). I had also dropped all observations that had NA's to ensure it would not mess up any calculations later on. As a result, from the sample of 3000, we ended up with a new sample of 659 females.

Table 1. Description of participants. Summaries are counts (%) or mean (SD; range) for each variable. Data are shown for all participants unless where indicated by a star (*) for skewed variables, which are instead summarized by median (IQR; range).

	All participants (n = 659)
Age	44.0 (14.2; 18.0 – 93.0)
Income* ($1000)	43.4 (46.2; .2 – 493)
Work Hours	39.5 (12.3; 3 – 80.0)
Race	
White	502 (76.2)
Black or African American	61 (9.3)
Asian	46 (7.0)
Other	50 (7.6)
Education	
Less than a HS diploma	31 (4.7)
HS diploma or GED	149 (22.6)
Some college	145 (22.0)
College degree	236 (35.8)
Master's degree / Prof / PhD	98 (14.9)
Marital Status	
Household Type	
Traditional	397 (60.2)
Nontraditional	262 (39.8)
Number of Own Children	
0	411 (62.4)
1	117 (17.8)
2	90 (13.7)
3+	41 (6.3)

Descriptive summary statistics were calculated for our sample. For instance, the mean age of our sample was 44 and over 60 percent had zero children (see Table 1 for more summary).

I created three models and ran various hypothesis tests on each, all at the $\alpha = 0.05$ significance level. I first used multiple linear regression to assess how the number of own children varied by the characteristics summarized in Table 1. I conducted an overall F-Test to determine if the model was significant. Individual t-tests were conducted to determine if any predictor has a significant main effect on number of own children, after adjusted for the

other predictors. For categorical variables with more than two levels, such as marital status, nested F-tests were conducted to test if the predictor was significantly associated with number of own children, after adjusted for the other predictors. If it was significant, I conducted post hoc comparisons between the groups in those variables using Tukey's method of pairwise comparisons.

I then dichotomized the outcome of this model to use logistic regression. If a person had 1 or more own children, then they were classified as "1" while those with none were classified as "0". I then conducted an overall Likelihood Ratio Test followed by Wald z-tests. Nested Likelihood Ratio Tests were done on categorical variables with more than three levels and post hoc comparisons using Tukey's method were conducted if they were significant.

For my secondary interest, I also used logistic regression to assess how the household type differed by demographics (see Table 1). Similar to the previous models, I conducted an overall Likelihood Ratio Test then Wald z-tests. Nested Likelihood Ratio Tests were done on categorical variables with more than three levels. Finally, I conducted post hoc comparisons between groups in significant categorical variables using Tukey's method.

Results

Table 2. Multiple Linear Regression Output. Individual t-test results are shown for each predictor. Rounded to three decimal places.

Predictors	Estimates	Std Err	t -value	P-Value
Age	-0.031	0.003	-10.234	<.001
Income	<.001	<.001	1.467	.143
Work Hours	-0.001	0.003	-2.952	.003
Race				
1. Black	0.068	0.127	0.534	.594
2. Asian	-0.152	0.144	-1.057	.291
3. Other	0.138	0.134	0.989	.323
Education				
1. High school / GED	-0.2102	0.185	-1.139	.255
2. Some college	-0.2376	0.185	-1.287	.199
3. Associates / BA	-0.0440	0.181	-0.243	.808
4. Prof / PhD	-0.019	0.197	-0.098	.922
Marital Status				
1. Widowed/Separated/Divorced	-0.282	0.171	-1.655	.099
2. Not Married	-0.860	0.160	-5.390	<.001
Household Type				
1. Nontraditional	0.073	0.150	0.484	.629

The overall F-Test determined the model to be a better fit than the null model ($F_{13,645}$ = 11.56, $P < 0.001$). A t-test on age showed that it had a significant effect on number of own children after adjusted for the other predictors in the model (t_{645} = -10.234, $P < .001$). On average, the model predicts for someone who is 20, they would have about 0.93 kids more than someone who was 50 years old, after adjusted for the other predictors. Another t-test showed that work hours had a significant effect on number of own children after adjusted for the other predictors in the model. (t_{645} = -2.952, $P < .001$). A t-test also showed that being not married also had a significant effect on the number of children (t_{645} = -5.39, $P <$ .001). Nested F-tests showed that marital status had a significant effect ($F_{2,645}$ = 18.821, $P <$

.001). Pairwise comparisons showed that on average, those Married had about 0.860 more kids than those not married (t_{645} = 5.390, $P < .001$) while those who were widowed / separated / divorced had about 0.578 more kids than those not married (t_{645} = 4.484, $P < .001$).

Table 3. Logistic Regression Output - Child. Wald's z-test results are shown for each predictor. Rounded to three decimal places.

Predictors	Estimates	Std Err	z-value	P-Value
Age	-0.102	0.001	-10.266	<.001
Income	<.001	<.001	1.478	.139
Work Hours	-0.022	0.009	-2.469	.014
Race				
1. Black	0.084	0.336	0.250	.803
2. Asian	0.175	0.362	0.483	.629
3. Other	0.326	0.338	0.965	.335
Education				
1. High school / GED	-0.354	0.488	-0.727	.467
2. Some college	-0.342	0.487	-0.702	.483
3. Associates / BA	-0.018	0.473	-0.037	.970
4. Prof / PhD	0.166	0.521	0.319	.750
Marital Status				
1. Widowed/Separated/Divorced	-0.839	0.433	-1.937	.053
2. Not Married	-2.672	0.424	-6.307	<.001
Household Type				
1. Nontraditional	0.412	0.368	1.118	.263

The overall Likelihood Ratio Test determined the model to be a better fit than the null model when predicting owning a child (χ^2_{13} = 178.94, $P < 0.001$). A Wald's z-test on age showed there to be a significant association between age and the odds of having their own children after adjusted for the other predictors in the model (z = -10.266, $P < .001$). On average, the model predicts that the odds of having their own children drop about 9.7% for

each additional increase in age, after adjusting for the other predictors. Another Wald's z-test shows that work hours is significantly associated with the odds of having a child (z = -2.469, P = .014). A nested Likelihood Ratio Tests showed a significant association between marital status and the odds of having their own children (χ^2_2 = 52.803, P < .001). Pairwise comparisons showed that on average, the odds of those married to have their own children were 14.47 times as large as the odds of those not married, after adjusting for the other predictors. (z = 6.307, P < .001) while the odds of those widowed /separated /divorced were 6.26 times as large as the odds of those not married (z = 4.916, P < .001).

Table 4. Logistic Regression Output - Household Wald z-test results are shown for each predictor. Rounded to three decimal places.

Predictors	Estimates	Std Err	z-values	P-Value
Age	0.057	0.0178	3.216	0.001
Income	<0.001	<0.001	1.034	0.301
Work Hours	0.009	0.016	0.531	0.595
Race				
1. Black	-0.312	0.520	-0.599	0.549
2. Asian	-0.073	0.725	-0.101	0.920
3. Other	-0.807	0.547	-1.476	0.140
Education				
1. High school / GED	-0.672	0.834	-0.805	0.421
2. Some college	-0.427	0.831	-0.513	0.608
3. Associates / BA	-0.406	0.830	-0.490	0.624
4. Prof / PhD	-1.025	0.949	-1.081	0.280
Marital Status				
1. Widowed/Separated/Divorced	6.984	0.613	11.401	<.001
2. Not Married	6.875	0.656	10.483	<.001
Number of Own Children	0.006	0.188	0.032	0.974

The overall Likelihood Ratio Test determined the model to be a better fit than the null model when predicting household type (χ^2_{13} = 619.93, P < .001). A Wald's z-test on age

showed there to be a significant association between age and the odds of being in a traditional household, after adjusting for the other predictors in the model (z = -3.216, P = .001). On average, the model predicts that the odds of being in a traditional household increases by about 5.9% for each additional increase in age, after adjusted for the other predictors. A nested Likelihood Ratio Tests showed a significant association between marital status and the odds of being in a traditional household (χ^2_2 = 560.52, P < .001). Pairwise comparisons show that the odds of those married to be in a traditional household were about 0.001 times larger than the odds of those not married. (z = -11.401, P<.001).

Conclusion

This study looked at examining the claims made by the Pew Research Center about what affects a woman's choice to have children, and in doing so, I came to similar conclusions. My results showed that factors like how much a woman worked and the marital status played significant roles in the number of children they have and whether or not they have children. Those who worked longer and those who were not married tend to have less children or no children at all. At the same time, my models suggested some predictors like income or race might not be significantly associated with a woman's choice to have a child when other variables are in play. However, my model must be looked at very cautiously as not all conditions were met, and I did not account for interactions that certainly are certainly there, such as a woman's age affecting when they decide to get married (Rabin 2018).

For my second outcome of interest, my logistic model predicting household type similarly to my first two models showed age and marriage to be significant predictors, after adjusting for the other predictors. The model shows no differences among races or

education when age and marital status are accounted for. Similar to my previous models, I did not account for any interactions between the predictors which could have provided me a clearer picture as to what is going.

The results of my research compel me to further the interactions between different predictors to get a better sense of what explains the number of children a woman has or the household type they live in. Further areas of research could include looking at the wage gap and measures of inequality in America that disproportionately affects women to see how they affect women's choices. But one thing seems to play a big role, and that is what a woman chooses to do with her time. As woman begin to work more and more and perhaps hold off on marriage, it could lead to drastic changes in America's population and family structures that affect all of us.

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