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Height and Leadership

Erik Lindqvist

Research Institute of Industrial Economics
P.O. Box 55665
SE-102 15 Stockholm, Sweden
info@ifn.se
www.ifn.se

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Erik Lindqvist[**]

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Abstract

This paper studies the relationship between height and leadership. Using data from a representative sample of Swedish men, I document that tall men are significantly more likely to attain managerial positions. An increase in height by 10 centimeters (3.94 inches) is associated with a 2.2 percentage point increase in the probability of holding a managerial position. Selection into managerial positions explains about 15 percent of the unconditional height wage premium. However, at least half of the height-leadership correlation is due to a positive correlation between height and cognitive and noncognitive ability.

Keywords: Height; beauty; leadership; discrimination.

JEL-codes: J24, J71.

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[**] Research Institute of Industrial Economics (IFN), P.O. Box 55665, SE–102 15 Stockholm, Sweden. E-mail: erik.lindqvist@ifn.se.

1. Introduction

A robust finding in the social sciences is that tall men are more likely to attain leadership positions (Stogdill 1948, Judge and Cable 2004). For example, US Presidents tend to be significantly taller than the average height in the US male population (Persico et al. 2004). The view that stature and leadership go hand in hand also permeates our language in expressions such as *big men*, *oversee*, *look up to* and *underling*.[1]

The idea that height affects the chances of attaining leadership positions is consistent with a large body of evidence from the psychology literature. This line of research have shown that tall people are seen as more persuasive (Baker and Redding, 1962; Zebrowitz, 1994; Young and French, 1996), impressive (Kurtz 1969) and capable (Hensley 1993). Moreover, people with prestigious occupations are judged to be taller (Dannenmaier and Thumin, 1964; Hensley and Angoli, 1980; Lechelt, 1975; Wilson, 1968). For example, Canadian voters perceived Brian Mulroney as being taller after winning the 1988 election (Higham and Carment, 1992).

Yet even though there are reasons to presume that the correlation between height and leadership is caused by discrimination of short men, another potential explanation is that height is correlated with skills and abilities sought after in leaders. In particular, several studies have found height to be positively correlated with intelligence.[2] An association between height and intelligence could arise both because of environmental and genetic factors. For example, it has been demonstrated that nutritional status during childhood affects both height and cognitive development.[3] Since both height and intelligence exhibit high levels

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[1] Several authors have noted that stature is used as a metaphor for leadership and power, e.g., Roberts and Herman (1986).

[2] See, for example, Tanner (1979), Humphreys et al. (1985), Teasdale et al. (1989), Johnson (1991), Wheeler et al. (2004), Case and Paxson (2008), Kanazawa and Reyniers (2009) and Lundborg, Nystedt and Rooth (2009).

[3] Several studies have shown that birth weight or nutrition in childhood is associated with height (Eide et al. 2005 and Steckel 1995) and cognition in adult age (Gomez-Pinilla 2008 and Martyn et al. 1996).

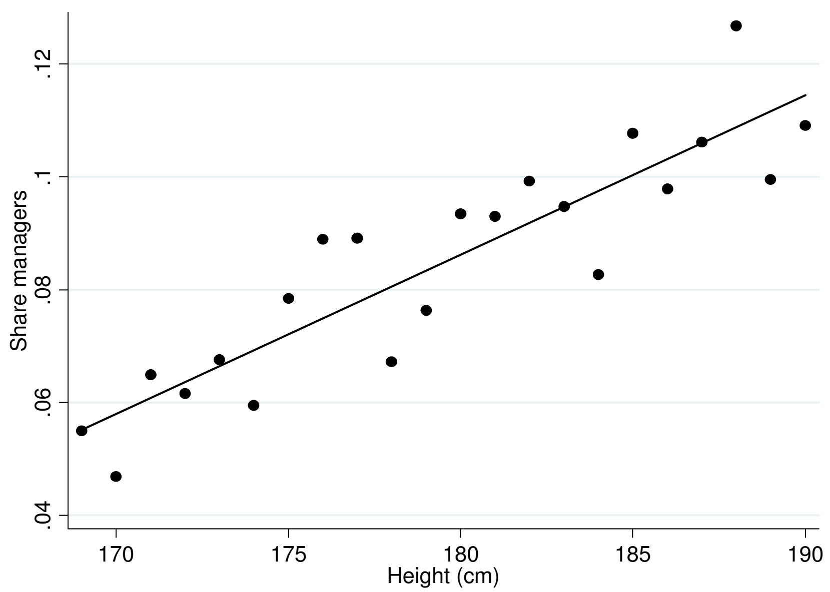
of heritability, assortative mating or pleiotropy (when a single gene affects several traits) could also be at play.[4]

In this paper, I match data on occupational status with data from the Swedish military enlistment. Along with data on height, health status, physical endurance and cognitive ability, the enlistment data provides a measure of noncognitive ability which has been found to be a strong predictor of leadership (Lindqvist and Vestman 2010). As shown in Figure 1, there is a strong correlation between height and the proportion of men in managerial positions in my data. An increase in height by 10 centimeters (3.94 inches) is associated with a 2.2 percentage point increase in the probability of holding a managerial position. The fact that tall men are more likely to select into managerial positions explains about 15 percent of the unconditional wage premium associated with height.

However, controlling for the enlistment measures of cognitive and noncognitive ability reduces the height-leadership correlation by more than 50 percent, suggesting that the association between height and leadership is, at least to a considerable extent, due to a correlation between height and ability.

[4] Three studies have used twin data to disentangle the effect of genetic and environmental factors for the height-intelligence correlation. Sundet et al. (2005) and Beauchamp et. al. (2009) find that environmental factors explain most of the height-intelligence correlation, while Silventoinen et al. (2006) argue that genetic factors are more important. However, as demonstrated by Beauchamp et. al. (2009), the share of the height-intelligence correlation attributed to genetic factors rise rapidly when positive levels of assortative mating are assumed.

Figure 1. Height and proportion of managers



Notes: Data on occupational from the year 2006 wave of LINDA. Data on height from Swedish enlistment records. Men born between 1965 and 1974.

Despite the voluminous literature on height and leadership, I am not aware of any previous study testing to what extent the association between height and leadership can be explained by a correlation between height and ability. In contrast, the relationship between height, wages and earnings has been studied in several other papers, almost all of which find that tall men fare better on average.[5] Though the relationship between height and earnings is often thought to reflect factors such as self-esteem or discrimination, Case and Paxson (2008) argue that the height earnings premium reflects a positive correlation between height and cognitive ability.

In terms of the data used, this paper is most closely related to Lundborg, Nystedt and Rooth (2009) who use data from the Swedish enlistment in a study of the relationship between height and earnings. They find that about one third of the association between height and

[5] See, for example, Loh (1993), Sargent and Blanchflower (1994), Persico et al (2004), Heineck (2005), Case and Paxson (2008), Steckel (2009) and Lundborg, Nystedt and Rooth (2009).

annual earnings is due to a correlation between height and ability. They also argue that a large fraction of the height-earnings correlation is due to a positive correlation between height and physical capacity. In contrast, I only find a small effect on the height-leadership correlation when controlling for a composite index of physical fitness; a difference due to a different specification of physical status.

2. Data

The data used in this paper are obtained by matching a data set on socioeconomic outcomes for a sample of the Swedish population (LINDA) with data from the military enlistment. LINDA is a representative panel data set covering three percent of the Swedish population annually.[6] I focus on labor market outcomes in 2006.

The military service is mandatory only for men, and I exclude the small fraction of women who enlisted in the military service. The first cohort for whom I have enlistment data is men born in 1965 (enlisted in 1983 and 1984). I do not consider men born after 1974, implying that the youngest men in my data were 32 years old in 2006. I also exclude men born outside of Sweden; men with an incomplete record from the military enlistment or enlistment after 1993; self-employed (defined as business income above 10 000 SEK); men who are not visible in any public records (zero earnings and no taxable transfers); men who received student support and men who work in the agricultural sector. With these restrictions, my matched sample consists of 14,595 men with a recorded height.[7]

[6] Edin and Fredriksson (2000) provide a detailed account of the data collection process for LINDA.
[7] There were 108 men with missing values on height. I also exclude one man with a reported height of 3.18 meters.

2.1 Socioeconomic data

The main data sources for LINDA are the Income Registers and the Population Census. In addition, LINDA contains information on occupation and wages from separate registers held by Statistics Sweden. These registers are not complete for the private sector where not all firms are sampled each year. In total, I observe occupation in 2006 for 12,304 workers, or 84.3 % of the sample. The remaining group consists both of men with no or limited participation in the labor market (e.g., people who were unemployed or on long-term sick-leave) and men whose employers did not report occupation. To increase coverage, I use occupation in 2004-2005 to impute occupation for men with missing information for 2006. I consider occupation in 2005 when information is available for both 2005 and 2004. Since the sample frame is rotated between years, this allows me to increase coverage to 13,450 men or 92.2 % of the sample.[8]

Workers in LINDA are divided into ten broad occupational groups, one of which is "managerial work". I define "managers" as all workers who belong to this group. According to this definition 8.1 percent of the men in my data are managers.

I also use information in LINDA to construct measures for wages, family background (household income in 1980 and region of birth), labor market experience, educational attainment and region of residence. I refer to Lindqvist and Vestman (2010) for detailed definitions of these variables.

2.2 Enlistment data

The enlistment usually takes place the year a Swedish man turns 18 or 19 and spans two days involving tests of health status, physical fitness, cognitive ability, and an interview with a

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[8] The results are similar if I drop men with imputed occupation from the analysis (results available upon request).

certified psychologist. For the cohorts I consider, the military enlistment was mandatory for all Swedish men and exemptions were only granted to men with severe physical or mental handicaps. About 90 percent of the men in our sample were eventually enlisted to the military service. I provide a short description of the tests of cognitive and noncognitive ability, physical fitness and health status below. Lindqvist and Vestman (2010) provide a more detailed account of the enlistment procedure and the tests of cognitive and noncognitive ability.

The enlistment test of cognitive ability consists of four parts (synonyms; inductions; metal folding and technical comprehension). The results of these tests are then transformed to a discrete variable of general cognitive ability ranging from 1 to 9. This variable follows a Stanine scale that approximates a normal distribution. I normalize the 1-9 measure of general cognitive ability to a distribution with zero mean and unit variance.

At the enlistment, conscripts are also interviewed by a certified psychologist for about 25 minutes. The objective of the interview is to assess the conscript's ability to cope with the psychological requirements of the military service and, in the extreme case, war. Each conscript is assigned a score from 1 to 9 in this respect. I use this score as a measure of "noncognitive ability" and normalize the score to mean zero and unit variance. The character traits considered beneficial by the enlistment agency include willingness to assume responsibility; independence; outgoing character; persistence; emotional stability, and power of initiative. Notably, motivation for doing the military service is not among the set of characteristics that are considered beneficial for functioning in the military. The enlistment psychologists' evaluation of conscripts has been shown to predict performance of primary school teachers on low aptitude students' performance (Grönqvist and Vlachos 2008) and labor market outcomes in terms of wages, earnings and unemployment (Lindqvist and Vestman 2010). Lindqvist and Vestman (2010) also find a distinct selection pattern with respect to the enlistment measures of cognitive and noncognitive ability. While men in managerial positions have somewhat lower cognitive ability than skilled workers in nonmanagerial positions, they had significantly higher noncognitive ability.

Importantly, height is positively correlated with both cognitive (0.127) and noncognitive (0.115) ability in my sample. Beauchamp et al. (2009) show that the correlation between height and ability as measured at the Swedish enlistment holds also within families.

The endurance test at the military enlistment implies that conscripts ride a stationary bicycle where the level of resistance (measured in terms of watt) increases over time. Since 1986, the enlistment agency bases the assessment of endurance on the maximum level of resistance divided by body weight, i.e., *watts/kg*.[9] In their study of the height earnings premium, Lundborg, Nystedt and Rooth (2009) instead use the absolute level of resistance (*watts*) as a control variable. It is not obvious a priori which measure is more appropriate.[10] For example, *watts* is a probably a better measure of the capacity to do a given amount of physical work (such as lifting heavy bags) whereas *watts/kg* is likely to be a better measure of fitness since it relates physical capacity to body weight. Further, while *watts* is strongly positively correlated with body weight (0.37) and height (0.27), *watts/kg* is negatively correlated with both weight (-0.41) and height (-0.12). This pattern raises the concern that *watts* is biased in favor of and *watts/kg* against tall men. If this were the case, controlling for *watts* would bias the effect of height on leadership toward zero while controlling for *watts/kg* would lead to an overstatement of the importance of height. To deal with these potential biases, I create an index of physical fitness based upon the combination of *watts/kg* and *watts*

[9] Conscripts get a score of endurance based upon the same type of 1-9 scale as for cognitive and noncognitive ability. There is an additional requirement in terms of the absolute level of resistance for the three highest endurance scores (7-9). This restriction could bind for men with a weight below 76.5, 70 or 64.5 kg depending on whether the relevant threshold is at 7, 8 or 9. Prior to 1985-86 the enlistment agency based their assessment of physical capacity on the absolute level of resistance.

[10] See Lundborg, Nystedt and Rooth for an argument in favor of the view that it is more appropriate to consider the absolute level of resistance rather than resistance divided by body weight. See also Böckerman et al. (2010) who argue based on Finish data that the height premium does not vary according to the physical strenuousness of work.

that best predicts absence from work due to poor health. More specifically, my index is the predictive value from a regression of an indicator variable for whether a person received long-term sick-leave or disability insurance benefits in 2006 on fourth-order polynomials in both *watts* and *watts/kg*.[11]

In addition to tests of physical performance, conscripts are also divided into 12 different categories based on their general health status. This health classification focuses on the absence of health problems rather than excellence in physical performance. About 56 percent of the men in my data received the highest health classification ("A") while 10 percent received one of the two lowest classifications ("Y" and "Z").

3. Estimation

I focus on the regression equation

$$M_i = \alpha + \beta_H \cdot Height_i + X_i\delta + \varepsilon_i, \qquad (1)$$

where M_i is a dummy variable equal to one in case person *i* holds a managerial position and zero otherwise, $Height_i$ is body height in meters and X_i is a vector of control variables. The parameter of interest is β_H, the partial correlation between height and managerial positions.[12] To see whether an association between height and leadership is mediated by a correlation between height and other characteristics, such as health status or ability, I test how the estimated value of β_H changes depending on which variables are included in the set of controls, X_i. This type of analysis addresses the question whether there is a *direct* effect of

[11] Eligibility for sick-leave benefits requires absence from work for more than two weeks. The correlation between my index and log wages (-0.195) is similar to the correlation for *watts* (0.190) and for *watts/kg* (0.178), but my index is more weakly correlated with height (-0.096). Note that the index is higher the higher is the probability of sick leave absence.

[12] Since quadratic terms for height does not increase model significantly I only consider the linear case.

height on leadership; it does not answer the question whether being tall facilitates the acquisition of skills.[13]

A potential problem in regression (1) is that measurement error in control variables correlated with height biases the estimated effect of height. In particular, there are several reasons to expect cognitive and noncognitive ability to be measured with error. For example, motivation for the military service is likely to affect performance on the test of cognitive skill and in the enlistment interview. The score of noncognitive ability is also subject to a particular form of measurement error since psychologists vary in their assessment of identical conscripts. Lilieblad and Ståhlberg (1977) estimated the correlation between the enlistment psychologists' assessment of noncognitive ability to 0.85 after letting SNSA psychologists listen to tape recordings of enlistment interviews.[14] Following the method employed by Isacsson (1999), Lindqvist and Vestman (2010) used data on Swedish twins to gauge the measurement error of the enlistment ability measures. Consistent with the lack of perfect congruence between the assessment of different psychologists, the estimated reliability ratio was higher for cognitive (0.87) than for noncognitive ability (0.70).

4. Results

Table 1 shows that selection into managerial positions explains a substantial fraction of the height wage premium. In line with what Lundborg, Nystedt and Rooth (2009) find for earnings, height is associated with a substantial wage premium for Swedish men (column 1). An increase in height by 10 cm is associated with a 5.8 percent higher wage. Including a dummy variable for managerial position in column 2 reduces the unconditional height coefficient by about 15 percent. Conditioning on educational attainment in columns 3 and 4

[13] See Judge and Cable (2004) and Persico et al. (2004) for a discussion of how height may affect the acquisition of skills.

[14] Since all psychologist listen to the same interviews, this correlation is not an exact measure of the true correlation between psychologists' assessment. The fact that psychologists make their own interviews could, in theory, imply that the true correlation is either higher or lower than 0.85.

implies that the manager dummy can account for about 18 percent of the height wage premium.

Table 1. Estimated effect of height on log wages

	(1)	(2)	(3)	(4)
Height (meters)	0.562**	0.480**	0.329**	0.269**
	(0.043)	(0.041)	(0.039)	(0.037)
Manager (dummy)		0.375**		0.337**
		(0.012)		(0.011)
Constant	9.119**	9.244**	9.361**	9.461**
	(0.078)	(0.073)	(0.071)	(0.067)
Cohort dummies	X	X	X	X
Education dummies			X	X
Observations	13,446	13,446	13,414	13,414
R-squared	0.020	0.122	0.184	0.266

Notes: All regressions estimated with OLS. Dependent variable in all regressions is log wages in 2006. Missing wages in 2006 are imputed from observable wages in 2001-2005 adjusted for inflation; see Lindqvist and Vestman (2010) for details. Heteroskedasticity-robust standard errors are reported in parenthesis for all regressions except in column 6 where standard errors are computed with nonparametric bootstrap. Two stars denote statistical significance at the one percent level while one star denotes statistical significance at the five percent level in a two-sided test.

We now turn to the question of why taller men are selected into managerial positions, i.e., the estimation of regression (1). The first column of Table 2 shows the relationship between height and leadership when no control variables except cohort dummies are included as regressors. The estimated coefficient implies a sizeable correlation between height and leadership: An increase in height by 10 centimeters (3.94 inches) predicts an increase in the probability of holding a managerial position by 2.16 percentage points. For a man of average height (1.79 meters), this correspond to an increase in the likelihood of attaining a managerial position by 27 percent.

As shown in columns 2 and 3, controlling for health status classification at the military enlistment does not change the estimated effect of height on leadership, though the height leadership correlation is somewhat weaker in the subsample with data on health status. Further, even though my physical fitness index is positively associated with the probability of obtaining a managerial position, including this index as a control variable has only a weak effect on the height coefficient (column 4).[15] In contrast, the estimated effect of height is reduced by more than 40 percent when cognitive and noncognitive ability are controlled for in column 5 and by more than 50 percent when I adjust for measurement error in cognitive and noncognitive ability in column 6. Controlling for socioeconomic background in column 7 and experience, educational attainment and region of residence in column 8 has almost no effect on the height-leadership correlation when ability is controlled for. The results in Table 1 thus clearly demonstrate that the association between height and leadership is partly due to a positive correlation between height and ability. However, since the estimated height coefficient is substantial even when observed ability is controlled for, the possibility that tall men are promoted to managerial positions partly *because* they are tall cannot be ruled out.

5. Conclusions

This paper has confirmed the conventional wisdom that tall men are significantly more likely to attain managerial positions. However, controlling for measures of cognitive and noncognitive ability reduces the estimated association between height and leadership by more than 50 percent. It is an open question whether the remaining height-leadership correlation reflects unobserved factors or whether being tall has a positive effect on the probability of obtaining a managerial position. Though I find no evidence that the height-leadership correlation is mediated by physical status, this result should be interpreted with caution since it is difficult to construct measures of physical status which are not biased for or against tall men.

Table 2. Estimated effect of height on the probability of holding a managerial position

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Height (meters)	0.216**	0.171**	0.176**	0.183**	0.121**	0.099**	0.108**	0.119**	0.129**
	(0.036)	(0.047)	(0.047)	(0.036)	(0.036)	(0.042)	(0.036)	(0.038)	(0.038)
Physical fitness index (higher value = lower fitness)				-0.008**					
				(0.001)					
Cognitive ability					0.018**	0.013**	0.016**	0.012**	0.018**
					(0.002)	(0.003)	(0.002)	(0.003)	(0.002)
Noncognitive ability					0.035**	0.043**	0.033**	0.033	0.036**
					(0.003)	(0.003)	(0.003)	(0.003)**	(0.003)
Constant	-0.286**	-0.425**	-0.334**	-0.133*	-0.116	-0.077	-0.086	-0.173	-0.129
	(0.065)	(0.097)	(0.090)	(0.067)	(0.065)	(0.076)	(0.068)	(0.074)	(0.068)
Cohort dummies	X	X	X	X	X	X	X	X	X
Health status dummies		X							
Socioeconomic background							X	X	
Birth region dummies							X	X	
Education dummies								X	
Experience (quadratic)								X	
Regional dummies								X	
Sample restrictions		Health status nonmissing	Health status nonmissing					Experience nonmissing	Experience nonmissing
Adjustment for ME in Cognitive and Noncognitive ability						X			
Observations	13450	6945	6945	13442	13450	13450	13424	12580	12580
R-squared	0.007	0.007	0.004	0.014	0.032	0.039	0.035	0.045	0.033

Notes: All regressions estimated with OLS. Dependent variable in all regressions is a dummy variable equal to one in case an individual held a managerial position in 2006. Heteroskedasticity-robust standard errors are reported in parenthesis for all regressions except in column 6 where standard errors are computed with nonparametric bootstrap. Estimates for cognitive and noncognitive ability in column 6 have been adjusted for normalization of ability test scores. Two stars denote statistical significance at the one percent level while one star denotes statistical significance at the five percent level in a two-sided test.

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