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Commentary: On the Importance of Early Life Cognitive Abilities in Shaping Later Life Outcomes

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Abstract

Early life cognitive ability is likely to be dynamically related to life course factors including educational attainment, occupational outcomes, health behaviors, activities, health, and subsequent cognitive health. Disentangling the selective and causal processes contributing to cognitive functioning across the lifespan is challenging and requires long-term investments in longitudinal data. We discuss results from several analyses using data from the Individual Development and Adaptation longitudinal research program (Bergman, 2000; Magnusson, 1988) that provide fresh insights into the relation of early life cognition, particularly high levels of cognitive capabilities, to educational achievement, emotional adjustment, and career success. These papers and the longitudinal data provide a remarkable window into the development and impacts of cognition, and high cognitive functioning, on a variety of important life outcomes that we hope will continue to inform us about additional outcomes in middle life, transition to retirement, and cognition and health in later years and to robustly examine how the early years matter across the whole lifespan.

Keywords

Cognitive ability; longitudinal; educational achievement; emotional adjustment; career success

Cognitive ability has been considered as both cause and consequence of important life course factors including educational attainment and occupational outcomes, such as unemployment or retirement. However, disentangling the selective and causal processes contributing to cognitive functioning across the lifespan is challenging and requires very long-term longitudinal data. This study, from the Individual Development and Adaptation longitudinal research program (Bergman, 2000; Magnusson, 1988), provides fresh insights into the relation of early life cognition, particularly high levels of cognitive capabilities, to educational achievement, adjustment, and career success. This study is an exemplar of the best studies for understanding the impact of cognitive ability early in life and how these individual differences matter for a host of important outcomes later in life.

A primary motivation for this study and set of papers, as noted in the introduction to this special issue, is to understand the role and outcomes of intellectual talent (defined as the top 10% or 20% in adolescent cognition), particularly on advanced educational achievement and occupational success. Indeed, childhood cognition is considered to have an integral role in determining educational attainment (Deary, et al., 2007; Deary & Johnson, 2010) and subsequently accounting for the correlation between education and adult cognition. While educational attainment is highly correlated with cognition in adulthood, the nature of this relationship remains controversial. Specifically, this perspective implies that childhood cognition acts as a proxy for educational attainment, operating primarily through selection into educational opportunities, leading some researchers to question the impact of any social factors and suggest that early life cognition underlies all social inequalities in health (Gottfredson, 2004; but see Link, Phelan, Miech, & Westin, 2008). Some researchers (De Graaf, De Graaf, & Kraaykamp, 2000; Deary, et al., 2007; 2010; Feinstein, 2003; Tucker-Drob, 2011) argue that the ostensible influence of education on cognition is primarily an artefact of selection by prior cognitive ability, differences in which emerge in early life, drive educational attainment, then track across the rest of the life course. While educational attainment is likely to be determined by prior cognitive ability, an alternative view is that educational attainment has a causal effect on cognitive development and improvement of cognitive performance in adulthood (Clouston, Kuh, Herd, Elliott, Richards, & Hofer, 2012; Jaeggi, Buschkuhl, Jonides, & Perrig, 2008; Richards & Sacker, 2003, 2011). Examining such an influence over the life course is important, as a number of researchers have noted that those with greater exposure to educational opportunities in early-life have higher subsequent cognitive capability as well (Glymour, Kawachi, Jencks, & Bergman, 2008).

This special issue examined the influence of early life predictors of educational attainment on a variety of outcomes of interest to interdisciplinary researchers. Bergman, Corovic, Ferrer-Wreder, and Modig (2014) find that adolescent cognitive capability was associated with educational attainment and occupational attainment, but also found that its influence was not alone, but was sometimes sufficient: among those with the highest cognitive scores, parental socioeconomic status was not predictive of later income. Meritocracy is a question of great interest to policymakers who are interested in supporting the development of human capital. Having a clearer understanding the range of determinants of educational attainment may help to support those with the correct nexus of capabilities, including cognitive capability and persistence or aspiration or the ability to achieve goals: even the smartest students who lack the ability to achieve their goals are evidently hampered by that lack.

Following such a thought, Andersson, Lovén, and Bergman (2014) find that characterizing males, but not females, as being “high competence,” defined by cognitive capability, persistence, aspiration, and achievement scores, was associated with a higher achievement even when separately adjusting for each individual component. Identifying the nexus of factors that predict success may be important for understanding how to integrate non-cognitive skills and towards further providing a complete picture of the role and, ultimately, meaning of educational attainment when incorporated. A better understanding of what goes into achievement can provide us with a better understanding of the causal role of educational attainment in aging research.

Ferrer-Wreder, Wanstrom, and Corovic (2014) examine the role of cognitive capabilities in influencing trajectories of emotional adjustment and behavioral factors and found that, “for those of above average intelligence, parents’ socioeconomic status and school grades were the strongest predictors of educational attainment.” Yet, the study also showed that 26% of the participants with above average intelligence (Mean IQ = 119) did not complete high school, with women more likely to drop out. However, it was also ten times more likely that a person of high IQ (top 10%) will achieve a graduate degree at the master’s level or higher (Bergman et al., 2014), though the proportions of those in this highest decile of IQ scores who went on to a graduate degree was relatively low, 13% for women and 34% for men. This study demonstrates that there are a wealth of factors involved in educational attainment, and implies that educational attainment is not simply a proxy for childhood IQ.

Finally, Zettergren and Bergman (2014) ask about the ability for those with high cognitive capability to emotionally adjust to their surroundings. They find robust nonlinear, but inconsistent, results that may suggest that these individuals find social adjustment difficult or that they are excluded from normal social interactions. For example, those in the top of the cognitive distribution were, in adolescence, more likely to be able to concentrate and were happier, while those in the bottom of the distribution were more likely, in early adulthood, to have alcohol problems and to have been cited for criminal offences though cognitive capability was not otherwise associated with either issue. More interesting, however, was that those in the highest group reported lower life satisfaction and less satisfying friendship ties. Social networks and satisfying social ties are associated with late-life health and capability (Clouston, Lawlor, & Verdery, in press); insofar as early life advantages predict poor midlife outcomes, late life health may be adversely impacted.

The results from the Individual Development and Adaptation program of research indicate a weak to moderate association between IQ and educational attainment and highlight the need to understand the independent impacts of cognition and educational attainment on later life outcomes. The results of these studies are in line with those of a recent paper by Clouston et al. (2012) that finds education confers a substantial benefit above that of childhood cognition (and parental social status), with differences in adult cognition derived in substantial part from educational experiences after adolescence. The educational effect may have a lasting impact on cognitive functioning in later life (Hatch, Feinstein, Link, Wadsworth, & Richards, 2007), including increased cognitive reserve, a resiliency to age-related neuropathology (Stern, 2009).

The findings presented in this set of papers have important implications for aging research. Cognition is recognized as an essential component of health and wellbeing across the life course. Factors throughout early life have substantial impacts on health and health behaviors in later life (Heckman, Stixrud, & Urzua, 2006; Richards, Stephen, & Mishra, 2010), including investment in early life education (Banks & Mazzonna, 2012; Glymour, Kawachi, Jencks, & Berkman, 2008), thereby forming the basis for cognitive reserve (Scarmeas & Stern, 2003; 2004). However, the same life course factors often lead to better occupational outcomes: those with higher cognition, better education, and parents with higher social class are more likely to succeed (Burks, Carpenter, Goette, & Rustichini, 2009), and are less likely to be unemployed (Clark, Georgellis, & Sanfey, 2001; Cole, Daly, & Mak, 2009;

Vinokur & Schul, 2002). In the Swedish cohort, Bergman et al. (2014) find a relatively weak association with vocational success, and report nonlinear effects of high IQ for men only.

While the study provides excellent evidence as to the particulars of the Swedish experience, a number of questions remain that may help the authors to conceptualize future studies. For example, why would the Swedish experience differ? Higher educational attainment, when not universally provided, clearly selects on gender, cognitive capability, individual desires, occupational aspirations, and parental social status among other things. Swedish results may differ in subtle, but interesting, ways from studies in the UK or USA because respondents are subject to compressed social inequalities where inequalities do not as strongly determine access to resources. Are these inequalities important to understanding cognitive development and its longitudinal effects?

Of particular interest, this issue highlighted results that may suggest that further study is needed to examine the role of non-cognitive skills in influencing midlife outcomes might be another place that this study might uniquely be situated to examine over the life course. Non-cognitive skills have been getting increasing interest from researchers and policymakers alike (Heckman & Rubinstein, 2001; Heckman, Stixrud, & Urzua, 2006) but the long-term influence of such skills remain to-date not well understood, especially in contexts outside the United States.

At least two of the studies explicitly noted that the role of cognitive capability is fundamentally different for men and women, though the gender effects were evident throughout. These effects, for example predicting different rates of educational attainment or occupational success, are unlikely to be related to sex-specific factors but are instead likely to be a result of differences in the ways that “gender,” perhaps defined as a fundamentally unequal societal treatment of persons with differing sexes, influences life course trajectories and health (Murray et al., 2011; Springer, Stelman, & Jordan-Young, 2012). Do women and men diverge in their life course trajectories? If so, when do those divergent results arise and how do they predict known, divergent, trajectories of health over the life course? One obvious demographic change that has occurred since these respondents were children is the shrinking of gender-related gaps in access to education and to well-paid and skilled jobs. Such gaps still exist in work (Blau & Kahn, 2003), though not in education (Arnot, David, & Weiner, 1999), thus understanding how the influence of cognitive capability has also changed over time may help us better understand when cognitive capability is most relevant as a developmental marker for life course socioeconomic and health-related trajectories.

Taken together, it is clear that early life cognition influences some of the distribution of social factors, including education and employment, and extends to post-retirement activities, health, and subsequent cognitive health (Richards, Power, & Sacker, 2009; Richards & Sacker, 2003; Rohwedder & Willis, 2010). Because of these complex dynamics, it is increasingly accepted that the study of aging requires a life course perspective, which advocates capturing early life influences, life events, and lifestyles to understand their importance in shaping outcomes in the middle and later years (Hofer & Piccinin, 2010; Kuh, Cooper, Hardy, Richards, & Ben-Shlomo, 2014). It is only by capturing important aspects of the person and their context on repeated occasions that we can describe and characterize

both general patterns of change over time but also the reasons why individuals differ from one another in their patterns and rates of change. The multivariate nature of such change is challenging to capture. As a result, the study of cognitive development and change, particularly declines later in life, is an increasingly interdisciplinary endeavor given the profound implications of cognitive decline to workplace productivity, health, independent living, social interactions, and wellbeing. This study provides important new results regarding the longitudinal association of cognitive capabilities early in life and how these influence outcomes in midlife.

It is our hope is that this study will continue for many more years. These data provide a remarkable window into the development and impacts of cognition, and high cognitive functioning, on a variety of important life outcomes and will inform us about additional outcomes in middle life, transition to retirement, and cognition and health in later years and how the early years matter. Indeed, there are many other questions that this valuable study might answer. Finally, we also must acknowledge the extraordinary “grit” that is required to initiate and sustain longitudinal studies such as this one and persistent interest necessary to achieve such long-term goals (Duckworth & Eskreis-Winkler, 2013).

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