The Interplay of Race/Ethnicity and Parental Education in College Completion: A Cohort Analysis

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Abstract

One or two sentences providing a **basic introduction** to the field, comprehensible to a scientist in any discipline. Two to three sentences of **more detailed background**, comprehensible to scientists in related disciplines. One sentence clearly stating the **general problem** being addressed by this particular study. One sentence summarizing the main result (with the words "**here we show**" or their equivalent). Two or three sentences explaining what the **main result** reveals in direct comparison to what was thought to be the case previously, or how the main result adds to previous knowledge. One or two sentences to put the results into a more **general context**. Two or three sentences to provide a **broader perspective**, readily comprehensible to a scientist in any discipline.

Keywords: keywords

Word count: X

The Interplay of Race/Ethnicity and Parental Education in College Completion: A Cohort Analysis

The United States features a diverse system of education. As diverse as the processes between states and districts is the students who reside in each, with further divisions manifesting themselves in differing educational outcomes.

Among U.S. adults born from 1980 to 1984, how does the intersection of race/ethnicity and parental education affect completion of a bachelor's degree or higher by 2017 (age's 33-37)? This question is of particular interest as educational inequality is rampant in the united states

Literature Review (1.5-3 pg)

• What have others written about these subjects? • What theoretical approach are you interacting with? • Use the literature to make a case for why your project is necessary. State your hypothesis. This does not need to be in a separate section, put it where it fits in your paper. Be sure to describe your expectations and explain your logic. (.5-1 pg)

Methods (1.5-2.5 pg)

As previously described, the sample used was the National Longitudinal Survey of Youth 1997 (NLSY97) conducted by the US Bureau of Labor Statistics (BLS). This is a nationally representative sample carried out every year pre-2011 and every two years thereafter, with selection finalized in 1997 and round 0 of questions carried out in 1998. This database was chosen due to it's large sample size (~8,000 respondents), robust and comprehensive question selection, representative nature, and ease of access. The sampling strategy, as described by the BLS, is as follows:

> The NLSY97 cohort was selected in two phases... In the first phase, a list of housing units for the cross-sectional sample and the over-sample was derived

from two independently selected, stratified multistage area probability samples. This ensured an accurate representation of different sections of the population defined by race, income, region, and other factors. In the second phase, sub-samples of the eligible persons identified in the first phase were selected for interview.

Additional information about the NLSY97 is available on the NLS website here.

Within the NLSY97, the data was subset to specify participants in round 18 who responded with an answer to the following question: [What is] the highest degree received as of the survey date? This was on a scale of of 0 to 7, with zero representing no high school completion and 7 representing a doctorates degree. Important to note is the difference in scales between parental and respondent education levels (see appendix A for the complete codebook).

A unique aspect of the data which made analysis more complex was the number of answers missing from the residential dad educational variable (round 1). Residential dad was chosen, as this study is attempting to determine how parents living in the same household affect their children's future education. To determine whether the pattern was random, Jamshidian and Jalal's (2010) Non-Parametric MCAR Test. Following this, data was imputed using the mice package, which utilizes Gibbs sampling. The imputation method chosen was predictive mean matching (PMM), as PMM provides plausible data that is more robust than other methods (Buuren, 2018).

Following

- Identify population, describe sampling strategy and why you chose that strategy. • What are the indicators of your variables? • How did you actually carry out the research? (study design and process) • Describe your data analysis – statistical test if quant or coding process if qual • Why is this context and this method the best choice for your research question?

Results (1-2 pg)

The

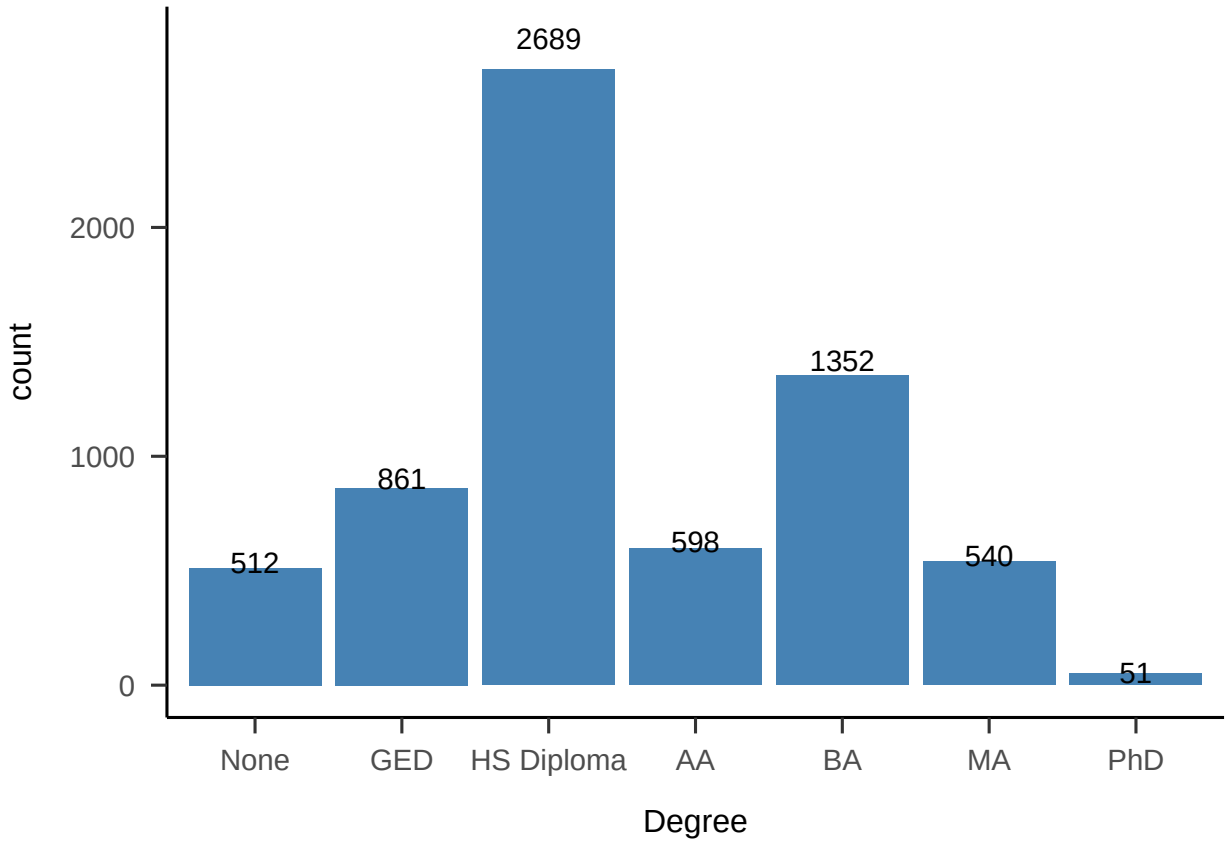


Figure 1. Fig

• What were the results? • Provide descriptive statistics for key variables as well as results of data analysis • Data summaries are ok – i.e. tables & charts

```
## # A tibble: 4 x 4
##   KEY_RACE_ETHNICITY_1997     n mom_missing_pct dad_missing_pct
##                     <int> <int>           <dbl>           <dbl>
## 1                       1  1808            14.7            59.9
## 2                       2  1391            12.4            40.2
## 3                       3    62            27.4            43.5
```

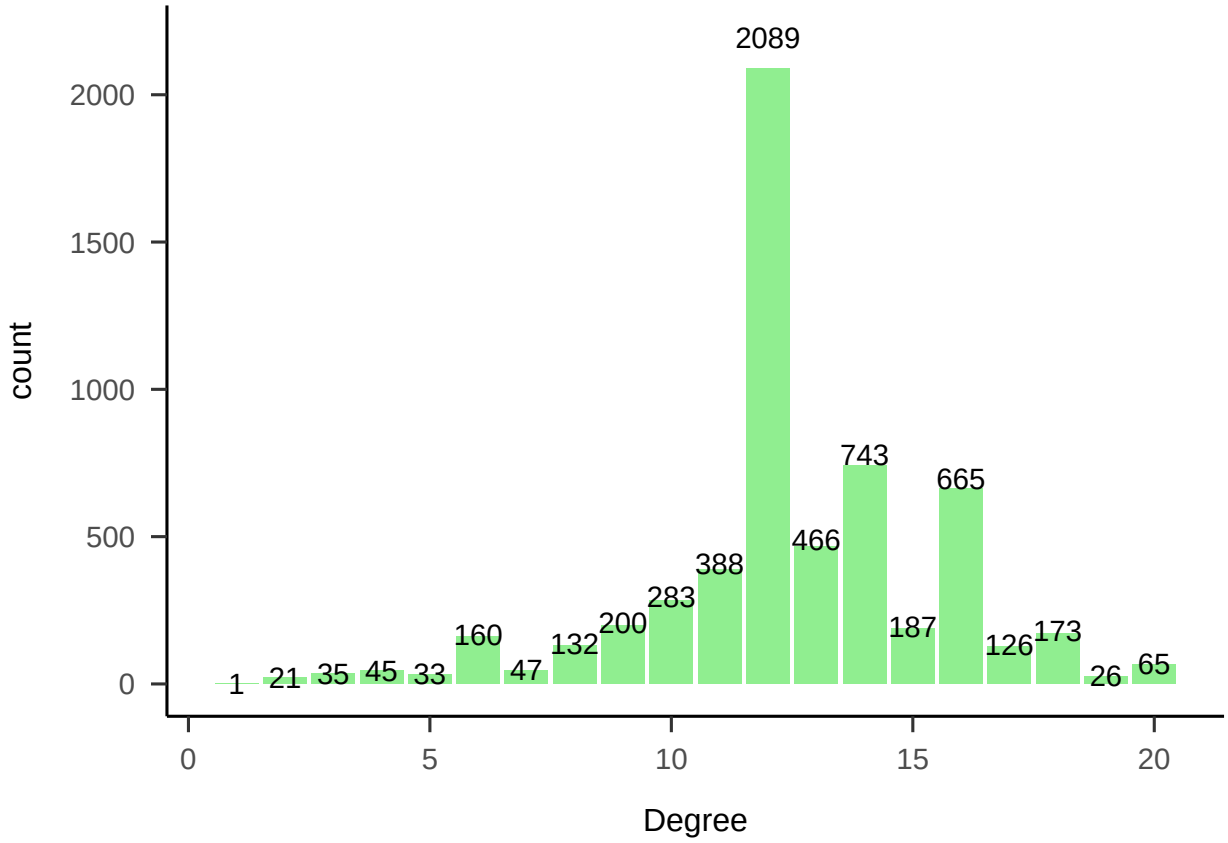


Figure 2. a

4 4 3342 7.90 22.6

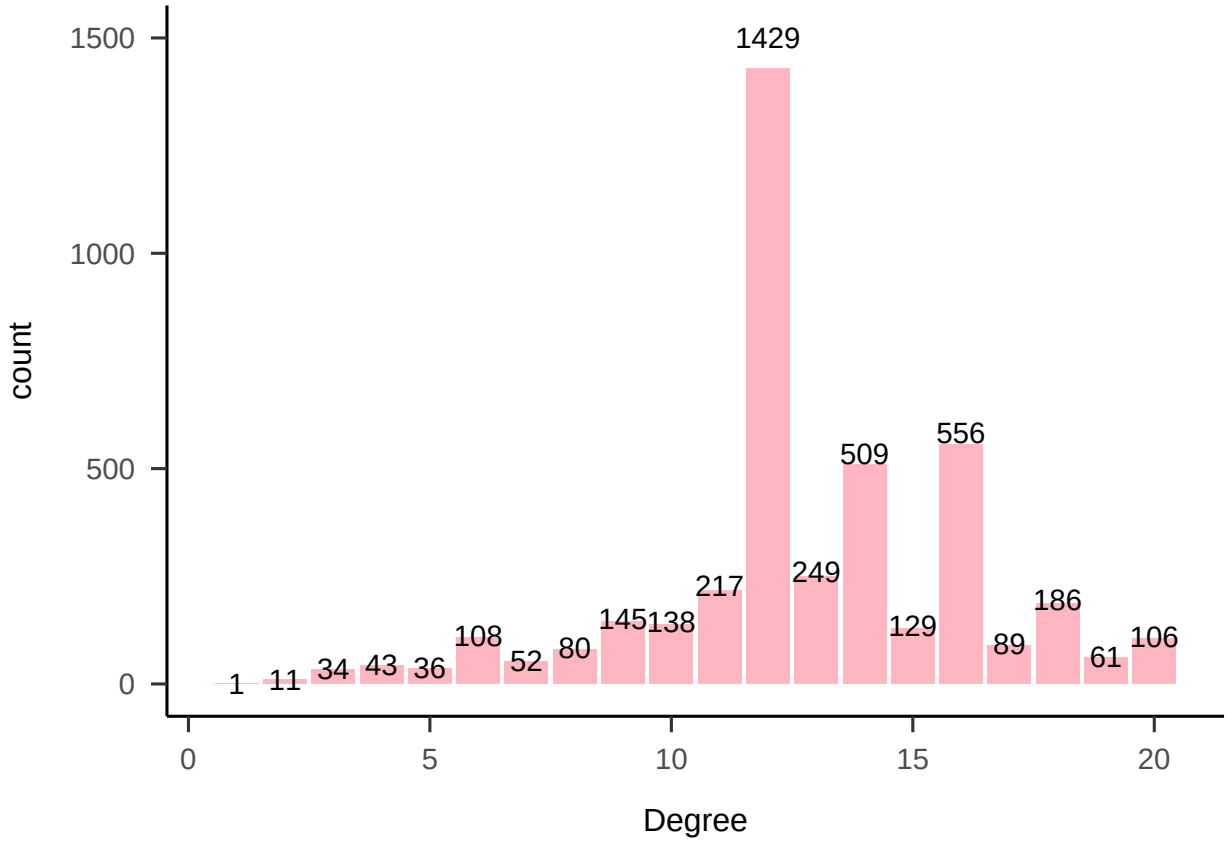
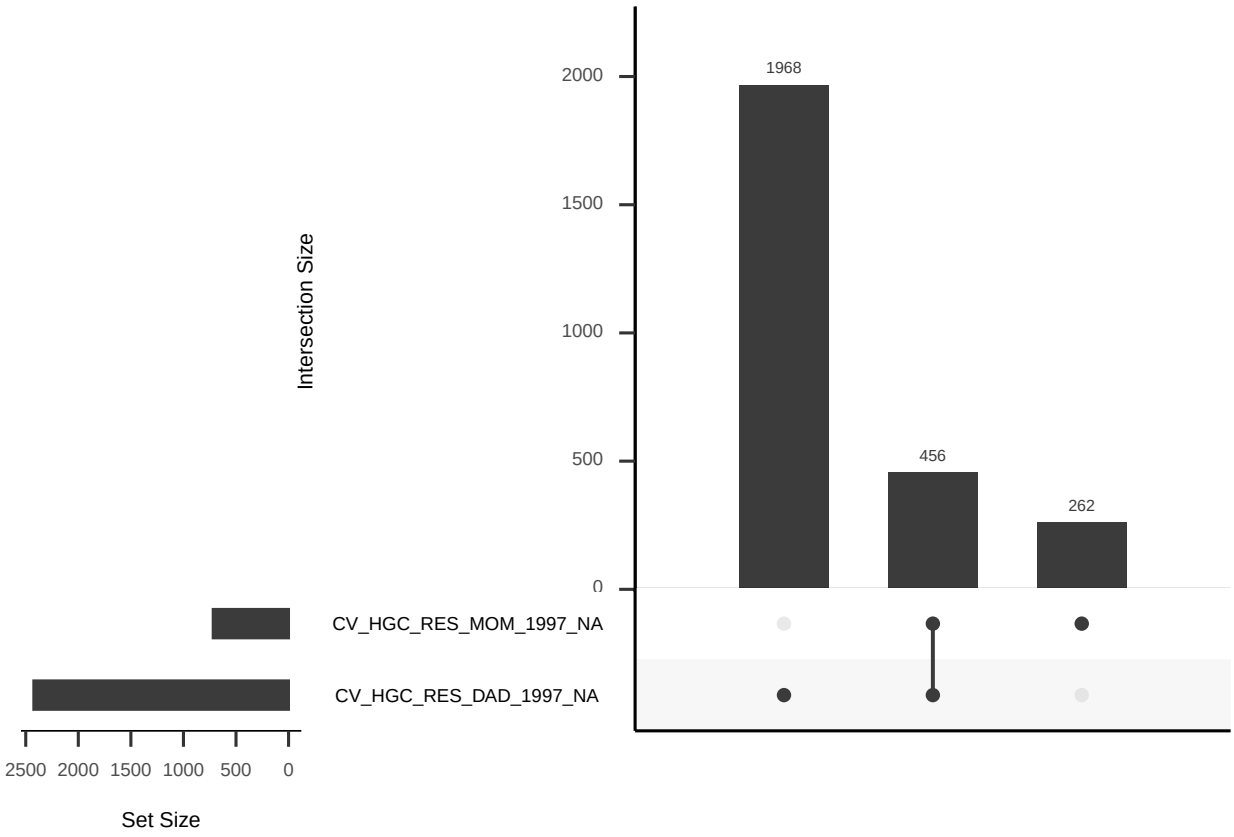

1500
1000
500
0
count
1
11
34
43
36
108
52
80
145
138
217
1429
249
509
129
556
89
186
61
106
0
5
10
15
20
Degree

Figure 3. row


2000
1500
1000
500
0
Intersection Size
1968
456
262
CV_HGC_RES_MOM_1997_NA
CV_HGC_RES_DAD_1997_NA
2500
2000
1500
1000
500
0
Set Size

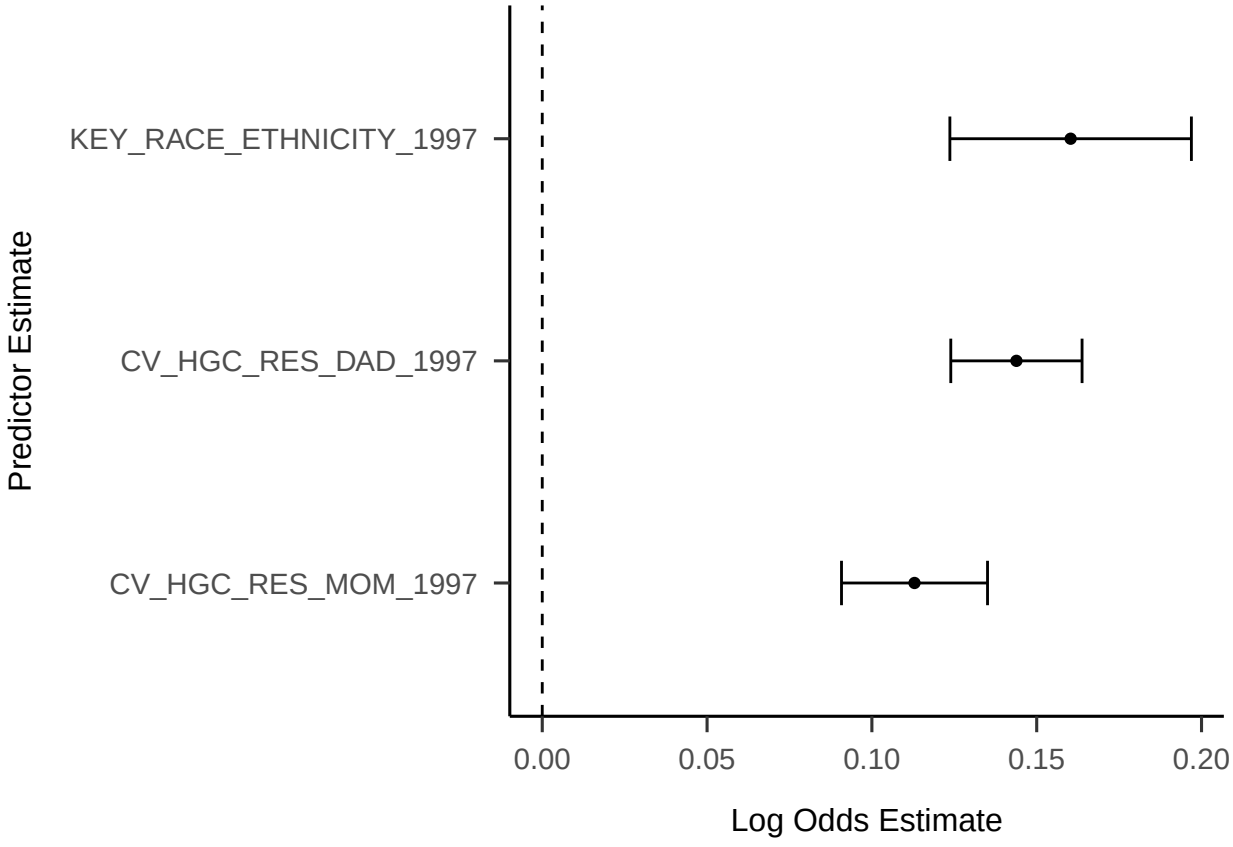
```
## # A tibble: 1 x 4
##   statistic    df p.value missing.patterns
##       <dbl> <dbl>   <dbl>            <int>
## 1      364.     5       0                4

## Call:
## TestMCARNormality(data = mcar_data)
##
## Number of Patterns:  4
##
## Total number of cases used in the analysis:  6603
##
##  Pattern(s) used:
##           CV_HIGHEST_DEGREE_EVER_EDT_2017   CV_HGC_RES_MOM_1997
## group.1                                 1                     1
## group.2                                 1                     1
## group.3                                 1                    NA
## group.4                                 1                    NA
##           CV_HGC_RES_DAD_1997   Number of cases
## group.1                     1              3917
## group.2                    NA              1968
## group.3                    NA               456
## group.4                     1               262
##
##
##     Test of normality and Homoscedasticity:
##   ------------------------------------------
##
```

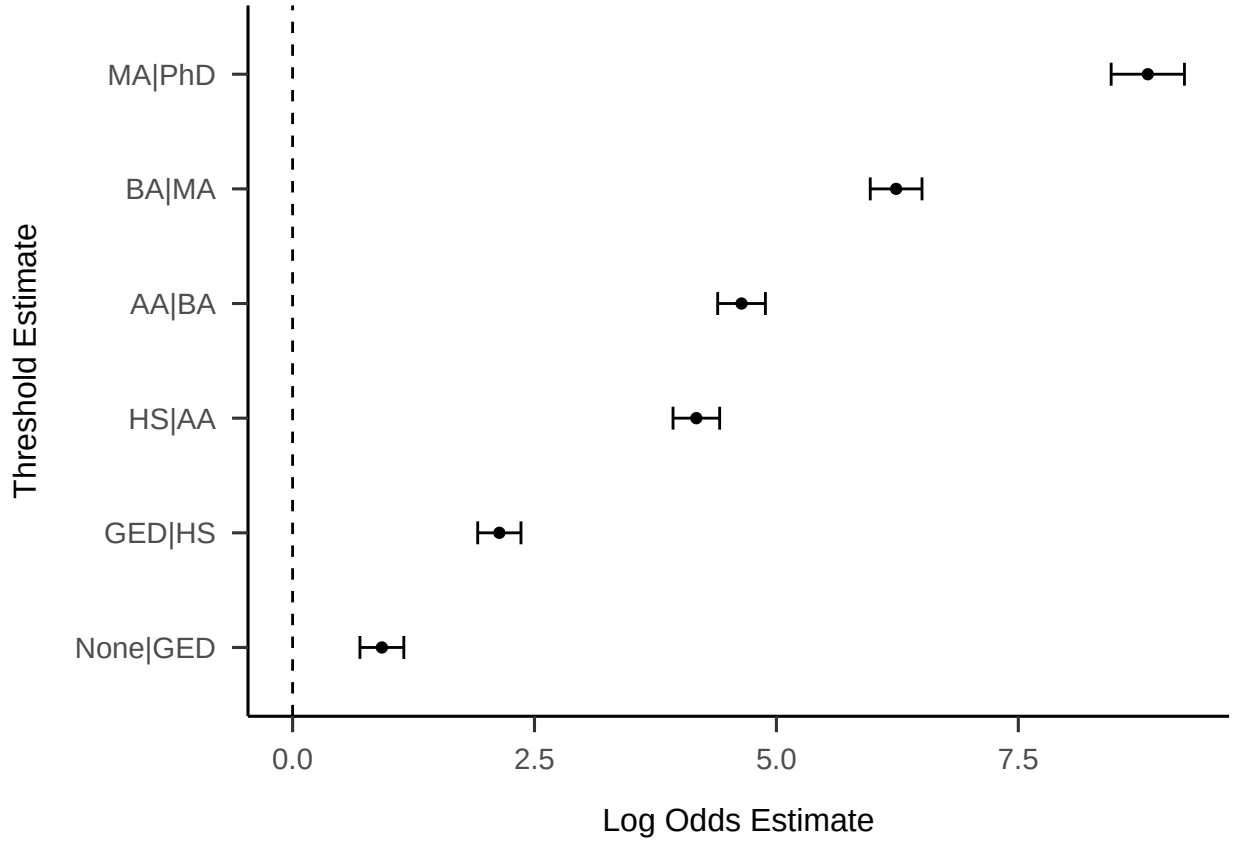
```
## Hawkins Test:
##
##     P-value for the Hawkins test of normality and homoscedasticity:  3.397327e-131
##
##     Either the test of multivariate normality or homoscedasticity (or both) is reject
##     Provided that normality can be assumed, the hypothesis of MCAR is
##     rejected at 0.05 significance level.
##
## Non-Parametric Test:
##
##     P-value for the non-parametric test of homoscedasticity:  1.571686e-19
##
##     Hypothesis of MCAR is rejected at  0.05 significance level.
##     The multivariate normality test is inconclusive.

##
##  iter imp variable
##   1   1  CV_HGC_RES_MOM_1997  CV_HGC_RES_DAD_1997
##   1   2  CV_HGC_RES_MOM_1997  CV_HGC_RES_DAD_1997
##   1   3  CV_HGC_RES_MOM_1997  CV_HGC_RES_DAD_1997
##   1   4  CV_HGC_RES_MOM_1997  CV_HGC_RES_DAD_1997
##   1   5  CV_HGC_RES_MOM_1997  CV_HGC_RES_DAD_1997
##   2   1  CV_HGC_RES_MOM_1997  CV_HGC_RES_DAD_1997
##   2   2  CV_HGC_RES_MOM_1997  CV_HGC_RES_DAD_1997
##   2   3  CV_HGC_RES_MOM_1997  CV_HGC_RES_DAD_1997
##   2   4  CV_HGC_RES_MOM_1997  CV_HGC_RES_DAD_1997
##   2   5  CV_HGC_RES_MOM_1997  CV_HGC_RES_DAD_1997
##   3   1  CV_HGC_RES_MOM_1997  CV_HGC_RES_DAD_1997
```

```
##   3   2  CV_HGC_RES_MOM_1997  CV_HGC_RES_DAD_1997
##   3   3  CV_HGC_RES_MOM_1997  CV_HGC_RES_DAD_1997
##   3   4  CV_HGC_RES_MOM_1997  CV_HGC_RES_DAD_1997
##   3   5  CV_HGC_RES_MOM_1997  CV_HGC_RES_DAD_1997
##   4   1  CV_HGC_RES_MOM_1997  CV_HGC_RES_DAD_1997
##   4   2  CV_HGC_RES_MOM_1997  CV_HGC_RES_DAD_1997
##   4   3  CV_HGC_RES_MOM_1997  CV_HGC_RES_DAD_1997
##   4   4  CV_HGC_RES_MOM_1997  CV_HGC_RES_DAD_1997
##   4   5  CV_HGC_RES_MOM_1997  CV_HGC_RES_DAD_1997
##   5   1  CV_HGC_RES_MOM_1997  CV_HGC_RES_DAD_1997
##   5   2  CV_HGC_RES_MOM_1997  CV_HGC_RES_DAD_1997
##   5   3  CV_HGC_RES_MOM_1997  CV_HGC_RES_DAD_1997
##   5   4  CV_HGC_RES_MOM_1997  CV_HGC_RES_DAD_1997
##   5   5  CV_HGC_RES_MOM_1997  CV_HGC_RES_DAD_1997
```

```
##                      term  estimate  std.error statistic        df
## 1     CV_HGC_RES_MOM_1997 0.1129312 0.01120928 10.074796  147.9423
## 2 KEY_RACE_ETHNICITY_1997 0.1602952 0.01864827  8.595714  520.2339
## 3     CV_HGC_RES_DAD_1997 0.1438466 0.01007570 14.276589  146.9429
## 4                 None|GED 0.9226579 0.11554605  7.985196 1258.2747
## 5                   GED|HS 2.1366787 0.11384089 18.768992  860.9647
## 6                    HS|AA 4.1726090 0.12280189 33.978378  696.8323
## 7                    AA|BA 4.6396842 0.12554164 36.957332  676.3646
## 8                    BA|MA 6.2373973 0.13624590 45.780441  727.2976
## 9                   MA|PhD 8.8384867 0.19316239 45.756767 1944.3151
##         p.value
## 1  1.677571e-18
## 2  9.731862e-17
```

```
## 3  1.482680e-29
## 4  3.141361e-15
## 5  3.770730e-66
## 6 5.338332e-150
## 7 1.877171e-164
## 8 2.180449e-216
## 9 6.882897e-311
```






```
##
## Call:
## svyglm(formula = degree_num ~ CV_HGC_RES_MOM_1997 + KEY_RACE_ETHNICITY_1997 +
##     CV_HGC_RES_DAD_1997, design = svy_design)
##
## Survey design:
## svydesign(ids = ~1, weights = ~SAMPLING_WEIGHT_CC_2017, data = completed_data)
##
## Coefficients:
##                          Estimate Std. Error t value Pr(>|t|)
## (Intercept)              0.591379   0.082831   7.140 1.04e-12 ***
## CV_HGC_RES_MOM_1997      0.088172   0.008338  10.574  < 2e-16 ***
## KEY_RACE_ETHNICITY_1997 0.094713   0.013034   7.267 4.11e-13 ***
```

```
## CV_HGC_RES_DAD_1997     0.121326   0.006960  17.432  < 2e-16 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## (Dispersion parameter for gaussian family taken to be 1.623647)
##
## Number of Fisher Scoring iterations: 2
```

	KEY_RACE_ETHNICITY_1997	CV_HGC_RES_MOM_1997	fit	se	lower
1	1.0	1.0	2.356420	0.10055290	2.159304
2	1.8	1.0	2.432191	0.09983960	2.236473
3	2.5	1.0	2.498491	0.10010621	2.302250
4	3.2	1.0	2.564790	0.10119809	2.366409
5	4.0	1.0	2.640561	0.10342204	2.437820
6	1.0	5.8	2.779645	0.06329052	2.655575
7	1.8	5.8	2.855416	0.06132908	2.735191
8	2.5	5.8	2.921715	0.06103899	2.802059
9	3.2	5.8	2.988015	0.06210275	2.866273
10	4.0	5.8	3.063785	0.06488700	2.936586
11	1.0	10.0	3.149967	0.03594049	3.079512
12	1.8	10.0	3.225737	0.03095931	3.165047
13	2.5	10.0	3.292037	0.02907362	3.235043
14	3.2	10.0	3.358336	0.02997604	3.299574
15	4.0	10.0	3.434107	0.03410759	3.367245
16	1.0	15.0	3.590826	0.03548223	3.521269
17	1.8	15.0	3.666597	0.02863611	3.610460
18	2.5	15.0	3.732896	0.02478542	3.684309
19	3.2	15.0	3.799195	0.02398120	3.752184

```
## 20                    4.0              15.0 3.874966 0.02709504 3.821851
## 21                    1.0              20.0 4.031685 0.06857514 3.897255
## 22                    1.8              20.0 4.107456 0.06448151 3.981051
## 23                    2.5              20.0 4.173755 0.06212608 4.051968
## 24                    3.2              20.0 4.240054 0.06105673 4.120364
## 25                    4.0              20.0 4.315825 0.06149183 4.195281
##       upper
## 1  2.553537
## 2  2.627909
## 3  2.694731
## 4  2.763171
## 5  2.843301
## 6  2.903715
## 7  2.975641
## 8  3.041371
## 9  3.109756
## 10 3.190985
## 11 3.220422
## 12 3.286428
## 13 3.349031
## 14 3.417099
## 15 3.500969
## 16 3.660382
## 17 3.722733
## 18 3.781483
## 19 3.846206
## 20 3.928081
```

```
## 21 4.166114
## 22 4.233860
## 23 4.295542
## 24 4.359745
## 25 4.436369
```

Analysis (1.5-2.5 pg)

• What patterns are there in the responses? Discuss how these might shed light on your research question. On your hypothesis? • Is the data strong enough to make a conclusion for your hypothesis? How do you know?

Discussion (1.5-2.5pg)

References

Buuren, S. van. (2018). *Https://stefvanbuuren.name/fimd/sec-pmm.html* (2nd ed.). Chapman; Hall/CRC. Retrieved from https://stefvanbuuren.name/fimd/sec-pmm.html

Jamshidian, M., & Jalal, S. (2010). Tests of homoscedasticity, normality, and missing completely at random for incomplete multivariate data. *Psychometrika*, *75*(4), 649–674. https://doi.org/10.1007/s11336-010-9175-3

R00001.00 [PUBID] Survey Year: 1997 PRIMARY VARIABLE

PUBID, YOUTH CASE IDENTIFICATION CODE

COMMENT: YOUTH CASE IDENTIFICATION CODE

0	0
998	1 TO 999
999	1000 TO 1999
997	2000 TO 2999
996	3000 TO 3999
998	4000 TO 4999
996	5000 TO 5999
994	6000 TO 6999
994	7000 TO 7999
989	8000 TO 8999
23	9000 TO 9999

8984

8984

8984

fusal(-1)

0 n't

Know(-2)

0 TAL

=========>

8984

VALID

SKIP(-4)

0 NON-

INTERVIEW(-

5) 0

n: 1 Max:

2 Mean:

1.49

ad In:

R00001.00[Default]

fault Next

Question:

R05364.00

8984

5364.01

[KEY!BDATE_M]

Survey Year: 1997 PRIMARY VARIABLE KEY!BDATE, RS BIRTHDATE MONTH/YEAR (SYMBOL) MMENT: Birthdate of Youth

8984
816 1: January
693 2: February
760 3: March
659 4: April 689
5: May
720 6: June 762
7: July
782 8: August
839 9: September 765
10: October
763 11: November
736 12: December

Refusal(-1) 0 Don't Know(-2) 0 TOTAL ==========> 8984 VALID SKIP(-4) 0 NON-INTERVIEW(-5) 0

Min: 1 Max: 12 Mean: 6.56

Earliest (NonMissing): JANUARY/1980 Latest (NonMissing): DECEMBER/1984

Lead In: None. Default Next Question: R05364.02

———————————————————————————— R05364.02 [KEY!BDATE_Y] Survey Year: 1997 PRIMARY VARIABLE

```
KEY!BDATE, RS BIRTHDATE MONTH/YEAR (SYMBOL)
```

COMMENT: Birthdate of Youth

Refusal(-1) 0 Don't Know(-2) 0 TOTAL ==========> 8984 VALID SKIP(-4) 0 NON-INTERVIEW(-5) 0

Min: 1980 Max: 1984 Mean: 1982.01

Earliest (NonMissing): JANUARY/1980 Latest (NonMissing): DECEMBER/1984

Lead In: R05364.01[Default] Default Next Question: R05366.00

———————————————————————————— R12358.00 [CV_SAMPLE_TYPE] Survey Year: 1997 PRIMARY VARIABLE

```
SAMPLE TYPE.  CROSS-SECTIONAL OR OVERSAMPLE
```

Sample type: Is the respondent a member of the cross-sectional sample or the oversample?

```
6748       1 Cross-sectional
2236       0 Oversample
```

8984

R12361.01 [SAMPLING_WEIGHT_CC] Survey Year: 1997 PRIMARY VARIABLE ROUND 1 SAMPLING WEIGHT CUMULATIVE CASES METHOD

Sampling Weight: Cumulative Cases Method 0 thru 9999999 (2 implied decimal places)

NOTE: 0 THRU 9999999 (2 IMPLIED DECIMAL PLACES)

0 0 0 30000 TO 59999: 300.00-599.99 1445 60000 TO 99999: 600.00-999.99 1883 100000 TO 149999: 1000.00-1499.99 214 150000 TO 199999: 1500.00-1999.99 514 200000 TO 249999: 2000.00-2499.99 3354 250000 TO 299999: 2500.00-2999.99 1442 300000 TO 349999: 3000.00-3499.99 97 350000 TO 399999: 3500.00-3999.99 22 400000 TO 449999: 4000.00-4499.99 8 450000 TO 499999: 4500.00-4999.99 4 500000 TO 549999: 5000.00-5499.99 0 550000 TO 599999: 5500.00-5999.99 0 600000 TO 649999: 6000.00-6499.99 0 650000 TO 699999: 6500.00-6999.99 0 700000 TO 749999: 7000.00-7499.99 0 750000 TO 799999: 7500.00-7999.99 0 800000 TO 849999: 8000.00-8499.99 1 850000 TO 9999999: 8500.00+

8984

Refusal(-1) 0 Don't Know(-2) 0 TOTAL ==========> 8984 VALID SKIP(-4) 0 NON-INTERVIEW(-5) 0

Min: 76071 Max: 1576182 Mean: 215699.61

Lead In: R12361.00[Default] Default Next Question: R12362.01

———————————————————————————— R13026.00

[CV_HGC_RES_DAD] Survey Year: 1997 PRIMARY VARIABLE

RESIDENTIAL FATHERS HIGHEST GRADE COMPLETED

Highest grade completed by respondent's residential father (includes both biological and non-biological fathers).

0	0	NONE
1	1	1ST GRADE
12	2	2ND GRADE
51	3	3RD GRADE
56	4	4TH GRADE
51	5	5TH GRADE
150	6	6TH GRADE
69	7	7TH GRADE
117	8	8TH GRADE
186	9	9TH GRADE
195	10	10TH GRADE
277	11	11TH GRADE
1917	12	12TH GRADE
345	13	1ST YEAR COLLEGE
720	14	2ND YEAR COLLEGE
164	15	3RD YEAR COLLEGE
780	16	4TH YEAR COLLEGE
119	17	5TH YEAR COLLEGE
255	18	6TH YEAR COLLEGE
86	19	7TH YEAR COLLEGE
153	20	8TH YEAR COLLEGE OR MORE
3	95	UNGRADED

5707

R13027.00 [CV_HGC_RES_MOM] Survey Year: 1997 PRIMARY VARIABLE RESIDENTIAL MOTHERS HIGHEST GRADE COMPLETED

5707

Highest grade completed by respondent's residential mother (includes both biological and non-biological mothers).

0 0 NONE 3 1 1ST GRADE 28 2 2ND GRADE 51 3 3RD GRADE 54 4 4TH GRADE 54 5 5TH GRADE 221 6 6TH GRADE 67 7 7TH GRADE 183 8 8TH GRADE 260 9 9TH GRADE 373 10 10TH GRADE 517 11 11TH GRADE 2870 12 12TH GRADE 639 13 1ST YEAR COLLEGE 996 14 2ND YEAR COLLEGE 251 15 3RD YEAR COLLEGE 902 16 4TH YEAR COLLEGE 163 17 5TH YEAR COLLEGE 246 18 6TH YEAR COLLEGE 38 19 7TH YEAR COLLEGE 89 20 8TH YEAR COLLEGE OR MORE 5 95 UNGRADED

8010

Refusal(-1) 0 Don't Know(-2) 0 Invalid Skip(-3) 316 TOTAL =========> 8326 VALID SKIP(-4) 658 NON-INTERVIEW(-5) 0

Min: 1 Max: 95 Mean: 12.58

Lead In: R13026.00[Default] Default Next Question: R12045.00

———————————————————————————————— R14826.00

[KEY!RACE_ETHNICITY] Survey Year: 1997 PRIMARY VARIABLE

KEY!RACE_ETHNICITY, COMBINED RACE AND ETHNICITY (SYMBOL)

COMMENT: Combined race - ethnicity variable

2335 1 Black

1901 2 Hispanic

83 3 Mixed Race (Non-Hispanic)

4665 4 Non-Black / Non-Hispanic

8984

U18460.00 [CV_HIGHEST_DEGREE_EVER_EDT] Survey Year: 2017 PRIMARY VARIABLE

HIGHEST DEGREE RECEIVED

The highest degree received as of the survey date.

514 0 None 862 1 GED 2692 2 High school diploma (Regular 12 year program) 598 3 Associate/Junior college (AA) 1352 4 Bachelor's degree (BA, BS) 540 5 Master's degree (MA, MS) 51 6 PhD 98 7 Professional degree (DDS, JD, MD)

6707

Refusal(-1) 0 Don't Know(-2) 0 Invalid Skip(-3) 27 TOTAL =========> 6734 VALID SKIP(-4) 0 NON-INTERVIEW(-5) 2250

Min: 0 Max: 7 Mean: 2.56

Lead In: U18459.00[Default] Default Next Question: U18461.00

———————————————————————————— U18554.00 [SAMPLING_WEIGHT_CC] Survey Year: 2017 PRIMARY VARIABLE

ROUND 18 SAMPLING WEIGHT CUMULATIVE CASES METHOD

Sampling Weight: Cumulative Cases Method 0 thru 9999999 (2 implied decimal places)

NOTE: 0 THRU 9999999 (2 IMPLIED DECIMAL PLACES)

2250 0

0 30000 TO 59999: 300.00-599.99

83 60000 TO 99999: 600.00-999.99

```
1882      100000 TO 149999: 1000.00-1499.99
 588      150000 TO 199999: 1500.00-1999.99
 157      200000 TO 249999: 2000.00-2499.99
 272      250000 TO 299999: 2500.00-2999.99
 346      300000 TO 349999: 3000.00-3499.99
2019      350000 TO 399999: 3500.00-3999.99
 938      400000 TO 449999: 4000.00-4499.99
 384      450000 TO 499999: 4500.00-4999.99
  30      500000 TO 549999: 5000.00-5499.99
  20      550000 TO 599999: 5500.00-5999.99
  10      600000 TO 649999: 6000.00-6499.99
   2      650000 TO 699999: 6500.00-6999.99
   1      700000 TO 749999: 7000.00-7499.99
   1      750000 TO 799999: 7500.00-7999.99
   0      800000 TO 849999: 8000.00-8499.99
   1      850000 TO 9999999: 8500.00+
```

```
8984
```

Refusal(-1) 0 Don't Know(-2) 0 TOTAL ==========> 8984 VALID SKIP(-4) 0 NON-INTERVIEW(-5) 0

Min: 0 Max: 2007281 Mean: 215699.61

Lead In: U18553.00[Default] Default Next Question: U18555.00