

Social Skills and Promotion: A Study of Racial and Gender Gaps

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Online Appendix: robustness checks.

This document provides additional estimates that verify the robustness of the qualitative estimates when adding additional controls. The first control is a college indicator variable. The effects of social skills may be biased because of unmeasured ability differences. Since the social skills variable used in this study is a proxy variable of the actual social skills, the noise from the proxy variable could correlate with other types of ability. Graduating from college demonstrates ability. Therefore, controlling for college is a way to include another measurement of ability. The second control variable is the interaction between cognitive skills and social skills. Weinberger (2014) finds the demand for social skills increases with cognitive skills. Tables 2A-5A replicate the analysis in the main paper and test whether the results are robust to adding a college dummy and the interaction between social skills and AFQT.

Table 2A replicates the analysis in Table 2 in the main text and tests the robustness of the conclusions about the effect of social skills on the likelihood of promotion. The coefficient's estimates regarding social skills are highly significant and change slightly compared to the estimates in Table 2. Therefore, I conclude that social skills can greatly explain the likelihood a worker is promoted after controlling for the college indicator and how social skills interact with cognitive skills.

Table 3A replicates the analysis in Table 3 in the main text and tests the robustness of the conclusions about the racial and gender gaps in the effects of social skills on the likelihood of promotion. The qualitative conclusions do not change as a result of controlling for education and AFQT interacted with social skills. There is no evidence for a racial gap or a gender gap in the effect of social skills on the likelihood of promotion.

Table 4A replicates the analysis in Table 4 in the main text and tests the robustness of the effect of social skills on wages. Like in the main text, the effect of social skills on wages is positive and statistically significant, except for the black male sample when controlling for college. However, the estimate is still positive. I provide two explanations for the estimate being

statistically insignificant. First, the estimate suggests black workers are paid mostly based on their educational attainment and less for their social skill level. Secondly, the college indicator variable is most likely endogenous as it correlated with innate ability. This led to biases in the estimates of all other coefficients. This is the main reason that the regressions in the main manuscript include controls that are exogenous.

The effect of college on wages is positive and highly significant. The interaction between social skills and the AFQT variable is positive in most regressions. In the white male sample, the effect of the interaction variable is significant at the 10 percent significance level. Therefore, the estimates partially confirm the conclusions in Weinberger (2014), but the estimates are not as strong as was reported in Weinberger (2014) when breaking the sample by race and gender.

Table 5A replicates the analysis in Table 5 in the main text and tests the robustness of the conclusions about the substantial gender and racial gaps in the wage returns to social skills. The conclusions do not change. There is a substantial racial gap in the return to social skills for male workers and a substantial gender gap in the return to social skills for white workers. The college indicator is highly significant and also the interaction term between social skills and AFQT.

I also report the distribution of the social skills variable and compare it across two races and genders. The distributions show that white workers' social skills dominate that of black workers. Among white workers, the distributions of social skills for male and female workers overlap. This suggests that there are racial gaps in the distribution of social skills, but there are no gender gaps in the distribution of social skills.

Table 2A: Social Skills and the Likelihood of Promotion, Robustness Checks

VARIABLES	Men White			Women White			Men Black			Women Black		
Social Skills	0.0450*** (0.0101)	0.0330*** (0.0100)	0.0348*** (0.0103)	0.0301*** (0.00943)	0.0280*** (0.00944)	0.0315*** (0.00964)	0.0590*** (0.0157)	0.0586*** (0.0142)	0.0506*** (0.0160)	0.0374** (0.0149)	0.0392*** (0.0140)	0.0351** (0.0150)
Cognitive (AFQT)	0.0116 (0.00919)	0.00102 (0.00925)	0.00126 (0.00925)	0.0180* (0.0100)	0.0194* (0.0102)	0.0195* (0.0102)	0.0339** (0.0153)	0.0215 (0.0160)	0.0218 (0.0159)	0.0311* (0.0159)	0.0288* (0.0158)	0.0269* (0.0161)
Soft Skills	0.0337*** (0.00972)	0.0270*** (0.00986)	0.0268*** (0.00985)	0.00969 (0.00987)	0.0117 (0.0101)	0.0110 (0.0101)	0.0285** (0.0144)	0.0237 (0.0145)	0.0242* (0.0145)	0.00768 (0.0147)	0.00463 (0.0148)	0.00535 (0.0149)
Social Skills * AFQT	-0.00663 (0.00875)		-0.00696 (0.00871)	-0.0138 (0.00872)		-0.0134 (0.00872)	-0.0134 (0.0149)		-0.0167 (0.0149)	-0.0110 (0.0145)		-0.0112 (0.0146)
College		0.107*** (0.0222)	0.107*** (0.0222)		-0.0188 (0.0230)	-0.0170 (0.0231)		0.104*** (0.0398)	0.108*** (0.0398)		0.0428 (0.0338)	0.0431 (0.0338)
Observations	19,153	19,153	19,153	16,540	16,540	16,540	8,349	8,349	8,349	8,569	8,569	8,569

Notes: Each column reports the estimates from equation (1) in the paper. The dependent variable is binary and equals one if promoted and 0 otherwise. The data source is the National Longitudinal Survey of Youth 1979 cohort (NLSY79). Cognitive skills are measured by each NLSY79 respondent's score on the Armed Forces Qualifying Test (AFQT) and are normalized to have a mean of zero and a standard deviation of one. The social skills measurement is taken from Deming (2017) and is a standardized composite of four variables - 1) sociability in childhood; 2) sociability in adulthood; 3) participation in high school clubs; and 4) participation in team sports - see the text for details on the construction of the social skills measure. The non-cognitive skills variable is the normalized average of the Rotter and Rosenberg scores in the NLSY (taken from Deming, 2017). The estimates are from Pooled OLS regressions. All regressions control for years of fixed effects, age in a quadratic form, three regional dummies, and time trends in a quadratic form. In column 2 (the entire sample), the regression controls for black and female dummies. Standard errors are robust and clustered at the individual level.

*** Significant at the 1 percent level.

** Significant at the 5 percent level.

* Significant at the 10 percent level.

Table 3A: Racial and Gender Gaps in the Effects of Social Skills on Promotion, Robustness Checks

VARIABLES	Male Workers			Female Workers			Black Workers			White Workers		
Social Skills	0.0463*** (0.0100)	0.0335*** (0.00997)	0.0359*** (0.0101)	0.0293*** (0.00939)	0.0259*** (0.00940)	0.0293*** (0.00954)	0.0581*** (0.0147)	0.0594*** (0.0140)	0.0533*** (0.0148)	0.0459*** (0.00997)	0.0392*** (0.00993)	0.0418*** (0.0100)
Cognitive (AFQT)	0.0127 (0.00917)	0.00181 (0.00919)	0.00208 (0.00919)	0.0182* (0.0100)	0.0181* (0.0102)	0.0182* (0.0101)	0.0325** (0.0154)	0.0244 (0.0156)	0.0248 (0.0156)	0.0113 (0.00915)	0.00677 (0.00920)	0.00704 (0.00919)
Soft Skills	0.0333*** (0.00969)	0.0266*** (0.00978)	0.0263*** (0.00978)	0.00975 (0.00982)	0.0104 (0.00997)	0.00977 (0.00996)	0.0273* (0.0144)	0.0240* (0.0144)	0.0244* (0.0144)	0.0334*** (0.00963)	0.0310*** (0.00969)	0.0306*** (0.00968)
Black*Social Skills	0.0140 (0.0178)	0.0239 (0.0170)	0.0171 (0.0178)	0.00734 (0.0172)	0.0156 (0.0166)	0.00733 (0.0172)						
Black*Cognitive Skills	0.0203 (0.0178)	0.0182 (0.0178)	0.0183 (0.0177)	0.0137 (0.0186)	0.0163 (0.0185)	0.0137 (0.0186)						
Black*Soft Skills	-0.00592 (0.0172)	-0.00427 (0.0171)	-0.00367 (0.0171)	-0.000675 (0.0174)	-0.00209 (0.0174)	-0.000684 (0.0174)						
Female*Social Skills							-0.0221 (0.0196)	-0.0226 (0.0196)	-0.0212 (0.0196)	-0.0170 (0.0135)	-0.0168 (0.0135)	-0.0166 (0.0135)
Female*Cognitive Skills							-0.000852 (0.0220)	0.00264 (0.0219)	-7.22e-05 (0.0220)	0.00679 (0.0135)	0.00729 (0.0135)	0.00719 (0.0135)
Female*Soft Skills							-0.0168 (0.0203)	-0.0182 (0.0203)	-0.0178 (0.0202)	-0.0235* (0.0136)	-0.0241* (0.0136)	-0.0242* (0.0136)
Social Skills * AFQT	-0.00846 (0.00754)		-0.00959 (0.00752)	-0.0132* (0.00751)		-0.0132* (0.00751)	-0.0119 (0.0104)		-0.0132 (0.0104)	-0.0103* (0.00620)		-0.0109* (0.00621)
College		0.109*** (0.0194)	0.110*** (0.0194)		-0.00180 (0.0190)	-0.000387 (0.0190)		0.0681*** (0.0258)	0.0695*** (0.0258)		0.0426*** (0.0159)	0.0435*** (0.0159)
Observations	27,502	27,502	27,502	25,109	25,109	25,109	16,918	16,918	16,918	35,693	35,693	35,693

Notes: The dependent variable is binary and equals one if promoted and 0 otherwise. The estimates are from Pooled OLS regressions. All regressions control for years of fixed effects, age in a quadratic form, three regional dummies, and time trends in a quadratic form. In column 2 (the entire sample), the regression controls for black and female dummies. Standard errors are robust and clustered at the individual level. *** Significant at the 1 percent level. ** Significant at the 5 percent level. * Significant at the 10 percent level.

Table 4A: The Effect of Social, Cognitive, and Soft Skills on Ln(Wage) - Robustness Checks

VARIABLES	Male White			Female White			Male Black			Female Black		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Social Skills	0.0826*** (0.0137)	0.0438*** (0.0135)	0.0428*** (0.0135)	0.0458*** (0.0118)	0.0198* (0.0114)	0.0200* (0.0114)	0.0487*** (0.0173)	0.0143 (0.0145)	0.0229 (0.0161)	0.0605*** (0.0180)	0.0474*** (0.0148)	0.0451*** (0.0167)
Cognitive (AFQT)	0.102*** (0.0128)	0.0519*** (0.0119)	0.0521*** (0.0120)	0.0903*** (0.0128)	0.0572*** (0.0124)	0.0572*** (0.0124)	0.118*** (0.0170)	0.0814*** (0.0163)	0.0829*** (0.0164)	0.102*** (0.0178)	0.0752*** (0.0162)	0.0739*** (0.0166)
Soft Skills	0.103*** (0.0138)	0.0821*** (0.0133)	0.0822*** (0.0133)	0.0928*** (0.0129)	0.0668*** (0.0126)	0.0668*** (0.0127)	0.0685*** (0.0153)	0.0599*** (0.0153)	0.0587*** (0.0152)	0.110*** (0.0164)	0.0906*** (0.0156)	0.0907*** (0.0157)
Promoted*Social Skills	0.0256 (0.0199)	0.0209 (0.0183)	0.0205 (0.0183)	0.0169 (0.0171)	0.0170 (0.0167)	0.0171 (0.0167)	0.000393 (0.0240)	-0.000735 (0.0230)	-0.00280 (0.0229)	-0.0367 (0.0236)	-0.0369* (0.0222)	-0.0359 (0.0226)
Promoted*Cognitive Skills	0.000575 (0.0196)	0.0121 (0.0173)	0.0112 (0.0174)	-0.00231 (0.0199)	0.00748 (0.0185)	0.00759 (0.0187)	0.0347 (0.0287)	0.0223 (0.0272)	0.0178 (0.0272)	0.0220 (0.0261)	0.0208 (0.0248)	0.0219 (0.0247)
Promoted*Soft Skills	0.0110 (0.0187)	-0.00636 (0.0173)	-0.00639 (0.0173)	0.0218 (0.0185)	0.0251 (0.0176)	0.0251 (0.0176)	0.0300 (0.0277)	0.0148 (0.0268)	0.0164 (0.0267)	-0.0139 (0.0237)	-0.00450 (0.0230)	-0.00407 (0.0230)
Promoted	0.156*** (0.0192)	0.119*** (0.0177)	0.119*** (0.0177)	0.210*** (0.0187)	0.212*** (0.0177)	0.212*** (0.0177)	0.190*** (0.0288)	0.163*** (0.0267)	0.162*** (0.0267)	0.153*** (0.0266)	0.145*** (0.0252)	0.145*** (0.0252)
AFQT*Social Skills	0.00634 (0.0101)		0.00461 (0.00907)	0.00731 (0.00982)		-0.000586 (0.00945)	0.0271* (0.0140)		0.0163 (0.0130)	-0.00360 (0.0134)		-0.00546 (0.0127)
College		0.465*** (0.0261)	0.465*** (0.0261)		0.320*** (0.0240)	0.320*** (0.0239)		0.385*** (0.0433)	0.381*** (0.0434)		0.290*** (0.0319)	0.290*** (0.0319)
Observations	19,153	19,153	19,153	16,540	16,540	16,540	8,349	8,349	8,349	8,569	8,569	8,569
R-squared	0.184	0.279	0.279	0.159	0.210	0.210	0.220	0.269	0.269	0.203	0.250	0.250

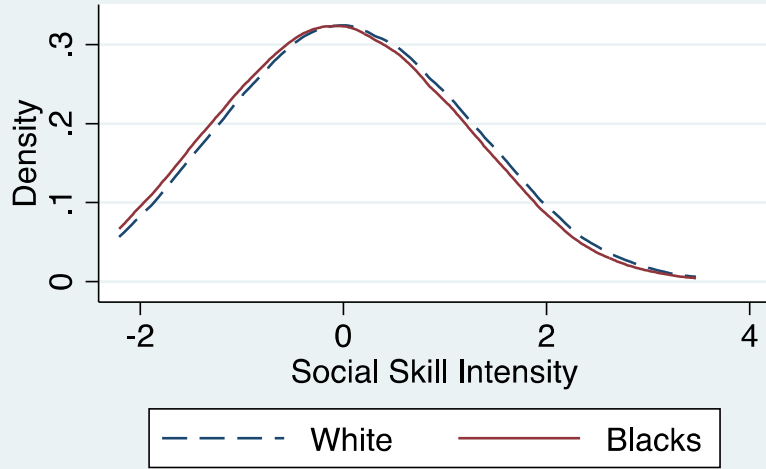
Notes: Each column reports the estimates from equation (3) in the paper. The dependent variable is log of real hourly wage (in 2016 \$). The data source is the National Longitudinal Survey of Youth 1979 cohort (NLSY79). Cognitive skills are measured by each NLSY79 respondent's score on the Armed Forces Qualifying Test (AFQT) and are normalized to have a mean of zero and a standard deviation of one. The social skills variable is taken from Deming (2017) and is a standardized composite of four variables - 1) sociability in childhood; 2) sociability in adulthood; 3) participation in high school clubs; and 4) participation in team sports - see the text for details on the construction of the social skills measure. The non-cognitive skills variable is the normalized average of the Rotter and Rosenberg scores in the NLSY (taken from Deming, 2017). The estimates are from Pooled OLS regressions. All regressions control for years of fixed effects, age in a quadratic form, three regional dummies, and time trends in a quadratic form. In column 2 (the entire sample), the regression controls for black and female dummies. Standard errors are robust and clustered at the individual level. All regressions control for years of fixed effects, age in a quadratic form, three regional dummies, and time trends in a quadratic form. In column 2 (the entire sample), the regression controls for black and female dummies. Standard errors are robust and clustered at the individual level. *** Significant at the 1 percent level. ** Significant at the 5 percent level. * Significant at the 10 percent level.

Table 5A: Gender and Racial Gaps in the Wage Returns to Social Skills, Robustness Checks

VARIABLES	Male			Female			White			Black		
Social Skills	0.0949*** (0.0110)	0.0558*** (0.0105)	0.0539*** (0.0104)	0.0557*** (0.00964)	0.0297*** (0.00939)	0.0302*** (0.00939)	0.0937*** (0.0110)	0.0582*** (0.0104)	0.0578*** (0.0103)	0.0424*** (0.0148)	0.0172 (0.0128)	0.0202 (0.0138)
Cognitive (AFQT)	0.103*** (0.0106)	0.0602*** (0.00974)	0.0600*** (0.00973)	0.0890*** (0.0105)	0.0612*** (0.00994)	0.0612*** (0.00994)	0.103*** (0.0105)	0.0652*** (0.00971)	0.0651*** (0.00970)	0.131*** (0.0152)	0.0949*** (0.0143)	0.0947*** (0.0142)
Soft Skills	0.108*** (0.0107)	0.0800*** (0.00970)	0.0802*** (0.00970)	0.0997*** (0.0103)	0.0763*** (0.00979)	0.0762*** (0.00982)	0.109*** (0.0106)	0.0845*** (0.00972)	0.0846*** (0.00972)	0.0771*** (0.0139)	0.0641*** (0.0135)	0.0639*** (0.0135)
Black*Social Skills	-0.0515*** (0.0185)	-0.0437*** (0.0165)	-0.0383** (0.0171)	-0.0102 (0.0166)	-0.00155 (0.0153)	-0.00266 (0.0159)						
Black*Cognitive Skills	0.0279 (0.0186)	0.0215 (0.0170)	0.0214 (0.0170)	0.0214 (0.0174)	0.0193 (0.0162)	0.0190 (0.0163)						
Black*Soft Skills	-0.0295* (0.0175)	-0.0196 (0.0165)	-0.0201 (0.0165)	0.00835 (0.0165)	0.0146 (0.0157)	0.0148 (0.0157)						
Female*Social Skills							-0.0395*** (0.0147)	-0.0357** (0.0139)	-0.0357** (0.0139)	0.00688 (0.0185)	0.0112 (0.0177)	0.0106 (0.0177)
Female*Cognitive Skills							-0.0155 (0.0148)	-0.0124 (0.0137)	-0.0124 (0.0137)	-0.0171 (0.0207)	-0.0140 (0.0191)	-0.0127 (0.0192)
Female*Soft Skills							-0.00880 (0.0147)	-0.0141 (0.0137)	-0.0141 (0.0137)	0.0298 (0.0190)	0.0258 (0.0183)	0.0256 (0.0183)
Promoted	0.166*** (0.0153)	0.134*** (0.0143)	0.134*** (0.0143)	0.190*** (0.0145)	0.190*** (0.0139)	0.190*** (0.0139)	0.183*** (0.0134)	0.169*** (0.0126)	0.169*** (0.0126)	0.166*** (0.0167)	0.153*** (0.0160)	0.153*** (0.0159)
Social Skills * AFQT	0.0126 (0.00829)		0.00771 (0.00748)	0.00398 (0.00793)		-0.00178 (0.00761)	0.00697 (0.00702)		0.00194 (0.00656)	0.0125 (0.00968)		0.00648 (0.00907)
College		0.450*** (0.0225)	0.450*** (0.0225)		0.310*** (0.0193)	0.310*** (0.0192)		0.393*** (0.0178)	0.393*** (0.0178)		0.329*** (0.0261)	0.328*** (0.0261)
Observations	27,502	27,502	27,502	25,109	25,109	25,109	35,693	35,693	35,693	16,918	16,918	16,918
R-squared	0.244	0.322	0.322	0.183	0.232	0.232	0.216	0.285	0.285	0.213	0.260	0.261

Notes: Each column reports the estimates from equation (3) in the paper. The dependent variable is log of real hourly wage (in 2016 \$). The data source is the National Longitudinal Survey of Youth 1979 cohort (NLSY79). Cognitive skills are measured by each NLSY79 respondent's score on the Armed Forces Qualifying Test (AFQT) and are normalized to have a mean of zero and a standard deviation of one. The social skills variable is taken from Deming (2017) and is a standardized composite of four variables - 1) sociability in childhood; 2) sociability in adulthood; 3) participation in high school clubs; and 4) participation in team sports - see the text for details on the construction of the social skills measure. The non-cognitive skills variable is the normalized average of the Rotter and Rosenberg scores in the NLSY (taken from Deming, 2017). The estimates are from Pooled OLS regressions. All regressions control for years of fixed effects, age in a quadratic form, three regional dummies, and time trends in a quadratic form. In column 2 (the entire sample), the regression controls for black and female dummies. Standard errors are robust and clustered at the individual level. All regressions control for years of fixed effects, age in a quadratic form, three regional dummies, and time trends in a quadratic form. In column 2 (the entire sample), the regression controls for black and female dummies. Standard errors are robust and clustered at the individual level. *** Significant at the 1 percent level. ** Significant at the 5 percent level. * Significant at the 10 percent level.

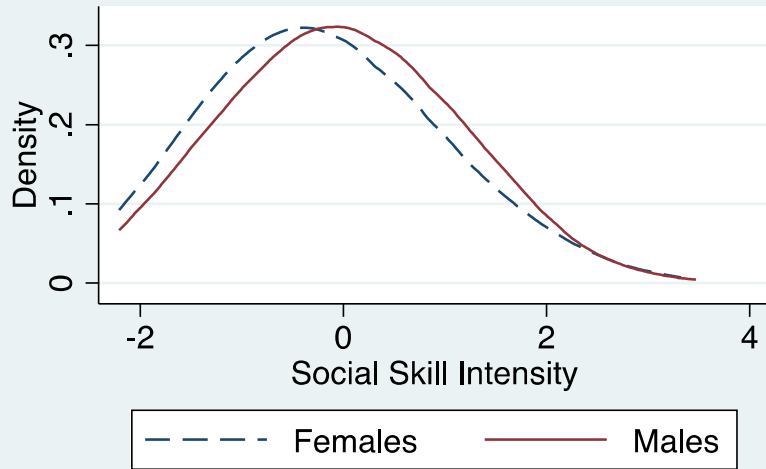
Male Workers



Female Workers



Black Workers



White Workers

