

Education and Health Behaviors:
Understanding the Role of Cognitive and Psychological Human Capital

Extended Abstract for PAA Submission

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Abstract

Health behaviors are strongly patterned by educational attainment, but the mechanisms underlying this relationship are unclear. One potential explanation is that education fosters and reflects human capital accumulation. Human capital can impact health behaviors via cognitive skills and psychological means. Using data from the Wisconsin Longitudinal Study (WLS), we examine the extent to which the association between education and health behaviors (smoking, obesity) is explained by measures of cognitive (academic performance) and psychological human capital (personality traits such as conscientiousness and indicators of psychological well-being such as environmental mastery). We find that cognitive human capital measures substantially mediate the association between education and health behaviors. Cognitive and psychological human capital measures are also independently associated with health behaviors, but the relative importance of each, as well as particular measures implicated, varies by specific health behavior and life course stage examined.

Introduction and Research Question

Health behaviors are strongly patterned by educational attainment, but the mechanisms underlying this relationship are unclear. One potential explanation is that education fosters and reflects human capital accumulation, which in turn influences health behaviors. Cognitive human capital refers to cognitive skills such as language, mathematical and critical thinking abilities, while psychological human capital relates to behaviors and traits such as conscientiousness and sense of environmental mastery. Research on health behavior differences by educational attainment has tended to treat all health behaviors as interchangeable, and thus influenced by education (and facets of human capital) in similar ways. Epidemiological literature, however, finds that health behaviors differ in their determinants and life course trajectories (e.g., timing of onset, continuation, and management), and sociological literature suggests that health behaviors vary in their social meanings by attributes such as gender. These variations may in turn imply that the importance of different facets of human capital varies by specific health behavior.

What role do cognitive and psychological human capital play in the educational patterning of health behaviors? What independent role do they have? Do these relationships vary by particular health behavior? In the current study we answer this question by examining the extent to which measures of cognitive and psychological human capital mediate the relationship between education and health behaviors (smoking and obesity) among a birth cohort of men and women. We move beyond prior research by examining how associations between education, dimensions of human capital, and health behavior vary by specific health behavior, life course stage, and gender.

Background

Numerous studies have found that education is a critical component of life chances, including health. Scholars have also argued that part of the relationship between health and education can be explained by cognitive human capital and psychological human capital, which are thought to be both fostered and reflected in educational attainment (Mirowsky and Ross 2003). While prior research has examined the importance of cognitive and psychological human capital for general health (Herd 2010), less is known about how these dimensions of human capital may be implicated in health behaviors, which, on average, explain about 25% of SES-health disparities (Pampel, Krueger, and Denney 2010). Though prior work on health has found that cognitive human capital plays a more important role in accounting for educational differences in health overall than psychological human capital (Herd 2010), the relative importance of each may differ by specific health behavior.

Smoking and obesity are both important risk factors for disease and death and are patterned by education, but differences in other determinants of health behaviors may have implications for the roles of cognitive and psychological human capital. For instance, one way that cognitive capital might be implicated in health behaviors is that cognitive skills enable individuals to make more informed decisions about their health, including via behavior. Though the health dangers of smoking are widely known due to successful public health campaigns, the

dangers of obesity are less widely-known. The majority of Americans report believing smoking is harmful for health (Saad 2006), but only about a third of Americans consider obesity a “very serious health problem” (Bleich et al. 2007). Thus, cognitive human capital may be more important in explaining the relationship between obesity and education than between smoking and education because the former behavior’s health dangers are less widely disseminated and individuals may have to process more complicated information to be informed of its risks.

Smoking and obesity also differ in their life course patterning in ways that may have implications for specific components of cognitive and psychological human capital. For instance, smoking behavior may span over much of the life course, beginning in adolescence, when the vast majority of smokers initiate the behavior (U.S. Department of Health and Human Services 1994), continuing in many cases for decades before (possible) cessation. Prior research has also identified the importance of social factors in adolescence for smoking initiation—especially the influence of peers, which points to psychological traits such as openness (which may signal curiosity about trying new things) and extraversion (which may signal greater influence of peer pressure). These same factors, however, may not be associated with smoking cessation, which prior research has tied to factors such as environmental mastery. Furthermore, the life course patterning of obesity may be better characterized by gradual weight gain as individuals age. While individuals are at risk of becoming overweight or obese at any age, individuals are more susceptible to being overweight or obese with age, as hormonal changes slow down metabolism and decrease lean muscle mass. New research, however, also suggests that the majority of weight gain with age is the result of changes in diet and lifestyle (Mozaffarian et al. 2011). Thus, factors such as conscientiousness may be of particular importance for body weight across the life course.

Health behaviors are not only patterned by education, but also by other markers of social position such as gender. Even within the same birth cohort, men and women may receive different messages as to the meaning of specific behaviors. For instance, among older cohorts, smoking behavior denoted masculinity among men as seen in advertisement using athletes and cowboys, but was seen as “not ladylike” for respectable young women (Brandt 2007: 325). For obesity, however, thinness has been seen as more tightly linked to beauty and attractiveness for women than men throughout much of the 20th century (Garner et al. 1980). Thus, the role of factors such as agreeableness, which may signal conformity to norms, may be stronger for women than men for both smoking and obesity.

Data, Key Variables, and Methods

This study uses data from the Wisconsin Longitudinal Study (WLS), a longitudinal study of a one-third random sample of 1957 high school graduates from 1957 (~age 18) through 2004 (~age 63). The WLS contains detailed measures of respondents’ family background, educational and occupational histories, earnings, family, and health. We utilize multinomial logistic regression to estimate the log odds of being in health behavior categories in 1992 (middle age, ~54 years old) and 2004 (early older age, ~63 years old). The two dependent variables are smoking status (never smoker, former smoker (reference), current smoker) and body weight (categorized by body mass

index thresholds as normal weight, overweight (reference), and obese). Education is coded as high school diploma, some college, college degree, master's degree, and doctoral/professional degree. Cognitive human capital measures include high school rank percentile, whether teacher described respondent as an "outstanding student," and whether respondent reported finding their studies "particularly interesting." Psychological human capital measures include Big Five personality measures (agreeableness, conscientiousness, extraversion, neuroticism, and openness) and indicators of psychological well-being taken from the Ryff scale (autonomy, environmental mastery, personal growth, positive relations with others, purpose in life, and self-acceptance). We also include several controls and potential confounders, including age, childhood IQ, mother's and father's education, childhood family income (from state tax records), mother's employment status, father's occupational status, and childhood family structure.

Preliminary Results

Descriptive analysis (Tables 1 and 2) reveal gender differences in the overall prevalence of unhealthy behaviors as well as differences in their patterning by education. Men have higher ever-smoking rates than women, and current smoking declines over time for both genders, though women ever-smokers are less likely to have quit than men. Within gender, the patterning of smoking by education varies. For men, the dividing line in ever-smoking and quitting behavior is between men with less than college education and men with a college education or more. Across waves, women with some college are more likely to be ever-smokers than women with either only a high school or a college or more education. Women are more likely to be normal weight as measured by BMI than men for both waves, though obesity rates by gender converge over time. In 1992, the proportion of men of normal weight increases by education, while the proportion of men who are obese decreases by education. In 2004, however, men with high school only or some college education have similar rates of obesity and being normal weight, while men with college or more education have lower rates of obesity and higher rates of being normal weight than men with less education. For women, higher levels of education are associated with lower levels of being overweight and obese and higher levels of being normal weight in 1992, with those having a college education or more exhibiting the healthiest weight profile as an educational group. In 2004, the educational gradient in being in the overweight category disappears, while higher levels of education are associated with higher rates of being normal weight and lower rates of obesity, with the greatest advantage goes to women with a college education or more.

Multinomial logistic regression models (selected tables presented, Tables 3-6) reveal that cognitive human capital measures account for more of the association between education and both smoking (especially being a never versus former smoker) and body weight than measures of psychological human capital. In some cases, the magnitude of educational coefficients actually increases when psychological human capital measures are accounted for, suggesting that they may operate as suppressor variables. Higher high school rank percentile is strongly and independently associated with higher log odds of being a never smoker compared with a former

smoker for both men and women across waves. Psychological human capital measures are also independently associated with health behaviors. For both genders and behaviors, higher levels of autonomy and extraversion are associated with unhealthy behaviors, including current smoking and obesity. Greater levels of mastery, however, are associated with lower relative log odds of being obese versus overweight for both men and women, and quitting smoking among women. For both women and men, higher levels of conscientiousness are associated with greater log odds of being a never smoker versus a former smoker, but are not associated with being current versus former smokers. Greater conscientiousness is also independently associated with greater relative log odds of being of normal weight versus overweight and lower relative log odds of being obese versus overweight. Neuroticism is associated with lower body weight for both men and women, but is not associated with smoking.

Discussion, Limitations, and Future Directions

Results indicate both similarities and differences in the roles of cognitive and psychological human capital measures in explaining the educational patterning of smoking and obesity, as well as the independent association of dimensions of human capital with behaviors. Our finding that cognitive human capital mediates more of the relationship between education and health behaviors is consistent with prior work examining the roles of cognitive and psychological human capital in the relationship between education and general health (Herd 2010). In contrast to prior work, we find a wide variety psychological human capital measures to be independently associated with health behaviors.

As this research moves forward, we will more completely address study limitations, including reverse causality. In particular, smoking initiation usually occurs in adolescence, but our measures of psychological human capital are not measured until middle age. Furthermore, changes in health behavior (such as smoking cessation between waves) may just as well contribute to environmental mastery as mastery contributes to successful cessation. In addition, future analysis (to be presented at PAA) will explore the potential role of income and occupational status as mediating pathways between dimensions of human capital and health behaviors, as well as utilize multiple imputation to address missing data.

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Table 1. Smoking Status (%) by Year, Gender, and Education, Wisconsin Longitudinal Study.

	Men			Women		
	HS	Some Coll	Coll/+	HS	Some Coll	Coll/+
1992						
Former Smoker	45	47	41	30	32	32
Never Smoker	34	34	48	51	47	58
Current Smoker	21	18	11	20	21	10
% Still Smoking Ever Smoked	32	28	21	39	40	24
total n	3,152			3,613		
2004						
Former Smoker	52	51	45	37	39	38
Never Smoker	33	35	46	50	45	56
Current Smoker	15	14	8	13	16	6
% Still Smoking Ever Smoked	23	21	16	26	29	13
total n	3,102			3,635		

Table 2. Body Weight Classification(%)by Year, Gender, and Education, Wisconsin Longitudinal Study.

1992	Men			Women		
	HS	Some Coll	Coll/+	HS	Some Coll	Coll/+
Overweight	58	56	59	40	38	35
Normal weight	19	23	26	41	48	54
Obese	23	21	15	19	14	11
total n	3,155			3,506		
2004						
Overweight	56	55	58	42	41	42
Normal weight	16	17	22	30	37	41
Obese	29	28	20	28	22	18
total n	2,849			3,223		
Note: Weight categories based on calculated body mass index (weight (in kg)/ (height (in meters)) ²)						
BMI: 18.5-24.9="normal weight"; 25-29.9="overweight"; 30+= "obese"						

Table 3. Women Smoking Behavior 1992, Wisconsin Longitudinal Study.

	Model 1				Model 2				Model 3				Model 4				Model 5			
	Never v. Former		Current v. Former		Never v. Former		Current v. Former		Never v. Former		Current v. Former		Never v. Former		Current v. Former		Never v. Former		Current v. Former	
	Coeff.	Sig.	Coeff.	Sig.	Coeff.	Sig.	Coeff.	Sig.	Coeff.	Sig.	Coeff.	Sig.	Coeff.	Sig.	Coeff.	Sig.	Coeff.	Sig.	Coeff.	Sig.
Education																				
High School																				
Some Coll	0.02		0.05		-0.08		0.19		0.08		0.07		0.07		0.03		-0.01		0.20	
Coll	0.29 *		-0.59 **		0.08		-0.42 *		0.36 *		-0.57 **		0.29 *		-0.57 **		0.13		-0.36	
Masters	0.62 **		-0.57 †		0.43 *		-0.40		0.75 ***		-0.51 †		0.65 **		-0.59 †		0.53 *		-0.33	
Phd/Professional	0.39		-0.61		0.27		-0.45		0.63		-0.51		0.49		-0.73		0.47		-0.47	
Cognitive Human Capital																				
Class rank percentile					0.42 ***		-0.05										0.37 ***		-0.05	
Exceptional Student					0.18		-0.03										0.17		-0.03	
Studies Interesting					-0.01		-0.40 **										0.05		-0.39 **	
Noncognitive Human Capital																				
Big Five Personality																				
Conscientiousness									0.04 ***		0.02						0.04 **		0.02	
Extraversion									-0.03 ***		-0.01						-0.03 ***		-0.03 *	
Agreeableness									0.06 ***		0.04 **						0.06 ***		0.04 **	
Neuroticism									0.01		0.01						0.01		0.02	
Openness									-0.01		0.00						0.01		-0.01	
Ryff Psychological Well-Being																				
Autonomy													-0.02 *		0.06 ***		-0.01		0.07 ***	
Environmental Mastery													-0.01		-0.04 *		-0.03 †		-0.04 *	
Personal Growth													-0.05 ***		-0.02		-0.05 ***		-0.01	
Positive Relations with Others													0.01		0.04 **		0.00		0.04 *	
Purpose in Life													0.03 *		-0.01		0.02		-0.02	
Self-Acceptance													0.03 **		0.01		0.04 **		0.02	
n (across models)	2860																			
* All models control for birth year, IQ, mother's education, father's education, childhood income (quintile), dummy mother worked, father's occupational education, and single parent family																				
Note: †p<0.1* p<0.05; ** p<0.01; *** p<0.001.																				

Table 4. Men Smoking Behavior 1992, Wisconsin Longitudinal Study.

	Model 1				Model 2				Model 3				Model 4				Model 5				
	Never v. Former		Current v. Former		Never v. Former		Current v. Former		Never v. Former		Current v. Former		Never v. Former		Current v. Former		Never v. Former		Current v. Former		
	Coeff.	Sig.	Coeff.	Sig.	Coeff.	Sig.	Coeff.	Sig.	Coeff.	Sig.	Coeff.	Sig.	Coeff.	Sig.	Coeff.	Sig.	Coeff.	Sig.	Coeff.	Sig.	
Education																					
High School																					
Some College	0.11		-0.09		-0.01		-0.09		0.13		-0.09		0.15		-0.07		0.03		-0.07		
College	0.47	**	-0.39	*	0.22		-0.36	†	0.49	**	-0.41	*	0.49	**	-0.35	†	0.25		-0.35	†	
Masters	1.06	***	-0.28		0.78	***	-0.25		1.08	***	-0.32		1.10	***	-0.20		0.83	***	-0.22		
Phd/Professional	0.62	**	-1.01	**	0.31		-0.97	**	0.69	**	-1.04	**	0.68	**	-0.94	**	0.41		-0.93	**	
Cognitive Human Capital																					
Class rank percentile					0.33	***	-0.05										0.32	***	-0.05		
Exceptional Student					-0.25	†	0.00										-0.25		-0.04		
Studies Interesting					0.11		0.02										0.12		0.06		
Noncognitive Human Capital																					
Big Five Personality																					
Conscientiousness									0.02	†	0.02						0.02		0.02		
Extraversion									-0.02	†	-0.02	†					-0.01		-0.02	†	
Agreeableness									0.02		0.03	†					0.02		0.03	†	
Neuroticism									-0.02	†	0.01						-0.03	*	0.01		
Openness									-0.02	*	0.01						-0.01		0.01		
Ryff Psychological Well-Being																					
Autonomy													0.00		0.08	***	0.00		0.09	***	
Environmental Mastery													0.03	*	0.00		0.02		0.00		
Personal Growth													-0.03	**	-0.02		-0.03	*	-0.03	†	
Positive Relations with Others													0.01		0.04	**	0.00		0.04	*	
Purpose in Life													0.00		0.00		-0.01		-0.01		
Self-Acceptance													-0.02		-0.07	***	-0.02		-0.07	***	
n (across models)	2516																				
* All models control for birth year, IQ, mother's education, father's education, childhood income (quintile), dummy mother worked, father's occupational education, and single parent family																					
Note: †p<0.1* p<0.05; ** p<0.01; *** p<0.001.																					

Table 5. Women BMI 1992, Wisconsin Longitudinal Study.

	Model 1		Model 2		Model 3		Model 4		Model 5											
	Normal Weight	Obese v.	Normal Weight	Obese v.	Normal Weight	Obese v.	Normal Weight	Obese v.	Normal Weight	Obese v.										
	v. Overweight	Overweight	v. Overweight	Overweight	v. Overweight	Overweight	v. Overweight	Overweight	v. Overweight	Overweight										
	Coeff.	Sig.	Coeff.	Sig.	Coeff.	Sig.	Coeff.	Sig.	Coeff.	Sig.										
Education																				
High School																				
Some Coll	0.09		-0.38 *		0.04		-0.38 †		0.07		-0.42 *		0.08		-0.37 *		0.03		-0.43 *	
Coll	0.18		-0.69 **		0.07		-0.68 **		0.14		-0.75 **		0.18		-0.64 **		0.04		-0.72 **	
Masters	0.51 **		-0.06		0.39 *		-0.07		0.43 *		-0.12		0.51 *		-0.02		0.32		-0.10	
Phd/Professional	0.57		0.29		0.49		0.26		0.48		0.09		0.58		0.17		0.39		0.02	
Cognitive Human Capital																				
Class rank percentile					0.15 **		-0.05										0.14 *		0.00	
Exceptional Student					0.17		0.08										0.16		0.07	
Studies Interesting					0.03		0.01										0.04		0.02	
Noncognitive Human Capital																				
Big Five Personality																				
Conscientiousness									0.04 **		-0.05 **						0.03 *		-0.03	
Extraversion									-0.02 *		-0.01						-0.02 *		-0.01	
Agreeableness									0.00		0.00						0.00		0.01	
Neuroticism									0.02 *		0.00						0.03 **		-0.01	
Openness									0.02 *		0.02						0.02 *		0.02	
Ryff Psychological Well-Being																				
Autonomy													0.00		0.03 *		0.00		0.03 *	
Environmental Mastery													0.02		-0.05 **		0.01		-0.04 *	
Personal Growth													0.01		0.00		0.01		-0.01	
Positive Relations with Others													0.00		0.02		0.01		0.02	
Purpose in Life													-0.01		-0.04 **		-0.02 †		-0.04 *	
Self-Acceptance													0.00		0.01		0.01		0.00	
n (across models)	2781																			
* All models control for birth year, IQ, mother's education, father's education, childhood income (quintile), dummy mother worked, father's occupational education, and single parent family																				
Note: †p<0.1* p<0.05; ** p<0.01; *** p<0.001.																				

Table 6. Men BMI 1992, Wisconsin Longitudinal Study.

	Model 1				Model 2				Model 3				Model 4				Model 5			
	Normal Weight v. Overweight		Obese v. Overweight		Normal Weight v. Overweight		Obese v. Overweight		Normal Weight v. Overweight		Obese v. Overweight		Normal Weight v. Overweight		Obese v. Overweight		Normal Weight v. Overweight		Obese v. Overweight	
	Coeff.	Sig.	Coeff.	Sig.	Coeff.	Sig.	Coeff.	Sig.	Coeff.	Sig.	Coeff.	Sig.	Coeff.	Sig.	Coeff.	Sig.	Coeff.	Sig.	Coeff.	Sig.
Education																				
High School																				
Some Coll	0.27 †		0.01		0.25		0.07		0.27 †		0.01		0.27 †		0.00		0.26		0.02	
Coll	0.14		-0.33 †		0.12		-0.19		0.13		-0.31 †		0.15		-0.27		0.13		-0.20	
Masters	0.47 **		-0.38 †		0.45 *		-0.20		0.44 **		-0.30		0.49 **		-0.31		0.44 *		-0.15	
Phd/Professional	0.46 *		-0.64 *		0.43 †		-0.45		0.43 *		-0.63 *		0.47 *		-0.58 *		0.44 †		-0.47	
Cognitive Human Capital																				
Class rank percentile					-0.02		-0.11 †										-0.04		-0.06	
Exceptional Student					0.06		-0.21										0.05		-0.24	
Studies Interesting					0.08		-0.11										0.08		-0.03	
Noncognitive Human Capital																				
Big Five Personality																				
Conscientiousness									0.02 †		-0.08 ***						0.02		-0.07 ***	
Extraversion									-0.03 *		0.04 **						-0.03 **		0.04 **	
Agreeableness									0.01		-0.03 *						0.01		-0.02	
Neuroticism									0.02		-0.03 *						0.02		-0.03 *	
Openness									0.02		-0.02						0.02		-0.02	
Ryff Psychological Well-Being																				
Autonomy													0.00		0.05 ***		0.00		0.04 **	
Environmental Mastery													0.00		-0.05 **		0.00		-0.04 *	
Personal Growth													0.00		0.00		-0.01		0.01	
Positive Relations with Others													-0.01		0.01		0.00		0.00	
Purpose in Life													0.00		-0.02		0.00		0.00	
Self-Acceptance													-0.01		0.00		0.00		-0.01	
n (across models)	2519																			
* All models control for birth year, IQ, mother's education, father's education, childhood income (quintile), dummy mother worked, father's occupational education, and single parent family																				
Note: †p<0.1* p<0.05; ** p<0.01; *** p<0.001.																				