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FRIENDS OR FAMILY? REVISITING THE EFFECTS OF HIGH SCHOOL POPULARITY ON ADULT EARNINGS

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ABSTRACT

Recent evidence has suggested that popularity during high school is linked with wages during mid-life using the Wisconsin Longitudinal Study. The results were shown to be robust to a large set of individual-level heterogeneity included completed schooling, cognitive ability, and personality measures. This paper revisits this question by first replicating the results using an alternative dataset that is very similar in structure. Like the previous results, the Add Health baseline effects suggest that an additional high school friendship nomination is linked to a 2% increase in earnings around age 30. However, leveraging the unique sibling structure of the Add Health shows that sibling comparisons eliminate any associations between popularity and earnings. The findings suggest that families, rather than friends, may be the cause of the association.

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Introduction

In this paper, I re-examine the evidence of the effects of popularity on labor market returns. A new study by Conti et al. (2012, forthcoming) uses the Wisconsin Longitudinal Study (WLS) to estimate both the predictors of high school friendship nominations as well as the labor market returns to these nominations. The authors show a robust relationship across multiple specifications, suggesting that having one additional high school nomination increases labor market earnings by approximately 2% around age 35. This is the key result that I re-examine.

Other aspects of the Conti et al. (henceforth CGMP) paper center on making a series of statistical adjustments for several issues with the WLS data. While the WLS is a unique and impressive dataset, it has several limitations related to linking high school nominations with earnings. First, the WLS nominations measures are likely incomplete because each student was limited to nominating three classmates as "friends", so that 60% of the individuals in the data have "no friends" who nominated them. Second, the data were collected from a single high school graduating class (1957) from a single state (Wisconsin). This feature of the data poses several issues with external validity. In addition to the state and cohort external validity issues, the sampled individuals were all high school seniors, so the distribution of educational attainments is left-censored. However, even with these limitations, I am able to closely replicate the main findings using an alternative dataset that has none of these limitations.

As CGMP argue, understanding key determinants of labor market earnings is an increasingly important topic in economics. An important shift in the literature has been a focus on "non-cognitive," or social, skills as key, and relatively unexamined, determinants of human capital accumulation and labor market rewards (e.g. Heckman et al. 2006, Mihaly 2009, Fletcher in press). However, the current evidence on many of these skills is underdeveloped. Indeed, most papers are unable to leverage quasi-random variation in the key factors of interest (unlike the use of compulsory schooling laws (Angrist and Krueger 1991) or college openings (Currie and Moretti 2003) in the larger and more mature labor returns literature). In addition, the literature focusing on estimating the returns to social skills is nearly always unable to account for family-level heterogeneity. This may be important because of the likely partial genetic transmission of personality and other noncognitive skills (e.g. Bouchard and Loehlin

2001) as well as the many examples in the economics literature where the use of sibling comparisons has quantitatively or qualitatively changed the baseline findings. For example Almond et al. (2003) show that estimates of the impacts of birth weight are 80% lower when using sibling comparison[2]. Fletcher (in press) shows evidence that a common estimate of the importance of the personality measure of contentiousness on earnings is reduced to zero when sibling comparisons are used.

This paper asks whether the estimated effects of popularity on earnings reported by CGMP are sensitive to controls for family level heterogeneity using a complementary dataset. The baseline estimates are nearly identical across datasets, however, I find that sibling comparisons suggest no detectable effects of high school popularity on adult earnings.

Data and Empirical Strategy

This paper uses the restricted version of the National Longitudinal Study of Adolescent Health (Add Health). Add Health is a school-based, longitudinal study of the health-related behaviors of adolescents and their outcomes in adulthood. Beginning with an in-school questionnaire administered to a nationally representative sample of students in grades 7 through 12 in 1994-95, the study follows up with a series of in-home interviews of students approximately one year, six years, and 13 years later. Other sources of data include questionnaires for parents, siblings, fellow students, and school administrators.

Of the 20,000 individuals surveyed in Wave 1, approximately 15,000 are also followed through age 30 at Wave 4. In order to also link these individuals with their high school social network measures, an additional 5,000 individuals are removed from the data due to missing network data[3]. Thus, the baseline sample is approximately 10,000 individuals. The Wave 1 survey also included an over-sampling of siblings who attended the same schools and were in grades 7-12 of approximately 5,000 respondents in the original 20,000 in-home sample. I am

[2] Similarly, Fletcher (2011) shows that the impacts of breastfeeding on later outcomes often disappear when sibling comparisons are employed.

[3] There are two linked data collection activities in Add Health. There was an original ("Wave 0") in-school survey of 90,000 children that ascertained friendship nominations and basic demographic information. Secondly, there are the four longitudinal "in-home" surveys that track 20,000 children. Approximately 75% of the 20,000 children in the in-home sample were also in the in-school sample.

able to use approximately 2,500 siblings who are followed to Wave 4 and also where each co-sibling has information on their social networks during high school.

Earnings are collected in Wave 4 and come from the following question and are interval coded[4]: "Now think about your personal earnings. How much income did you receive from personal earnings before taxes—that is, wages." Using this coding procedure, the average earnings for this sample of adults (average age nearly 30) is over $37,000. As in standard social science surveys, a host of sociodemographic data has also been collected, including age, race, birth order, gender, and family background characteristics such as maternal education, rural status, and parental marital status at Wave 1 are included. I follow CGMP and control for these demographic characteristics as well as an indicator for whether the individual is an only child. In some specifications, I also control for a measure of ability (the Peabody Picture Vocabulary Test), grade point average at Wave 1, completed years of schooling at Wave 4, and the Big 5 personality measures at Wave 4—adding these controls follow the specifications in CGMP. Table 1 presents summary statistics for the full sample. Appendix Table 1A shows that there are no important differences between the main sample and sibling sub-sample.

Finally, like CGMP, I use as a measure of high school popularity the number of nominations that each individual received from other high school classmates ("in-degree"). While the WLS had a maximum allowable number of nominations of three individuals attending the same school, Add Health's maximum number is ten (and fewer than 1% of students make 10 nominations). Also, WLS is only able to link incoming nominations for individuals where both students were followed (WLS sampled 1/3 of each graduating class), while Add Health has the full set of nominations for all individuals in school on the day of the survey. This limitation with WLS has the implication that 60% of the sample has no nominations received. Table 2 shows that in Add Health, this figure is <10%.

A final difference between this examination and the CGMP paper is that I use both women and men in the analysis and show in an appendix table (Table 3A) that adding an interaction between in-degree and gender shows no statistically or economically significant

[4] The midpoint of each interval is used in the analysis. The intervals include: $0, <$5,000, $5,000-9,999, 10,000-14,999, 15,000-19,999, 20,000-24,999, 25,000-29,999, 30,000-39,999, 40,000-49,999, 50,000-74,999, 75,000-99,999, 100,000-149,999, 150,000 or more.

differences for this cohort. See Table 2A in the appendix for descriptive differences between male and female respondents.

Results

This paper examines the associations between high school popularity and adult earnings. Table 3 reports results replicating CGMP. Column 1 estimates a baseline regression and finds a 2% earnings increase for each additional same-sex friendship nomination; like CGMP there is no effect for the number of nominations sent (out degree). CGMP controls for a number of school characteristic not available in the Add Health. To follow their specification, I control for school level fixed effects beginning in Column 2, though this results in little change in the estimates. CGMP then control for ability and education (my Column 3) and personality (my Column 4), showing that the results are not very sensitive to these controls. Thus, even with samples from different eras (1950s vs. 1990s), different geographical areas (Wisconsin vs. National samples), and different sample strategies (high school seniors vs 7-12th graders), the results are remarkably similar in the replication attempt. Finally, in order to examine whether moving from the full to sibling sample may change the results (even without controlling for sibling fixed effects), Column 5-7 repeat Column 2-4 with the sibling sample and show very similar results. A potential issue with using sibling fixed effects is lack of variation in the outcome and/or the popularity measure. However, in this sample, only 13% of siblings have the same value of in-degree (average difference between siblings is 2.64, with a 2.88 standard deviation); only 3% of the sample of siblings have the same wage (average difference is $23,000, with a standard deviation of $39200).

The main findings of the paper are presenting in Table 4. Here I repeat earlier estimates in Column 1-3 with no sibling fixed effects and then proceed to add sibling fixed effects in Column 4-6. What is clear from the results is that the effects of popularity on earnings are quite sensitive to controls for family-level heterogeneity. Indeed, the baseline sibling fixed effects estimate is zero. While the standard errors in the sibling models are too large to rule out the baseline results, they do suggest the fragility of the point estimates to family controls.

In contrast, the associations between completed schooling and wages are quite similar with the baseline and sibling fixed effects results.

Conclusion

Understanding the key factors related to human capital accumulation and wage determination is a central question in labor economics. During the past decade there has been a shift of attention from traditional measures of cognitive ability and education to less examined measures of "non-cognitive skills" such as personality, self control, leadership, and popularity. While the evidence linking cognitive ability to wages is strong and the literature is mature, much less is conclusive in the newer literature on non-cognitive skills. In part, this is because many research designs used to estimate the returns to education and cognitive skills have yet to be used to examine non-cognitive skills. This paper begins to fill this void by comparing siblings' popularity in high school with their earnings around age 30. I replicate new results in the literature using a different dataset and show that the results are sensitive to controls for family-level heterogeneity and suggest no return to popularity in earnings for this new cohort of workers.

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Tables

Table 1
Descriptive Statistics
Main Analysis Sample

	Obs	Mean	Std Dev	Min	Max
Earnings	10001	37485.43	39848.04	1	920000
Log (Earnings)	10001	10.18	1.01	0	13.73213
In Degree	10001	4.46	3.67	0	32
Out Degree	10001	4.41	3.01	0	10
Age (W4)	10001	28.95	1.71	24.5	34.08333
Male	10001	0.48	0.50	0	1
Black	10001	0.23	0.42	0	1
Hispanic	10001	0.15	0.36	0	1
Other Race	10001	0.07	0.26	0	1
Grade =8	9869	0.14	0.34	0	1
Grade = 9	9869	0.18	0.39	0	1
Grade = 10	9869	0.20	0.40	0	1
Grade = 11	9869	0.19	0.39	0	1
Grade = 12	9869	0.16	0.36	0	1
Only Child	10001	0.21	0.41	0	1
Birth Order	9994	1.81	1.15	1	13
Maternal Education	10001	13.30	2.25	0	17
Parents Married	10001	0.72	0.42	0	1
Rural Status	10001	0.27	0.44	0	1
Missing Family Indicator	10001	0.30	0.46	0	1
Education (W4)	10000	14.47	2.04	8	21
PVT Score (W1)	10001	101.53	13.90	14	137
Missing PVT Score	10001	0.04	0.21	0	1
GPA (W1)	9816	2.81	0.75	1	4
Extraversion (W4)	9995	13.25	3.05	4	20
Neuroticism (W4)	9994	10.33	2.72	4	20
Agreeable (W4)	9995	15.29	2.39	4	20
Conscientiousness (W4)	9995	14.70	2.68	4	20
Openness (W4)	9955	14.59	2.44	4	20

Notes: Maternal education, parents married, rural status, and PVT score imputed if missing

Table 2
Distribution of In-Degree By Sample

	Full Sample			Sibling Sample			Full Sample (Men)			Full Sample (Women)		
In Degree	Freq.	Percent	Cum.	Freq.	Percent	Cum.	Freq.	Percent	Cum.	Freq.	Percent	Cum.
0	1,348	9.41	9.41	291	8.37	8.37	812	11.57	11.57	536	7.34	7.34
1	1,871	13.07	22.48	436	12.54	20.91	1,029	14.66	26.23	842	11.53	18.87
2	1,992	13.91	36.39	449	12.92	33.83	1,003	14.29	40.52	989	13.55	32.42
3	1,930	13.48	49.87	449	12.92	46.75	967	13.78	54.3	963	13.19	45.61
4	1,642	11.47	61.34	378	10.87	57.62	730	10.4	64.71	912	12.49	58.1
5	1,304	9.11	70.44	318	9.15	66.77	574	8.18	72.88	730	10	68.1
6	1,070	7.47	77.92	268	7.71	74.48	467	6.65	79.54	603	8.26	76.36
7	815	5.69	83.61	208	5.98	80.47	351	5	84.54	464	6.36	82.71
8	634	4.43	88.04	161	4.63	85.1	282	4.02	88.56	352	4.82	87.54
9	434	3.03	91.07	114	3.28	88.38	183	2.61	91.17	251	3.44	90.97
10	329	2.3	93.37	98	2.82	91.2	152	2.17	93.33	177	2.42	93.4
11	250	1.75	95.11	70	2.01	93.21	120	1.71	95.04	130	1.78	95.18
12	185	1.29	96.4	56	1.61	94.82	96	1.37	96.41	89	1.22	96.4
13	130	0.91	97.31	46	1.32	96.14	53	0.76	97.16	77	1.05	97.45
14	112	0.78	98.09	45	1.29	97.44	57	0.81	97.98	55	0.75	98.21
15	76	0.53	98.62	20	0.58	98.01	39	0.56	98.53	37	0.51	98.71

Table 3
Replication of the Effect of In Degree on Log Earnings

Outcome	Log (Earnings)	Log (Earnings)	Log (Earnings)	Log (Earnings)	Log (Earnings)	Log (Earnings)	Log (Earnings)
Sample	Full	Full	Full	Full	Family	Family	Family
Fixed Effects?	Grade	Grade, School	Grade, School	Grade, School	Grade, School	Grade, School	Grade, School
In Degree	0.022***	0.024***	0.017***	0.016***	0.021***	0.014**	0.013**
	(0.003)	(0.003)	(0.003)	(0.003)	(0.006)	(0.006)	(0.006)
Out Degree	0.003	0.004	-0.003	-0.005	0.004	-0.004	-0.006
	(0.003)	(0.003)	(0.003)	(0.003)	(0.007)	(0.007)	(0.007)
Age (W4)	-0.128***	-0.114***	-0.047***	-0.047***	-0.094***	-0.021	-0.026
	(0.019)	(0.018)	(0.017)	(0.017)	(0.034)	(0.032)	(0.032)
Male	0.344***	0.346***	0.409***	0.395***	0.365***	0.415***	0.404***
	(0.032)	(0.032)	(0.031)	(0.035)	(0.054)	(0.053)	(0.059)
Black	-0.204***	-0.194***	-0.176***	-0.175***	-0.209**	-0.182**	-0.187**
	(0.048)	(0.040)	(0.038)	(0.039)	(0.084)	(0.077)	(0.076)
Hispanic	0.072**	-0.028	-0.011	-0.018	-0.119	-0.086	-0.092
	(0.036)	(0.039)	(0.037)	(0.037)	(0.088)	(0.086)	(0.087)
Maternal Education	0.038***	0.026***	0.004	0.004	0.034**	0.004	0.005
	(0.007)	(0.006)	(0.005)	(0.005)	(0.014)	(0.013)	(0.013)
Parent's Married	0.118***	0.101***	0.055**	0.052**	0.117**	0.077	0.072
	(0.025)	(0.025)	(0.025)	(0.026)	(0.058)	(0.055)	(0.054)
PVT Score W1			-0.000	0.001		0.003	0.004*
			(0.001)	(0.001)		(0.002)	(0.002)
GPA W1			0.115***	0.112***		0.108***	0.104***
			(0.017)	(0.017)		(0.030)	(0.029)
Education (W4)			0.099***	0.102***		0.106***	0.108***
			(0.007)	(0.007)		(0.013)	(0.013)
Extraversion W4				0.021***			0.013**
				(0.003)			(0.006)
Neuroticism W4				-0.016***			-0.017**
				(0.004)			(0.007)
Agreeable W4				-0.016***			-0.011
				(0.005)			(0.010)
Conscientiousness W4				0.013***			0.014*
				(0.004)			(0.007)
Openness W4				-0.026***			-0.025***
				(0.005)			(0.009)
Observations	9,862	9,862	9,795	9,750	2,578	2,563	2,550
R-squared	0.089	0.121	0.167	0.176	0.161	0.215	0.222

Notes: Additional Controls include Constant, Missing indicator for PVT Score, Missing Family Information Indicator, Other Race Indicator, Birth Order, Only Child Indicator, Rural Status. Standard Errors Clustered at the School Level (W1).

Table 4

The Effects of High School Popularity on Adult Earnings: Sibling Fixed Effects

Outcome	Log (Earnings)	Log (Earnings)	Log (Earnings)	Log (Earnings)	Log (Earnings)	Log (Earnings)	Log (Earnings)
Sample	Full	Full	Full	Full	Family	Family	Full
Fixed Effects?	Grade	Grade, School	Grade, School	Grade, School	Family	Family	Family
In Degree	0.022***	0.024***	0.017***	0.016***	-0.000	-0.004	0.007
	(0.003)	(0.003)	(0.003)	(0.003)	(0.019)	(0.019)	(0.016)
Out Degree	0.003	0.004	-0.003	-0.005	0.010	0.007	0.009
	(0.003)	(0.003)	(0.003)	(0.003)	(0.022)	(0.022)	(0.021)
Age (W4)	-0.128***	-0.114***	-0.047***	-0.047***	0.055	0.082	0.069
	(0.019)	(0.018)	(0.017)	(0.017)	(0.106)	(0.100)	(0.099)
Male	0.344***	0.346***	0.409***	0.395***	0.383**	0.423***	0.427**
	(0.032)	(0.032)	(0.031)	(0.035)	(0.158)	(0.158)	(0.176)
Birth Order	0.002	0.005	0.010	0.009	-0.006	0.006	-0.005
	(0.010)	(0.010)	(0.009)	(0.009)	(0.083)	(0.079)	(0.081)
PVT Score W1			-0.000	0.001		0.006	0.004
			(0.001)	(0.001)		(0.008)	(0.006)
GPA W1			0.115***	0.112***		0.040	0.056
			(0.017)	(0.017)		(0.114)	(0.113)
Education (W4)			0.099***	0.102***		0.077**	0.081**
			(0.007)	(0.007)		(0.033)	(0.034)
Extraversion W4				0.021***			0.017
				(0.003)			(0.017)
Neuroticism W4				-0.016***			-0.011
				(0.004)			(0.023)
Agreeable W4				-0.016***			-0.011
				(0.005)			(0.024)
Conscientiousness W4				0.013***			-0.004
				(0.004)			(0.019)
Openness W4				-0.026***			-0.010
				(0.005)			(0.025)
Observations	9,862	9,862	9,795	9,750	2,578	2,563	2,550
R-squared	0.089	0.121	0.167	0.176	0.793	0.801	0.811

Notes: Same as Table 3.