

Conformity and Soft Skills as Determinants of Alternatively Credentialed Non-College Graduate Hireability

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Abstract

Despite targeting technical skills, vocational school graduates are paid less than college graduates. This paper hypothesizes that nonconformity stigma and a perceived deficit in soft skills substantially explain reduced alternatively credentialed non-college graduate (ACNG) hireability. Results from an original survey in the United States indicates that willingness to break rules is a key factor of hireability, but the direction of effect is heterogenous by employer type. ACNG job candidates tend to be perceived favorably as creatives or as possible high performers. Selection of traditional candidates is better explained as an employer risk aversion behavior, rather than selection for conformity as a direct property of quality labor. Perceived skill gaps are more important than widely recognized factors of hireability including industrial and state effects. Soft skills are particularly important. Recent college graduates and ACNGs are seen as similarly lacking in soft skills including work ethic. The population of the United States systematically comparatively devalues alternative postsecondary education. Results collectively indicate that nontraditional postsecondary education is undervalued.

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1. Introduction

A substantial gap exists between the skills expected by employers and those possessed by college graduates[1, 2, 3, 4]. Experts view college alternatives including vocational school as useful for technical training, but the traditional college degree retains a wage premium over vocational education. Unemployment, underemployment, and other negative labor outcomes follow a similar pattern[5]. This paper maintains the orthodox view that employers pay for perceived job candidate skill. To explain inferior labor outcomes, this paper hypothesizes that employers expect an offsetting non-technical skill deficit when considering an alternatively credentialed non-college graduate (ACNG).

The signalling model has become one of the two standard explanations of the value of the college degree. Signalling theory provides three advantages over human capital theory for the purposes of the present study. First, signalling theory is able to explain labor outcome variance when human capital is held constant.

Second the signalling model empowers a survey research design. In an idealized human capital model, the measures of human capital would correspond to production process inputs. To establish a wide array of skill measures would be complicated and prone to measurement sensitivities, assumptions, and errors of various and potentially subtle kinds. Survey measures could be used as a second-best proxy, but they would never be an ideal measure of human capital. Signaling theory takes the reverse approach. According to the signalling model, labor demand is formed on the basis of job candidate value as perceived by an employer. Whether this corresponds to any concrete ability is secondary. Employer perception can be assessed through a simple survey. An additional benefit of using a questionnaire is the ability to ask hypothetical questions. In pondering hypotheticals, employer evaluation of a credential or signal can be isolated from job candidate human capital variance.

Third, signalling theorists have already laid out a testable hypothesis for weak labor outcomes among non-college graduates. Following this model, schol-

ars claim that the college degree signals intelligence, work ethic, and conformity[6]. Non-traditional education, in contrast, is hypothesized to signal nonconformity. Non-traditional courses can also be completed in a shorter span of time and with reduced entry qualifications relative to the traditional degree. For this reason,
35 alternative credentials are thought not to signal conscientiousness, or work ethic.

Conscientiousness is associated with a variety of positive outcomes, but there is reason for employers to value imperfect conformity. Firm innovation is attributable to underlying employee innovation, but conformity is antithetical to innovation. Leaders and high performers also behave abnormally, but in a way
40 that is seen as desirable.

Risk aversion represents a separate reason to select for conformity. A risk averse employer with low ability to distinguish high performing outliers from low performing outliers may prefer not to hire an outlier at all. The gamble is particularly expensive for small employers that are unable to spread risk
45 across many hires. A secondary investigation in this paper will be to look for employer size effects. If large employers are favorable to alternatively educated individuals, this will add weight to an explanation based on risk aversion.

Alternative credentials refer to credentials other than the undergraduate degree[7]. The category includes, for example, industry certifications, portfolios
50 of work, and transcript, badges, or other records of unaccredited learning and achievement. Individuals pursuing alternative credentials typically intend to leverage the credential toward better employment. That is, they have the same ends as college students. Many individuals obtain alternative credentials as a supplement to the degree. Such a situation is pareto-superior to degree attainment alone and is therefore intentionally excluded from analysis. This paper
55 focuses on alternatively credentialed non-college graduates in order to better identify stigmata of interest.

2. Methodology

This study uses ordinary least squares regression analysis to estimate the
60 effect of perceived skill gaps on willingness to hire. Perceived skill gaps and
willingness to hire are included in original response data collected by online
survey ($n = 212$). Observations are cross-sectional and taken at the individual
level. The data is available for replication or any other use¹.

Respondents were obtained through the Amazon Mechanical Turk crowd-
65 sourcing service. Respondents were United States citizens at or over the age of
eighteen. Respondents were paid for participation. The survey administration
took place in July of 2020.

Respondents were asked 65 questions in two sections. The first section of
responses describe the respondent. There are 13 questions in this section. The
70 second section identifies perceived skill gaps for 13 skills. Each section beings
with a contextual message to normalize response anchoring. Questions are pro-
vided in nonrandom order for the same reason. Appendix A provides a copy of
the survey.

Data from the second section is used to calculate perceived skill gaps. For
75 each of 13 skills, the respondent is asked to imagine four types of candidates.
One type of candidate is an ideal candidate. At a high level, skill gaps are
calculated by differencing skill levels of the ideal candidate with others.

Perceived skill is reported on a scale from 1 to 10. Perceived skill is reported
for the ideal candidate, the average actual employee, the average recent college
80 graduate, and the average alternatively credentialed non-college graduate. Skill
gaps are technically computed in two ways. One method allows for overqualifi-
cation of job candidates and the other does not. Overqualification effects have
been identified as important[8, 9], but these effects are often ignored during skill
gap analysis[10].

¹See https://osf.io/8qtxf/?view_only=95b0c0b0c65e4b7983198cc87c2ab733 for data
used in this study.

85 When overqualification is allowed, the skill gap is measured as a raw skill gap. The raw skill gap is the skill level of the ideal candidate less the skill level of the actual candidate. The skill gap without overqualification is calculated as the raw skill gap or zero if the raw skill gap value is negative.

3. Results

90 Alternatively credentialed non-college graduate (ACNG) hireability was generally positive. The mean response was 7.5 on a scale from one to ten ($\sigma = 1.80$). Employers status was not associated with a significant response effect. Perceived skill gaps explained a significant and important portion of hireability variance.

Table 1 compares perceived skill gap explanatory power in a simple regression to explanatory power of other simple regressions involving factors of known
95 relevance to hireability. Allowing for overqualification seems to weaken explanatory power. Overqualification effects seem to be heterogeneously signed per skill, so generalizing weakens overall explanatory power relative to ignoring these effects. With overqualification, perceived skill gaps explain about fifty percent
100 more than industrial effects or robust state effects. Without overqualification, the adjusted explanatory power of perceived skill gaps is about three times the adjusted explanatory power of industry or state effects. Semi-robust state factors are dummy variables by state which are significant in a multiple regression. Robust state factors are subset of semi-robust state factors which are additionally
105 significant in a simple regression.

Table 1 also describes the explanatory power of so-called rulebreaker effects. Whether the candidate is perceived as a rule breaker is a perceived skill gap, but employers evaluate this gap in a heterogenous and multispecific way. In the first place, this heterogenous evaluation has sign and magnitude implications for
110 the dependent variable of interest. Secondly, heterogenous evaluation implies a qualitatively different evaluation. These differences are captured using three questions in the first section of the survey.

The three rulebreaker questions measure respondent agreement on a scale

Table 1: Factor Group Explanatory Power in a Simple Regression

Effect Group Name	Adj R-Sqr	R-Sqr	Max p-value
Industry	0.0185	0.0510	0.288
Rulebreaker	0.1432	0.1554	0.053
Skill Gaps with Overqualification	0.0558	0.0737	0.106
Skill Gaps without Overqualification	0.0758	0.0933	0.115
State, Robust	0.0177	0.0503	0.227
State, Semi-Robust	0.0034	0.0648	0.831

from 1 to 10 with statements about rulebreakers, or "People who are willing
115 to break formal or informal rules and norms." The first statement indicates
that rulebreakers present a risk to the reputation, productivity, or value of a
company. This statement received the least agreement and greatest response
variance among three qualitatively different descriptions of people that are will-
ing to break rules ($\mu = 6.40, \sigma = 2.55$).

120 The second statement states that people break rules which hold them back,
and that rulebreakers "could just as easily be high performers as low perform-
ers." This statement received the most agreement and least comparative re-
sponse variance as a rule breaker description ($\mu = 7.42, \sigma = 1.91$). The agree-
ment with this statement provides evidence against the thesis that employers
125 value conformity for its own sake. In turn, this adds weight to the theory
that employers value conformity as a risk aversion tactic, but they actually
believe nonconformity may signal positive outlier potential. The third descrip-
tion of rulebreakers states that they tend to be gifted in the areas of innova-
tion or creativity, and that such people may benefit the company of a culture

130 $(\mu = 7.25, \sigma = 2.03)$.

Each of the three rulebreaker effects turns out to be independently important. These effects collectively explain more than three times as much response variance as do industrial or state effects. Rulebreaker effects are about twice as important as perceived skill gaps. This is not taken to be a general lesson
135 about skill gaps. Willingness to break rules is a special case of a behavior which is valuable under certain parameters. This contrasts with something like poor communication skill which is generally detrimental.

Table 2 reports selected factor statistics across five least squares multiple regressions. The selected factors which are reported include any perceived skill
140 gap which is important in any specification. Factor importance is determined by the ability of a factor to improve model adjusted explanatory power. Model 1 is a multiple regression using skill gaps that allow for overqualification. Model 2 is a multiple regression without overqualification.

Models 3 and 4 are equivalent to models 1 and 2, respectively, after nor-
145 malizing for certain effects. Industry, state, and company size effects are the specific effects which are normalized. These effects are normalized for robustness by cross-referencing the subfactors from models 1 and 2. Robust effects are retained. For example, some state effects are important in one specification and not in the other. Such state effects are dropped in Models 3 and 4.

150 Model 5 is specified as Model 4 plus two adjustments. First, the factor for salary is dropped. The salary factor improved adjusted explanatory power in Model 2, but it provided no such benefit in any other model. Moreover, the p-value of this factor was unacceptably low in Model 4 ($p > 0.9$). The second adjustment is to add a duration factor.

155 The duration factor is a measure of the length of time a respondent believes it takes to earn an alternative credential. Duration is a categorical variable which was important in both Models 1 and 2. As a categorical variable, it was decomposed into a boolean series for factor analysis. Models 1 and 2 retained one or more duration dummies, but none overlapped. As a result, duration was
160 dropped from Models 3 and 4.

Table 2: Table of Multiple Regression on Favorability, Selected Variables

	Model 1	Model 2	Model 3	Model 4	Model 5
Gap, Body Language	-2.240e-01* (8.314e-02)	-3.831e-01** (1.124e-01)	-1.507e-01+ (8.980e-02)	-3.155e-01* (1.173e-01)	-3.060e-01* (1.145e-01)
Gap, Body Language-IT	2.199e-01+ (1.269e-01)	2.298e-01 (1.656e-01)	1.837e-01 (1.334e-01)	2.791e-01 (1.707e-01)	2.771e-01+ (1.665e-01)
Gap, Commute		-2.320e-01++ (9.720e-02)	-4.953e-02 (6.862e-02)	-1.197e-01 (1.023e-01)	-1.582e-01 (1.010e-01)
Gap, Conscientiousness	2.416e-01* (8.000e-02)	3.223e-01* (1.045e-01)	1.387e-01 (8.483e-02)	2.174e-01+ (1.129e-01)	2.175e-01++ (1.093e-01)
Gap, Customer Service	-1.259e-01+ (6.389e-02)	-1.512e-01 (9.599e-02)	-1.253e-01+ (7.162e-02)	-1.276e-01 (1.037e-01)	-1.323e-01 (1.009e-01)
Gap, Rule Breaker		-6.336e-02 (1.028e-01)	-3.896e-02 (6.054e-02)	-8.535e-02 (1.082e-01)	-1.034e-01 (1.036e-01)
Gap, Salary		-1.135e-01 (8.284e-02)	3.873e-02 (6.597e-02)	-6.250e-03 (8.575e-02)	
Gap, Teamwork		1.227e-01 (9.179e-02)	6.812e-02 (6.963e-02)	1.287e-01 (9.697e-02)	1.131e-01 (9.505e-02)
Gap, Technical	-1.274e-01+ (7.443e-02)		-9.408e-02 (7.702e-02)	-1.010e-01 (1.023e-01)	-9.806e-02 (1.001e-01)
Rulebreaker, Culture Add	2.612e-01** (7.057e-02)	2.829e-01** (7.015e-02)	2.114e-01* (7.187e-02)	2.279e-01* (7.190e-02)	2.235e-01* (7.036e-02)
Rulebreaker, Risky	1.688e-01** (4.993e-02)	1.758e-01** (4.813e-02)	1.517e-01* (5.160e-02)	1.472e-01* (5.063e-02)	1.686e-01** (5.006e-02)
Rulebreaker, Rockstars	1.406e-01+ (7.646e-02)	1.748e-01++ (7.245e-02)	1.669e-01++ (7.851e-02)	1.546e-01++ (7.754e-02)	1.655e-01++ (7.599e-02)
Adj R-sqr	0.3100	0.3491	0.2317	0.2554	0.2866
R-sqr	0.4408	0.4663	0.3409	0.3613	0.3880

Standard errors in parentheses

+ $p < 0.10$, ++ $p < 0.05$, * $p < .01$, ** $p < .001$

After dropping the salary factor, duration was reanalyzed in the new multiple regressive context. A single duration factor proved important in this reanalysis. The duration factor which indicates that a respondent believes it takes more than a year to obtain an alternative credential is significantly and importantly
165 associated with improved willingness to hire ($\beta = 0.875, p < 0.01$).

An individual is considered an employer if they state that they contribute to hiring and firing decisions. Employer effects are positively signed in all five models, but the significance is lost after normalizing effects. This suggests that employer favorability to alternative credentials is sensitive to industry and state
170 of residence.

The preferred model is able to explain roughly one third of the willingness to hire. 7 of 13 skill gaps investigated contribute to this model, and two stand out as the most significant. Technical skill gaps are insignificant but they are robust across specifications and possess the expected negative sign. Other than
175 technical skill, the remaining gaps are soft skills. Body language skill gaps and skill gaps in work ethic are the two most significant factors in this model. The relative importance of soft skill gaps, and work ethic in particular, adds weight to a revision of the usual signalling explanation as the most plausible story.

An important and complicated finding involves conscientiousness. Notice
180 that the effect is robustly positive across specifications. Simple intuition would indicate that a large conscientiousness gap is associated with improved hireability. This is an oversimplification which results from linear analysis.

A simple regression of conscientiousness on favorability produces an expected negative sign. That supports the intuitive notion that a lack of conscientiousness
185 is associated with reduced hireability. That result is also an oversimplification. A synthesis of both results and outside research indicates there is some bliss point for work ethic. The change in the model constant from the simple regression to the multiple regression explains the robust sign inversion. In the multiple regression, the model constant is near 0.5, while in the simple regression it is
190 about 7.5.

In one study, conscientiousness exhibited a parabolic relationship with peer-

rated team contribution[11]. Adding a quadratic term to Model 5 replicates a negative marginal relation between conscientiousness and teamwork skill. In addition, conscientiousness exhibits a negative marginal relation with hireability overall.

Complementary to the bliss point explanation is an explanation from attenuation. In the current data set, conscientiousness exhibits an important cross-correlation with several factors including willingness to commute and customer service skill. Conscientiousness also structurally interacts with independent rule-breaker effects. Theoretically, conscientiousness is related to rule breaking behavior, but the effect on hireability is interacted with employer perceptions of those who break rules. Because these factors are entered independently in the multiple regression, the underlying component of conscientiousness is entered in redundantly. Because conscientiousness gaps have a negative effect, the overall negative effect is overstated. The direct factor of conscientiousness corrects, or attenuates, the overstated effect which is partialled in, or captured in, the correlated independent factors. Removal of other skill gap factors and rule-breaker factors from Model 5 validates this explanation by yielding a negative coefficient ($\beta = -0.084, p < 0.31$).

The importance of conscientiousness does not add weight to the classic signalling explanation. The conscientiousness gap is not a comparative gap between a recent college graduate and a non-college graduate. It is a gap between an ideal job candidate and an ACNG. An important note is that the conscientiousness gap among recent college graduates is statistically no different from an ACNG. Unsurprisingly, the candidate perceived to have a minimal conscientiousness gap is the typical employee already working in the labor force. A comparative gap of note would be that college graduates were perceived to have better technical skills compared to the average ACNG.

Employer size was an important factor in the preferred model. The largest category of employer is positively associated with willingness to hire an ACNG. This matches the risk aversion model. The largest category of employer has lower risk, and in fact generates comparative advantage, when hiring from a

high-variance pool of candidate quality.

Some state and industrial effects are identified. No particular relation among
225 state effects was found, but further comparative policy research is encouraged.
With respect to industry, an interesting interaction between body language skill
and employment in the information technology is identified. The interacted vari-
able has a positive association with willingness to hire. Body language skill gaps
on their own are associated with reduced willingness to hire. This specifically
230 indicates a reduced penalty for lacking body language communication skills in
the information technology industry. With less strength and more breadth, a
positive coefficient to the interaction variable indicates a reduced penalty for
generalized soft skill deficiency in the information technology industry.

A reduced penalty for soft skill deficit helps explain the particular flour-
235 ishing of alternative credentials in the information technology industry. The
reduced penalty in this particular industry might be related to a relative lack
of deregulation in the industry. Alternatively, it might be related to cultural
norms around the acceptability of an anti-social geek in a technology field. The
cultural norm itself might be derived from deeper collective personality organi-
240 zation. That is, there is less technical need for social skills in programming and
related disciplines, so introverts may naturally obtain a comparative advantage
in this field.

4. Conclusion

This study demonstrates that perceived skill gap variance is qualitatively
245 different for alternatively educated non-college graduates. Perceived skill gaps
do a better job of explaining willingness to hire than do other widely recognized
effects including industry and state effects. Employer factors better explain
candidate hireability than do the perceived skill gaps themselves. This paper
finds multiple facts in support of employer risk aversion over conformity selection
250 when considering job candidates that lack a college degree. Technical skill gaps
were identified with less relevance to the hiring decision when compared with

soft skill gaps for the ACNG job candidate.

Some evidence on the role of misinformation is demonstrated in a survey on trade schooling taken in 2019[12]. Only 27 percent of respondents correctly
255 responded that lower debt is an advantage of enrolling in trade school relative to college. Additionally, over 75 percent of respondents failed to notice that trade school graduates receive industry employment sooner and receive specialized training when compared to a four-year college. Obtaining a college degree after obtaining some work experience will allow students to leverage employer tuition
260 benefits.

In addition to the noted applications of the results of this study, there are several ways in which results could be technically improved. The preferred model explains about one third of willingness to hire. This study uses a cross-sectional analysis to investigate a subject that varies over time. The traditional
265 system of accredited undergraduate education was itself at one time an innovation. Abnormal job candidates differentiated themselves using novel credentials, and broad employer adoption was achieved over time. This paper concludes that the alternative credentials of today will follow a similar pattern.

Dynamic technical analysis would yield deeper understanding of such trends
270 and achieve greater overall explanatory power. Dynamic analysis would also generate better opportunity for causal understanding. Other research has conducted some dynamic analysis of the same dependent variable with differing independent inputs[13]. Integrated modelling of those effects with skill gap analysis could replicate results and generate new models of better explanatory
275 power. Specifications that allow for overqualification effects and heterogeneous curved relations between skill gaps and hireability would improve not only the present paper, but the state of the art in skill gap analysis.

If perceived skill is representative of actual skill, then the current study concludes that employers should be more willing to hire alternatively educated
280 non-college graduates. At the same time, this paper demonstrates plausible misalignment of perceived and actual skill in some cases. Last mile training is a type of alternative education which has been specifically recommended as a

remedy for technical skill gaps among recent college graduates. It is surprising that the average recent college graduate in the sample of analysis is perceived to have better technical skill compared to the average ACNG.

Employers seem to be favorable to individuals with alternative credentials. In many cases, employer-perceived skill gaps are not statistically different when comparing recent college graduates with ACNG candidates. The relative social preference for the college degree may be better explained by a lack of relevant credentials for some occupations, government subsidy of the legacy system, and ignorance about available alternative opportunities on the part of students and those influencing student enrollment choices.

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