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Antisocial and Human Capital Pathways to Socioeconomic Exclusion:

A 42-Year Prospective Study

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Abstract

Nordic welfare states have been very successful at reducing poverty and inequality among their citizens. However, the presence of a strong social safety net in these countries has not solved the problem of *socioeconomic exclusion*, manifesting in such outcomes as chronic unemployment and welfare dependency. In an effort to understand this phenomenon, the current study builds on the assumption that *psychological risk factors* emerge as important determinants of socioeconomic disadvantage in an environment where ascribed characteristics have less impact on educational and occupational attainment. Using data from Finland, this research examined a life course model linking childhood differences in cognitive skills and antisocial propensity to midlife socioeconomic exclusion. The Jyväskylä Longitudinal Study of Personality and Social Development (n = 369) follows individuals from age 8 (b. 1959) through age 50. Evidence from a structural equation model found support for key theoretical predictions: (1) human capital and antisocial pathways contributed independently to socioeconomic exclusion; (2) the effect of childhood psychological factors on midlife socioeconomic exclusion was mediated by adolescent and adult life course outcomes; and (3) the human capital and antisocial domains intersected such that antisocial children struggled in school as adolescents, which contributed to their persistence in crime and deviance in adulthood – a behavioral pattern that directly increased the risk of socioeconomic exclusion in midlife. In short, the findings suggest that early emerging differences in cognitive ability and antisociality set in motion a process of negative life outcomes with enduring consequences for socioeconomic well-being. The results are discussed from the perspective of socio-historical context and public policy.

Keywords: Socioeconomic disadvantage, life course, antisocial behavior, human capital

An influential theory of social justice (Rawls, 2009 [1971]) argues that *maximizing the well-being of the worst off* should guide the equitable distribution of socioeconomic resources, such as income and access to education and health care. In light of cross-national comparative data, Nordic countries offer the closest approximation of this principle: those who are poor, jobless, or disabled in Denmark, Finland, Norway, or Sweden tend to be much better off than those who are poor, jobless, or disabled elsewhere in the world (e.g., Gornick & Jäntti, 2012; Kangas, 2000). The likely reason for this accomplishment is their advanced welfare regimes, which provide comprehensive and generous systems of support from cradle to the grave (Esping-Andersen 1990; Kenworthy, 1999). Although these policies have been effective at minimizing material hardship – virtually eradicating such problems as homelessness, illiteracy, and hunger – even the most advanced welfare states struggle with the problem of *socioeconomic exclusion*. Originating from the European public policy discourse (Atkinson & Da Voudi, 2000; Room, 1999), this concept refers to such interrelated aspects of disadvantage as (relative) poverty, long-term unemployment, and welfare dependence (Bäckman & Nilsson, 2010). For the purposes of the present study, socioeconomic exclusion is defined as persistent failure to participate in the economic mainstream.

Finland is a Nordic welfare state with strong policies supporting healthy development through universal access to high quality prenatal clinics, paid parental leaves, subsidized childcare, and a public school system that is internationally recognized by its high academic achievement and low socioeconomic segregation (Gauthier, 2001; Gorard & Smith, 2004; Lundberg et al., 2008). Despite these and numerous other policies of collective social protection, participation in the economic mainstream continues to elude a significant share of the Finnish

population. A study of Finns born in 1987 found that, between ages 21-25, as many as 14% of the birth cohort were disengaged from employment, education, and any kind of training, including the military (Larja et al., 2016). In 2010, only 60% of Finnish men between ages 55-64 were counted as part of the labor force, which means they were either employed or looking for work (Statistics Finland, 2015). In other words, as many as 40% of the Finnish men in this age group had effectively withdrawn from the labor force before the standard retirement age of 65.

The aim of the present study is to illuminate pathways to socioeconomic exclusion in a cohort of Finns born in 1959. The theoretical perspective is informed by the assumption that in advanced welfare states, such as Finland, those who fall through the cracks of the social safety net are associated with psychological characteristics that make it difficult for them to take advantage of the policies designed to prevent socioeconomic exclusion (Mayer 1997). Drawing on the literature on the influence of individual differences on educational and occupational attainment, we develop a causal model which identifies deficits in *cognitive ability* and *behavior regulation* as childhood psychological characteristics that set in motion a life course process resulting in midlife socioeconomic exclusion. We examine the validity of this dual pathway model using data from the Jyväskylä Longitudinal Study of Personality and Social Development (JYLS).

Individual Differences and Socioeconomic Attainment

Research on the determinants of socioeconomic attainment has become increasingly attentive to individual differences in psychological factors. Although classic perspectives, such as the Wisconsin model (Jencks, Crouse, & Mueser, 1983; Sewell, Haller, & Portes, 1969), recognize the importance of cognitive ability and educational aspirations, psychological

characteristics outside the human capital domain have traditionally received limited attention in the literature dominated by sociologists and economists (Farkas, 2003; Gelissen & de Graaf, 2006; Roberts, Kuncel, Shiner, Caspi & Goldberg, 2007). The situation has changed as scholars have begun to consider the role of “noncognitive” characteristics in socioeconomic outcomes (e.g., Caspi, Elder, & Bem 1987; Duckworth & Gross 2014; Evans & Rosenbaum 2008; Heckman & Kautz 2012; Kokko & Pulkkinen 2000; Kokko, Pulkkinen, & Puustinen, 2000; Lleras 2008). Such individual dispositions as self-control, hyperactivity, aggressiveness, and task-persistence have emerged as important predictors of educational and occupational attainment (Fergusson, Horwood, & Ridder 2005; Fontaine et al., 2008; McLelland, Acock, Piccinin, Rhea, & Stallings, 2013; Moffitt et al., 2011).

In a cornerstone study, Caspi, Wright, Moffitt, and Silva (1998) considered life course determinants of youth unemployment from the perspective of three etiological domains: human capital (e.g., cognitive ability and academic performance), social capital (e.g., family structure and parental attachment), and personal capital (e.g., personality and mental health). Regarding personal capital, *difficult temperament* assessed in preschool ages and *behavioral problems* observed in elementary school emerged as strong predictors of labor market failure in emerging adulthood. Some of these effects were mediated by truncated education, suggesting a process whereby childhood deficits in personal capital hindered the accumulation of human capital in adolescence. However, this research also identified a *direct pathway* from personal capital to socioeconomic attainment by showing that adolescent delinquency predicted youth unemployment net of differences in human and social capital.

That dispositions related to externalizing behavior influence socioeconomic attainment has been recognized in a number of subsequent studies. Miech, Caspi, Moffitt, Wright, and Silva

(1999) found that individuals meeting the diagnostic criteria for childhood conduct disorder and ADHD were at increased risk of educational failure independently of family socioeconomic status and other comorbid mental disorders. McLeod and Keiser (2004) reached similar conclusions in a study analyzing data from the National Longitudinal Surveys of Youth: “In the case of high school degree receipt, the educational disadvantages associated with child emotional and behavioral problems result from the association of those problems with academic failures in middle and high school. In contrast, the association of childhood behavior problems with college enrollment appears to reflect *the persisting effects of early behavioral and academic predispositions*” (McLeod & Keiser 2004, p. 636; emphasis added). These findings echo the patterns observed in Caspi et al. (1998) showing that antisocial tendencies influence socioeconomic failure both directly, as an expression of behavioral continuity, and indirectly through their negative effects on human capital development.

Evidence from additional studies suggests that these effects are not limited to adolescence or emerging adulthood, but remain influential during the more mature stages of the life course (Moffitt et al., 2011). Using data from the Jyväskylä Longitudinal Study of Personality and Social Development (JYLS), Kokko and Pulkkinen (2000) found childhood aggression (age 8) to be associated with long-term unemployment in adulthood (ages 27-36). The association was mediated by educational adjustment problems and problem drinking in adolescence and early adulthood. More recent evidence from another Finnish cohort study (n=3,600) showed childhood disruptive behavior (aggression, hyperactivity, and low social adjustment) to predict low educational attainment and occupational status at ages 30-36 (Alatupa et al., 2013).

In sum, there is little doubt that individual differences in cognitive ability and antisocial behavior predict educational and occupational attainment and failure. Evidence points to two

basic mechanisms capable of producing these effects. First, *cumulative continuity* refers to a process whereby collateral consequences of psychological risk factors limit opportunities for socioeconomic attainment (Caspi, Elder & Bem 1987; Moffitt, 1993). In a process representing a developmental cascade of adverse consequences (Masten et al., 2005), aggressive and undercontrolled children struggle in school and, as a consequence of educational failure, end up facing difficulties in the labor market. Second, a person who is impulsive, aggressive, and prone to substance misuse is less likely to hold on to a job as a *direct* consequence of these dispositions and behaviors. Caspi et al. (1987) refer to this kind of process as *interactional continuity*. Drawing on these insights, the section below presents a dual pathway model linking childhood differences in antisocial propensity and cognitive skills to midlife socioeconomic exclusion.

Dual Pathway Model of Socioeconomic Exclusion

As described in Figure 1, the hypothesized model covers four major stages of human development: (1) childhood, (2) adolescence, (3) early adulthood, and (4) midlife. *Midlife socioeconomic exclusion* (MSE, henceforth) is understood as a product of intersecting pathways stemming from childhood differences in cognitive skills and antisocial propensity. The upper pathway connects childhood antisocial tendencies to adolescent delinquency and problem behavior in adulthood. We call this sequence the *antisocial pathway* as it captures developmental continuity in antisocial or externalizing behaviors. The lower pathway links differences in cognitive skills to adolescent educational performance and occupational attainment in adulthood. We refer to this as the *human capital pathway*. As explained below, the model postulates that, in some cases, factors within the antisocial domain influence human capital formation, and vice versa.

Figure 1 about here

Pathways from Antisocial Propensity

Childhood antisocial propensity is expected to contribute to MSE because, as a relatively stable characteristic (Gottfredson & Hirschi, 1990; Kokko & Pulkkinen, 2005; Moffitt, 1993), it contributes to the persistence of deviant behavior (crime, violence, and substance misuse) in mature adulthood both directly and through its effect on adolescent problem behavior. For example, we expect antisocial individuals to be more likely to be fired from a job because they engage in such counterproductive work behaviors as theft, tardiness, sexual harassment, or workplace violence (Roberts, Harms, Caspi, & Moffitt, 2007). Employees who abuse alcohol or drugs risk losing their jobs if they miss days of work or show up under the influence. Once unemployed, individuals with poor impulse control and delinquent proclivities have difficulty resisting the temptations of immediately gratifying activities, such as drinking and spending time socializing with similarly situated peers. They are less committed to finding work and less successful in acquiring training or skills necessary to compete for stable jobs. Participation in a criminal lifestyle is detrimental to health and may result in chronic disability and early death – outcomes that imply permanent exclusion from the labor market (Bäckman & Nilsson, 2010; Savolainen, Lehti, & Kivivuori, 2008).

In addition, antisocial behavior is expected to contribute to socioeconomic exclusion due to its negative effects on educational and occupational attainment at various stages of the life course. A child who is hyperactive or has a bad temper will face more difficulties adjusting to the learning environment at school (Caspi et al., 1998; Frazier, Youngstrom, Glutting, & Watkins, 2007; Kokko et al., 2000; Miech et al., 1999; Rodriguez et al., 2007). Students with these characteristics are more likely to receive low or failing grades, and they are more likely to be

streamed into educational tracks that are less demanding and focused on vocational schooling in manual trades (Savolainen, Hughes, Hurtig, Ebeling, & Taanila, 2013). In the end, children with behavioral problems are more likely to drop out or to not pursue education beyond the compulsory level (Barry & Reschly, 2012; McLeod & Keiser, 2004).

Pathways from Cognitive Skills

Cognitive deficits are hypothesized to influence the risk of MSE due to its effects on educational and labor market failure. Adults with minimal educational credentials are more likely to work in low-skill jobs that do not pay well and are more unstable or seasonal. As a result of technological change and globalization, these kinds of jobs tend to be increasingly scarce in post-industrial societies (David & Dorn, 2013; Reich, 1991). Careers in low-skill manual labor are known to be taxing for one's health and mental well-being (Rahkonen, Laaksonen, Martikainen, Roos, & Lahelma, 2006; Stansfeld & Candy, 2006). In addition, because intelligence is associated with problem-solving, cognitive deficits are likely to impede day-to-day job performance. Low verbal ability may be a particular liability in job interview situations (Barrett & Depinet, 1991).

Due to these processes, we expect low cognitive skills to have both direct and indirect associations with low socioeconomic status in adulthood, which is understood as a proximate risk factor for MSE. In addition, as shown in Figure 1, low cognitive skills are hypothesized to influence the risk of MSE through its "spillover" effect on the antisocial pathway. This expectation is consistent with extensive criminological literature showing increased involvement in criminal behavior and increased risk of criminal justice contact among individuals with lower levels of intelligence (Hirschi & Hindelang, 1977; Moffitt & Silva, 1988; Schwartz, Savolainen, Aaltonen, Merikukka, Paananen, & Gissler, 2015).

The Current Study

The validity of the dual pathway model (Figure 1) was examined using data from JYLS, which features detailed measurements of relevant constructs spanning from age 8 to age 50, allowing us to test hypothesized links between childhood psychological risk factors, adolescent and adult outcomes, and midlife socioeconomic exclusion. We present empirical results from a structural equation model that corresponds directly to the theoretical model. These results reveal the strength of the antisocial and human capital pathways, and they will show which elements of the antisocial pathway influence the human capital pathway, and vice versa. For example, the theoretical model expects adolescent educational failure to contribute to persistence in crime and deviance in adulthood. The model will investigate the extent to which childhood differences in antisocial propensity and cognitive skills exert direct influence on outcomes observed in mature adulthood.

Most prior research on the consequences of antisocial propensity on socioeconomic failure have not extended the analyses beyond emerging to early adulthood (e.g., Caspi et al. 1998; Evensen, Lyngstad, Melkevik, & Mykletun, 2016; Kokko & Pulkkinen, 2000; McLeod & Keiser 2004; Miech et al., 1999), leaving open the possibility that these effects dissipate by midlife as a function of desistance (Massoglia and Uggen, 2010). Investigations that extend to midlife (past age 40 or so) have focused on occupational or educational attainment, but have not addressed pathways to discrete manifestations of *socioeconomic disadvantage*, such as poverty and socioeconomic exclusion (Andersson & Bergman, 2011; Dubow, Huesmann, Boxer, Pulkkinen, & Kokko, 2006). The few studies that have linked childhood individual differences to disadvantage in mature adulthood provide limited insights as to the putative *causal mechanisms*. Thus, we know that self-control and intelligence are negatively related to unemployment at age

42 (Daly et al., 2015) and that childhood differences in low self-control predict low income at age 32 (Moffitt et al., 2011), but we know relatively little about the processes responsible for these associations. The only prior study that examined etiological pathways to socioeconomic exclusion from childhood to midlife was focused on the consequences of childhood *living conditions* and largely ignored the influence of psychological factors on socioeconomic exclusion (Bäckman & Nilsson, 2010).¹ Consistent with the dual pathway model, Bäckman and Nilsson (2010) found that persistence in antisocial lifestyle had a direct positive effect on social exclusion, net of problems in the human capital domain. The current study builds on this important work by incorporating childhood differences in cognitive ability and behavioral regulation as focal elements of the explanatory scheme.

In sum, the present study makes a unique contribution to the literature on the influence of individual differences on socioeconomic attainment because it combines three desirable qualities in a single study: very long (42-year) follow-up from childhood to age 50; comprehensive measures of theoretically-guided intervening developmental outcomes, and an explanandum that captures exclusion from the socioeconomic mainstream as a midlife outcome. In addition, based on data from Finland the result add to the literature dominated by evidence from Anglo-American countries characterized by weaker social safety nets. As noted above, we expect individual differences in ability and self-regulation to emerge as particularly salient factors in the macrosocial environment of the Nordic welfare state.

¹ Bäckman and Nilsson (2010) used childhood cognitive ability (IQ) as a control variable but did not integrate it or any other measures of psychological difference in the explanatory framework. Although they used the term “social” as opposed to “socioeconomic” exclusion, their outcome measure is very similar to the one used in the present study.

Method

Participants

The analyses were based on the Jyväskylä Longitudinal Study of Personality and Social Development (JYLS) where the development of the same participants (b. 1959) has been followed from age 8 (1968) to 50 (Pulkkinen, 2009, 2017). The initial sample of 12 second-grade school classes in the town of Jyväskylä, located in Central Finland, was randomly selected. There were 369 students (173 girls and 196 boys) in these classes. All the sampled students participated in the study with no initial refusals. At age 14 (1974) the participants were contacted again, and 356 participants (167 girls and 189 boys) took part in the data collection, representing a retention rate of 96%. At ages 8 and 14, the main methods of data collection were teacher-ratings and peer-nomination of children's socioemotional behaviors.

At ages 27 (1986), 36 (1995), 42 (2001), and 50 (2009) the participants were observed using two complementary methods of data collection: a mail-in questionnaire and semi-structured face-to-face interviews which included self-report inventories. At ages 42 and 50, the life history calendar was also used, covering life events from age 15 to 50 (Caspi, Moffitt, Thornton, Freedman, Amell, Harrington, & Silva, 1996). These methods provided, among other things, information about educational attainment, employment situation, criminal offending, and alcohol use. At age 27, 321 (155 women and 166 men) members of the sample participated in the data collection, representing a retention rate of 87%. The respective figures for ages 36, 42, and 50 were 313 (161 women and 152 men; 85%, excluding two participants who had died), 285 (134 women and 151 men; 79%, excluding six participants who had died), and 271 (127 women and 144 men; 76%, excluding 12 participants who had died). In midlife, information about annual income was collected from the government tax register. These data were available

for 325 (148 women and 177 men; 90%) and 216 participants (109 women and 107 men; 61%) at ages 43 and 50, respectively. Information about deaths was obtained from the Central Population Register. At age 50, attrition analyses revealed no differences between stayers and attriters on child and adolescent socioemotional behavior and school success. Moreover, the sample has continued to be representative of the Finnish population with respect to marital status and employment situation (Pulkkinen & Kokko, 2010).

Measures

Childhood characteristics (age 8)

Antisocial propensity

Antisocial propensity was measured as a latent variable with two indicators of self-regulation: aggressiveness and low behavior regulation. Both indicators are scales assessed via teacher-ratings at age 8. Teachers were asked to evaluate items for each participant on a scale from 0 (does not apply) to 3 (typical for the student). Low behavior regulation was computed as an average score across five items ($\alpha = .80$) describing the child as moody, inattentive, dishonest, disobedient, and prone to joking around to get attention (Pitkänen, Kokko, Lyyra, & Pulkkinen, 2008). In a study of the offspring of the JYLS participants (Lehto, Pulkkinen, & Juujärvi, 2002; see also Pulkkinen, 2017), items of this construct were found to correlate strongly with the 20-item version of the Self-Control Rating Scale (SCRS) developed by Kendall and Wilcox (1979). Aggressiveness was computed as the average score from eight items ($\alpha = .91$) describing acts of physical harm, unprovoked verbal assaults, sulking, kicking objects when angry, attacking others physically for no apparent reason, mean-spirited taunting of other children, bullying peers who are smaller or weaker, and grabbing things that belong to other children (Pulkkinen, Kokko, & Rantanen, 2012).

Cognitive skills

Teacher-assessed school performance at age 8 was used to measure childhood differences in cognitive skills. Teachers were asked to rank boys and girls separately on the basis of their demonstrated learning outcomes. These rankings were then transformed into a five-point scale following the normal distribution, such that 10% of the pupils obtained the lowest rank (= 1) and another 10% were in the highest rank (= 5) (Pitkänen, Lyyra, & Pulkkinen, 2005). The remaining rank distributions were as follows: 20% (=2), 40% (=3), and 20% (=4). These rankings have been found to reflect the child's general intellectual ability. In a subsample of 60 boys, this measure correlated strongly ($r = .70$) with a standardized test of reading ability (Dubow, Huesmann, Boxer, Pulkkinen, & Kokko, 2006).

Control variables

The hypothesized pathways were estimated controlling for the influence of gender (1 = female, 2 = male) and family socio-economic status (SES) of the family of origin (1 = working class, 2 = professional). Information about the father's occupation was used to measure family SES. In 1968, it was typical for the father's occupational status to be higher than the mother's. In situations where the mother was the sole provider, information about her occupation was used to measure family SES. Information about the mother's occupation was not collected if the father was present and working. The working class category includes occupations in skilled and unskilled labor; the professional category ranges from lower to upper white-collar professions (see Kokko et al., 2014 for details).

Adolescent characteristics (age 14)

Problem behavior

Adolescent problem behavior was measured using teachers' reports about their students' behavior at age 14. The relevant questions asked how frequently the student had been (i) disciplined at school, if the student was involved in (ii) truancy and substance misuse – (iii) smoking and (iv) drinking – and if the student had been in (v) trouble with the police or other enforcement authorities. The problem behavior scale ($\alpha = .68$) was computed by pooling the standardized scores of teacher reports across the five items. This measure has been identified as a strong precursor of criminal offending among adult males (Hämäläinen & Pulkkinen, 1996).

Academic performance

Information on academic performance was obtained from school archives containing official transcripts handed out at the completion of the 9-year compulsory school when most participants were 15 years of age (Pulkkinen, 1989). The grades ranged from 4 (fail) to 10 (outstanding). The average score across each academic subject was used as the indicator of adolescent academic performance.

Early adulthood characteristics

Crime and deviance

Deviant behavior in early adulthood was measured with a latent variable consisting of three indicators: (1) criminal behavior variety score, (2) heavy drinking, and (3) alcoholism. The variety score is based on a questionnaire of self-reported offending administered at age 36 (Junger-Tas, Terlouw, & Klein 1994). This measure indicates how many different types of criminal or delinquent acts the respondent committed between ages 21-36. The questionnaire listed 18 different offending types, such as driving under the influence, failure to pay child support, disorderly conduct, shoplifting, breaking and entering, and fighting in public. Heavy drinking was measured at age 27 and indicates the annual frequency of drinking to the point of

(severe) intoxication (Pitkänen et al., 2008). This information was coded into five categories: 0 = never, 1 = once a year, 2 = less than once a month, 3 = 1-3 times per month, 4 = once a week, and 5 = several times a week. The alcoholism score was obtained at age 36 from the abbreviated (9-item) version of the Michigan Alcoholism Screening Test (MAST; Pokorny, Miller & Kaplan, 1972; Selzer, 1971), which has been adapted for the Nordic culture as the Malmö modification of the brief MAST (Mm-MAST; Kristenson & Trelle, 1982; Seppä, Sillanaukea & Koivula, 1990). Focused on attitudes and habits rather than symptoms of drinking, the Mm-MAST used in the present study consisted of nine items, such as ‘Do you tend to have a drink *before* going to a party?’ The responses were coded 0 = no, 1 = yes. The Cronbach’s alpha was 0.69.

Socioeconomic status

Early adulthood socioeconomic status (SES) was measured with a latent construct consisting of two indicators: educational attainment (measured at age 27) and occupational status (measured at age 36). The categories of educational attainment are, from the lowest to the highest level: 1=compulsory school, 2=vocational school (upper-secondary), 3=junior/trade college, and 4=university degree (Kokko et al., 2008). Occupational status was measured with the question: “What is your current or most recent occupational title?” The responses were coded into three categories: 1=blue-collar (skilled or unskilled worker), 2=lower white-collar (office work, clerical), and 3=upper white-collar (professional, managerial). Entrepreneurs were placed into these categories according to the nature of the enterprise.

Midlife socioeconomic exclusion

Exclusion from the socioeconomic mainstream – the dependent variable in this study – was represented as a latent variable with three indicators capturing two major components: (a) persistent poverty and (b) labor market exclusion. Persistent poverty is represented with two

binary indicators, both of which operationalize poverty as having annual income below 60% of the median. *Poverty43* identifies those who were living below the poverty line at age 43 (1=yes; 0=no). *Poverty50* identifies individuals who had been living in poverty for two consecutive years when they were observed at age 50 (1=yes, 0=no). In each situation, the data on income were obtained from government tax records. *Labor market exclusion* was captured with a dummy variable indicating the occurrence of one of two outcomes by age 50: (1) early death or (2) disability pension. The latter is an eligibility-tested welfare benefit for individuals deemed chronically unemployable (Hytti, 2004). Those who qualify for this benefit have essentially been “retired” from unemployment benefits of the more activating kind. The data on disability pension were collected by the mailed questionnaire where the participants were asked about their current employment situation. One of the options was “disability pension or rehabilitation assistance.” This information was verified and supplemented by annual information (from age 15 to 50) provided by the retrospective life history calendars. Death is obviously an outcome that permanently excludes a person from participating in the labor market. In this generation of Finns, dying by age 50 has been found to be a strong marker of persistent socioeconomic disadvantage (Mäki & Martikainen, 2012; Martikainen, Kauppinen, & Valkonen, 2003; Pensola & Martikainen, 2004). As reported by Pitkänen (2010), the majority of the JYLS participants who had died by age 50 were chronic heavy drinkers.

Data analysis

The hypothesized paths depicted in Figure 1 were tested via structural equation modeling (SEM) in Mplus 7.11 (Muthén & Muthén, 1998-2012). Gender and the SES of the family of origin were included as covariates, but are not shown in the figure to reduce clutter. The

covariates were allowed to correlate with childhood Antisocial Propensity and Cognitive Skills, and had paths leading to the endogenous variables in adolescence, early adulthood, and midlife. A series of multiple group models was estimated to test for gender moderation of the pathways under investigation. Since no gender differences in the path estimates were found, the analyses proceeded based on the total sample and included gender as a covariate. Within-time covariances among the disturbances or residuals of the endogenous variables were also estimated (i.e., Delinquency with Academic Performance; Crime and Deviance with SES). Because some of the latent variable indicators were categorical (e.g., Labor Market Exclusion), parameter estimates were generated using the weighted least squares means-variance (WLSMV) estimator, which implements pair-wise missing data procedures and maintained the full analysis sample (Muthén & Muthén, 1998-2012). Proportion of missing data varied between zero and 23.3%, except for the variable *Poverty50* with 41.5% missing. The large share of missing data in this variable has to do with the way in which these data were collected. Whereas income data at age 43 were gathered from local agencies, the data concerning ages 49 and 50 were received from the central registry of the National Tax Administration. The average proportion of missing data across all analytic variables was 10.4%.

We implemented a standard two-step approach that began with an evaluation of the measurement model via confirmatory factor analysis and then turned to an evaluation of the structural model via SEM (Anderson & Gerbing, 1988). Model fit was determined with the chi-square statistic, which is sensitive to sample size and often statistically significant, indicating model misfit. Thus, the Comparative Fit Index (CFI) and the Root Mean Square Error of Approximation (RMSEA) were considered as additional fit indices. Recommended guidelines suggest that CFI values around .95 or greater and RMSEA values around .06 or less indicate

acceptable model fit (Hu & Bentler, 1999). Relative fit of alternative models was evaluated using the difftest option in Mplus, which is appropriate for the WLSMV estimator. Finally, tests of indirect effects were conducted using the Sobel procedure (Baron & Kenny, 1986).

Table 1 about here

Results

Correlations, means, and standard deviations for the study variables are reported in Table 1. Whereas 19% ($n = 62$) of the sample lived below the poverty line at age 43, 14% ($n = 30$) had been living in poverty in the two years preceding the age 50; and 11% ($n = 35$) qualified for disability pension (8%) or had died (3%) before turning 51.² Other indicators of risk were moderately elevated. For example, participants reported an average of 3.3 criminal behaviors (from a list of 18 offenses) at age 36, and had on average 4.1 attitudes/habits related to alcoholism (from a list of 9 Mm-MAST items). The directions of the correlations among variables generally were consistent with expectations. Correlations of latent variable indicators within the same construct were relatively large in magnitude (e.g., $r = .48$ to $.61$ for the indicators of Crime and Deviance). Likewise, correlations of variables measured within the same time period were relatively strong (e.g., $r = .78$ for aggressiveness and low behavior regulation). As expected, correlations of variables measured more distally to one another were smaller in magnitude and several were statistically non-significant. However, there were noteworthy exceptions to this pattern. For example, Cognitive Skills at age 8 had statistically significant negative associations with the three indicators of Socioeconomic Exclusion at age 50 ($r = -.13$ to $-.22$).

² These percentages are relative to the sample available in the relevant wave. At age 50, the valid sample is smaller than at ages 42-43.

Table 2 about here

Prior to estimating the hypothesized structural equation model, a confirmatory factor analysis (CFA) was conducted to evaluate the measurement structure. In the CFA, latent variables were specified as previously described in the Measures section and shown in Table 2, and correlations among all latent and manifest variables were estimated. The fit between the data and the primary CFA was acceptable, $\chi^2 (59 \text{ df}, N = 369) = 104.75, p < .05, \text{CFI} = .97, \text{RMSEA} = .05$ (full results available on request). Note that alternative, nested measurement models were considered and their relative fits compared. For example, a measurement model that specified variables on the antisocial pathway as indicators of a common factor capturing antisociality across time was estimated and found to fit more poorly than the primary measurement model, $\chi^{2\text{Diff}} (14 \text{ df}, N = 369) = 96.82, p < .05$. As reported for the primary measurement model in Table 2, all factor loadings were statistically significant and ranged from .74 to .90, with one exception: The loading of the Alcoholism indicator on the Crime and Deviance factor was acceptable, but lower (.63). Overall, CFA results and model comparisons suggested a strong final measurement model, therefore analyses proceeded with a test of the hypothesized structural model.

Figure 2 about here

The fit between the data and the hypothesized structural model (the theoretical paths tested are illustrated in Figure 1) was acceptable, $\chi^2 (63 \text{ df}, N = 369) = 117.24, p < .05, \text{CFI} = .96, \text{RMSEA} = .05$. Note that alternative, nested structural models were considered and their relative fits compared. For example, a structural model that omitted all spillover paths linking the two pathways was estimated and found to fit more poorly than the hypothesized structural model, $\chi^{2\text{Diff}} (6 \text{ df}, N = 369) = 20.75, p < .05$. As reported in Table 2 for the hypothesized structural model, all factor loadings were statistically significant. Statistically significant standardized path

estimates are reported in Figure 2. The theoretical model (Figure 1) specified two intersecting life course processes: the human capital and the antisocial pathways. Starting with the former, the results support the hypothesis that childhood differences in Cognitive Skills at age 8 contribute to the risk of MSE indirectly through its influence on Academic Performance in adolescence and SES in early adulthood. The persistent effect of Cognitive Skills on SES was comparable in magnitude to its effect on adolescent Academic Performance. As one would expect, SES in early adulthood was a very strong negative predictor ($b = -.50$) of the risk of social exclusion.

Turning to the antisocial pathway, the results show that – *independent of factors residing in the human capital domain* – individuals who persist in Crime and Deviance as adults are at increased risk ($b = .30$) of becoming marginalized from the socioeconomic mainstream by age 50. Reading Figure 2 from the left, the results show evidence of cumulative continuity in antisocial behavior across the life course: Childhood Antisocial Propensity was positively related to Problem Behavior in adolescence ($b = .28$), which, in turn, predicts Crime and Deviance in early adulthood ($b = .27$). Childhood Antisocial Propensity did not have a statistically significant direct effect on Crime and Deviance in early adulthood.

In addition to domain-specific pathways, the results provide partial evidence of spillover effects hypothesized in the theoretical model (Figure 1). Childhood Antisocial Propensity was found to be a statistically significant negative predictor of adolescent Academic Performance ($b = -.15$), which was in turn a statistically significant negative predictor of Crime and Deviance in early adulthood ($b = -.19$).

The total indirect effects of Antisocial Propensity ($b = .22$, $s.e. = .07$, $p < .05$; $\beta = .14$) and Cognitive Skills ($b = -.22$, $s.e. = .06$, $p < .05$; $\beta = -.26$) on Midlife Socioeconomic Exclusion

were statistically significant. Specific indirect effects also were examined and were statistically significant for both the Human Capital Pathway ($b = -.072$, $s.e. = .023$, $p < .05$; $\beta = -.09$) and the Antisocial Pathway ($b = .035$, $s.e. = .016$, $p < .05$; $\beta = .02$). Note that some of the indirect effect associated with the Human Capital Pathway was due to the cross-domain association between childhood Antisocial Propensity and adolescent Academic Performance.

Although not shown in Figure 2, (male) gender was negatively related to Academic Performance ($b = -.65$, $s.e. = .09$, $p < .05$; $\beta = -.38$), Socioeconomic Status ($b = -.28$, $s.e. = .10$, $p < .05$; $\beta = -.16$), and Socioeconomic Exclusion ($b = -.73$, $s.e. = .18$, $p < .05$; $\beta = -.41$), and positively related to Delinquency ($b = .85$, $s.e. = .38$, $p < .05$; $\beta = .13$) as well as Crime and Deviance ($b = 1.27$, $s.e. = .22$, $p < .05$; $\beta = .41$). Childhood Family SES was related only to early adult SES ($b = .48$, $s.e. = .08$, $p < .05$; $\beta = .25$). Taken together, all of the variables in the model explained an estimated 30% of the variance in Midlife Socioeconomic Exclusion.

Discussion

There is little doubt that individual differences in psychological resources influence socioeconomic outcomes. In addition to cognitive ability, prior research has established that noncognitive factors, such as conscientiousness and impulsivity, matter to educational attainment and employment. The goal of the present study was to advance this literature in three distinct ways. First, this research linked individual differences in cognitive ability and antisocial propensity to *socioeconomic exclusion* – a relatively persistent and severe form of disadvantage. Second, focusing on *midlife* socioeconomic exclusion as the terminal outcome, this research extended the developmental analysis further in the life course than most prior studies have been able to do. Third, utilizing comprehensive measures of intervening developmental outcomes –

such as academic performance in adolescence and deviant behavior in mature adulthood – this research examined the hypothesized pathways in considerable detail. We are not aware of prior research featuring all these elements in a single study.

The results provided partial yet clear support for the dual pathway model described in Figure 1. It was not surprising, in light of prior research, to find evidence for the *human capital pathway*. It is well understood, for example, that low educational and occupational attainment in adulthood predict socioeconomic exclusion, and that cognitive deficits impede educational attainment. It was rather more compelling to observe a relatively strong independent effect ($\beta = .14$) of the antisocial pathway on MSE. Although the pathway associated with the human capital domain is stronger by comparison ($\beta = -.26$), it was informative to observe that antisocial individuals are not only at increased risk of MSE, but that much of this effect is independent of their failure to accumulate human capital.

The theoretical model hypothesized a number of spillover effects between the human capital and antisocial domains. Many of these failed to materialize in the empirical analysis. Contrary to evidence from some prior studies there was no persistent effect from childhood antisociality to low socioeconomic attainment in adulthood. However, childhood antisocial propensity was found to be negatively related to adolescent academic performance, which, in turn, was associated with crime and deviance in adulthood – a direct predictor of socioeconomic exclusion. This “hybrid” pathway bridges evidence from prior research showing, on the one hand, that behaviorally disordered children are more likely to have truncated educational careers (Evensen et al. , 2016; McLeod & Kaiser, 2004), and that, on the other hand, persistence in crime and substance misuse through adulthood increases the risk of poverty and social exclusion (Bäckman & Nilsson, 2010). The observed process is consistent with the hypothesis that

adolescent educational failure operates as a life course specific “snare” (Moffitt, 1993) or a turning point (Laub & Sampson, 1993) with the potential to direct individuals towards a criminal lifestyle.

Implications

What do we know about the causal mechanisms producing the associations documented in this research? In particular, what is it about antisocial behavior that increases the risk of poverty and socioeconomic exclusion? A sizeable literature points to the negative effects of punishment for socioeconomic attainment (e.g., Bernburg & Krohn, 2003; Kirk & Sampson, 2013; Mueller-Smith, 2015; Western, 2002). If social reactions to deviance is a major factor in this pathway, criminal justice policies may need to be revised with an eye on minimizing their counterproductive consequences. We doubt, however, that this is the source of the patterns observed in these data given that the Finnish system of criminal justice is among the most lenient, supportive, and least punitive in the world (Cavadino & Dignan, 2006; Pratt, 2008). It is more credible that the path to socioeconomic exclusion among the criminally active stems from their involvement in routine activities, such as heavy drinking, that are gratifying in the short-term but destructive in the long run (Gottfredson & Hirschi, 1990; Savolainen et al., 2008). Regular participation in these behaviors makes it difficult to hold a steady job and increases the risk of injury and violence (Felson, Osgood, Horney, & Wiernik, 2012; Shepherd & Farrington, 2003).

If this explanation is the correct interpretation of the findings, the prevailing policies designed to reduce socioeconomic exclusion may be insufficient. The European platform against poverty and social exclusion lists five major areas of action (European Commission, 2016), none

of which recognize the salience of psychological risk factors in the etiology of these detrimental outcomes. Instead, the dominant response is to provide job opportunities and income support to adults at risk of exclusion (Mikkonen, 2013). The effectiveness of these standard policy approaches depends on the capacity and willingness of the target populations to embrace regular employment – and conventional lifestyle more generally – as a desirable life goal. However, the results from the current study suggests that many of the individuals at risk of socioeconomic exclusion are poorly equipped – as matter of their psychological constitution – to take advantage of such opportunities. An ethnographic analysis of persistent offenders in England found participants in that study to describe *themselves* as “persons who dislike taking orders” and who “rebel against the grinding routine of everyday life” (Maruna, 2001, p. 59). It is possible that a similar resistance to “going straight” (Bushway & Reuter, 1997) prevails among many of the individuals facing socioeconomic exclusion in Finland.

As noted by Mayer (1997), in advanced welfare states, those who fall through the cracks of the social safety net, are likely to be associated with multiple personal liabilities. It may be unrealistic to expect such individuals to be integrated into the economic mainstream with the help of income transfers or other situation-specific means of support. To address the root causes of socioeconomic exclusion, it may prove more effective to invest in early childhood programs that promote the development of executive function, emotional self-regulation, and healthy behaviors (Campbell et al., 2014; Caspi et al. 2016; Diamond & Lee, 2011; Schmitt, McClelland, Tominey, & Acock, 2015).

Limitations

JYLS, the data source used in this research, has a number of desirable and even unique qualities. There are very few studies that track individuals from childhood through midlife, and even fewer such studies that are nationally representative and include a rich set of measures from multiple independent sources. Despite these major strengths of the data source, the present study is not without limitations. Childhood family SES was measured (at age 8) using a dichotomous indicator that grouped children into working class or professional categories (Kokko et al., 2014). Given that children in the lower socioeconomic category comprise 70% of the sample, it is clear this measure is unable to identify children from truly disadvantaged families. This may bias the effects associated with individual differences under the assumption that more extreme values of socioeconomic well-being influenced the rating of students by their teachers. For example, it is possible that, due to implicit bias, aggressive or antisocial behavior by children from poor households was judged more harshly by the teachers. Under this hypothetical scenario, some of the effects associated with individual differences are confounded with family and/or parent characteristics.

Although we acknowledge this limitation, it is unlikely to have produced substantial bias in the reported results. First, the JYLS sample represents the population of Finland, which was, at the time, quite homogenous with respect to social class, ethnic composition, and cultural values. Using data from JYLS, Pulkkinen (1989) found that teachers' expectations of their students' long-term educational and occupational pathways were uncorrelated with the father's occupational status. Second, prior research on the influence of personal capital on socioeconomic attainment suggests these effects are independent of social capital (e.g., Caspi et al., 1998; McLeod & Kaiser 2004; Miech et al., 1999). Exploiting longitudinal data on siblings, a recent

study from Norway showed that the association between childhood externalizing problems (a clinical measure of antisocial propensity) on low educational attainment was “not confounded by stable family-level characteristics shared by siblings” (Evensen et al., 2016).

Because these data represent a cohort of Finns born in 1959, the results cannot necessarily be generalized beyond this historical and cultural context. Finland is a Nordic welfare state characterized by generous systems of collective social protection (Esping-Andersen, 1990). Even by the standards of the European Union, Finland stands out as a nation with very low levels of school segregation by income and academic ability (Gorard & Smith, 2004). In a macrosocial context where ascribed characteristics have less impact on educational and economic opportunities, individual differences in ability and effort are expected to command a more prominent role in status attainment (Adkins & Guo, 2004). It is possible that the effects reported in the present study would not turn out as strong in social systems characterized by higher levels of social closure and inequality. The members of this cohort reached their prime working ages during the period when Finland transitioned into a postindustrial economy with declining demand for unskilled labor (Nickell & Bell, 1995). The disappearance of jobs in manufacturing, logging, and other industries likely made it harder for those with limited personal capital to remain connected to the labor force. It is possible that this historical context explains why the associations observed in this research are as strong as they are.

Conclusion

The evidence from this research supports the dual pathway model of socioeconomic exclusion. Consistent with the human capital pathway, children with lower cognitive skills are at increased risk of dropping out from the economic mainstream because they perform poorly at school and fail to establish stable bonds to the labor market. In addition, continuity in antisocial

behavior from childhood to mature adulthood contributes to socioeconomic exclusion both independently of the human capital pathway and through its negative impact on adolescent educational attainment. These results advance the growing literature documenting the influence of individual differences for socioeconomic attainment, poverty, and related outcomes. In particular, the evidence from the present study shows that antisocial tendencies that emerge in early childhood set in motion a process of negative outcomes with enduring detrimental consequences for personal well-being.

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Table 1

Descriptive statistics for the study variables

Measure (Age)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1. Male gender															
2. Family SES	.04														
3. Low behavior reg. (8)	.30*	-.07													
4. Aggressiveness (8)	.32*	-.04	.78*												
5. Cognitive skills (8)	.02	.25*	-.23*	-.01											
6. Problem behav. ^a (14)	.20*	-.10	.30*	.31*	-.17*										
7. Academic perf. (14)	-.40*	.10	-.32*	-.29*	.42*	-.47*									
8. Criminal behavior (36)	.49*	-.07	.36*	.37*	-.06	.35*	-.39*								
9. Heavy drinking (27)	.46*	-.07	.25*	.28*	-.11	.42*	-.40*	.51*							
10. Alcoholism (36)	.33*	-.05	.14*	.15*	-.01	.25*	-.34*	.48*	.61*						
11. Educ. attainment (27)	-.23*	.30*	-.25*	-.23*	.48*	-.35*	.57*	-.17*	-.21*	-.20*					
12. Occup. status (36)	-.34*	.26*	-.23*	-.24*	.35*	-.29*	.52*	-.24*	-.28*	-.27*	.54*				
13. Poverty (43)	.05	-.02	.10	.04	-.16*	.11	-.16*	.18*	.19*	.15*	-.20*	-.24*			
14. Poverty (50)	-.13	-.08	.08	-.02	-.22*	-.001	-.09	.06	.08	-.03	-.28*	-.19*	.49*		
15. Labor market ex. (50)	-.03	-.04	.05	.04	-.13*	.16*	-.09	.02	.25*	.09	-.17*	-.16*	.35*	.44*	
Mean	1.53	1.29	0.61	0.46	3.01	0.00	7.22	3.30	0.64	4.06	3.19	1.85	0.19	0.14	0.11

Standard deviation	0.50	0.45	0.62	0.54	1.04	3.28	0.86	2.69	0.82	2.46	0.70	0.70	0.39	0.35	0.32
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^aStandardized score. * = $p < .05$. N-values range from 216 to 369.

Table 2

Factor loadings from the structural equation modeling analysis

Factor/Indicator	b	SE	B
Antisocial Propensity			
Low Behavior Regulation	1.00 ^r	-----	0.90
Aggressiveness	0.85	0.09	0.87
Crime and Deviance			
Alcoholism	1.00 ^r	-----	0.63
Heavy Drinking	0.58	0.07	0.91
Criminal Behavior	1.29	0.16	0.75
Socioeconomic Status			
Educational attainment	1.00 ^r	-----	0.86
Occupational status	0.96	0.07	0.82
Socioeconomic Exclusion			
Poverty50	1.00 ^r	-----	0.88
Poverty43	0.96	0.17	0.84
Labor market exclusion	0.93	0.17	0.82

Note. All factor loadings are statistically significant. ^r = reference indicator fixed at 1.0 for identification and scaling purposes.

Figure Captions

Figure 1. Conceptual model illustrating hypothesized pathways to midlife socioeconomic exclusion.

Figure 2. Statistically significant standardized path estimates from the structural equation modeling analysis.

Childhood

Adolescence

Early Adulthood

Midlife



