Elaboration on the association between IQ and parental SES with subsequent crime

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Abstract

To examine competing theoretical propositions and research, the hypotheses were tested that low parental socioeconomic status (SES), low IQ and their interaction increase the likelihood of crime. To test these hypotheses, representative US data (n = 11,437) were examined based on SES and IQ in 1981, and subsequent incarcerations from 1982 to 2006. Incarceration outcomes predicted included: incidence with binary logistic modeling, time to incarceration with Cox modeling and incarceration frequency with Poisson modeling. Results showed that low IQ, low SES and their interaction modestly predicted these three incarceration outcomes. These results were replicated among males, underprivileged groups and people with a last interview. Given that low IQ and SES are generally associated with increased risk of subsequent crime their theoretical integration is appropriate.

Keywords:
Intelligence
SES
Criminal careers
National Longitudinal Study of Youth
Bell Curve

1. Introduction

It has been widely reported that poor performance on intelligence (IQ) tests increases the likelihood of criminal activity (Neisser et al., 1996). Reviews have reported that the average IQ of criminals is approximately eight IQ points below the average of controls, and that the IQ–crime relationship is robust after accounting for various factors (Hirschi & Hindelang, 1977). For instance, the IQ–crime relationship remains significant after accounting for demographic factors (Lynam, Moffitt, & Stouthamer-Loeber, 1993), and the possibility that people with low IQs are more likely to be detected by the law (Moffitt & Silva, 1988). Despite such findings, the IQ–crime relationship is a topic of controversy and research often contrasts SES and IQ as competing explanations of social behavior, such as crime (Ellis, Walsh, & Helmhuth, 2003; Herrnstein & Murray, 1994). For instance, in status attainment research IQ and SES are contrasted to highlight the extent to which society should reward people for their abilities or their social background (Strenze, 2007). These positions need not, however, be contrasted and may be complementary. Accordingly, the current study aims to examine the associations between IQ, SES and the IQ × SES interaction with crime.

1.1. IQ as an explanatory factor of crime

IQ refers to a content- and context-free ability to process information of any sort (Gottfredson, 2004). Six criteria have been invoked to highlight that IQ rather than SES is a ‘fundamental cause’ of health (Gottfredson, 2004, p. 174). The six criteria include: a stable distribution over time, replication across generations, a transportable form of influence, a consistent general effect, measurability, and falsifiability. Since ill health and criminal activity reflect poorer social outcomes, these criteria may be extrapolated to the IQ–crime relationship (see also Neisser et al., 1996, p. 83).

From this perspective, a lower IQ indicates a relatively poor decision-making ability, lower ability to compete for resources and material success, and less capacity to learn from experience. A low IQ is hypothesized to increase the likelihood that some people will engage in more antisocial conduct irrespective of their more impoverished circumstances. Conversely, a high IQ protects against the likelihood of crime even if a person is at risk of crime due to social circumstances, as is the case of people from turbulent backgrounds. This is consistent with the conclusion of the Bell Curve regarding crime. Namely, that ‘the socioeconomic background of the National Longitudinal Survey of Youth white males was a negligible factor once their cognitive ability was taken into account’ (Herrnstein & Murray, 1994, p. 235). Also, although not studies of crime per se, life course research indicates that low IQ operates as a risk factor for the emergence and continuity of antisocial behavior early in the life course, after accounting for SES (e.g., Hinshaw, 1992; Moffitt, Lynam, & Silva, 1994; Simonoff et al., 2004). Prospective research of two Danish cohorts highlights a negative correlation between IQ and delinquency, independently of SES (Moffitt, Gabrielli, Mednick, & Schulsinger, 1981). In sum, theory and research suggest that IQ–crime relationship persists irrespective of SES.
1.2. SES as an explanatory factor of crime

Socioeconomic status is a social and economic indicator of attainment. Generally, SES refers to an individual level composite of earnings, occupational prestige, and years of education (Bradley & Corwyn, 2002). In some studies residential status area is a neighborhood-based level SES aggregate measure that is based on consensus data (e.g., number of persons per room and electrical appliances), from which domicile in a low class neighborhood is ascertainable. These forms of SES differ regarding their meaning, consequences and the direction they provide regarding interventions (Bradley & Corwyn, 2002; Sastry & Pebley, 2010). In terms of meaning, neighborhood SES refers to capital, whereas parental SES based on wages, education and occupational status reflects social class. As a consequence of their surroundings, children from lower SES neighborhoods suffer on account of poorer quality institutions (e.g., schools), and stressful and hazardous surroundings. Children from lower SES families suffer from a poorer home environment, including less direction towards social attainment, less cognitive stimulation, poorer health, worse child care, and a less consistent and less warm parenting style (Guo & Harris, 2000). Also parental and neighborhood SES direct policy towards different intervention targets. Specifically, neighborhood SES based research implies non-familial social interventions, whereas findings based on parental SES suggest family based interventions are appropriate.

From this perspective, the IQ–crime relationship is a by-product of low SES that is associated with both lower IQ and more crime (Ellis et al., 2003). Seen this way, people with a low SES find themselves in impoverished circumstances, are exposed to more criminal social influences and more or less independently suffer from poorer health care and education (which may translate into lower IQ). Also, the conclusion of the Bell Curve, that IQ is associated with crime irrespective of SES, is considered to be spurious, because SES was based on a turbulent background (i.e., neighborhood-based SES), and thus underestimates the relative contribution of parental SES (Fischer et al., 1996). Low parental SES may increase the risk of misbehavior through several routes, including a lack of access to resources and experiences required for healthy development (Bradley & Corwyn, 2002).

1.3. Elaboration on the Bell-Curve analysis

The data and analysis in the Bell Curve appear to be worthy of particular consideration regarding the association of SES and IQ with crime (Herrnstein & Murray, 1994). The Bell Curve reports data from the National Longitudinal Survey of Youth (NLSY), a large representative US sample examined over a considerable period of time. The original report, however, may be elaborated upon in the following ways. First, the Bell Curve used IQ measured in 1981 and conviction outcome was whether or not a person was imprisoned, and frequency and incidence of imprisonment from 1982 to 2006.

Bell Curve reports direct effects and not the SES–IQ interaction. This is relevant, since interactions are theoretically more intuitive and meaningful than direct effects (e.g., Frazier, Tix, & Barron, 2004).

1.4. Theoretical integration and study aims

The approach uniquely adopted in the present study is to aim to reformulate the association between SES and IQ with crime. First, in considering SES, the current approach emphasizes SES as social class, rather than capital (neighborhood SES). Second, it appears to be less appropriate to contrast the contributions of SES and IQ than to examine their interaction. Third, the interaction between IQ and SES is relevant since society may respond to the combination of SES and IQ, rather than IQ or SES independently. Theoretically, interactions between traits and states have been widely proposed due to their intuitive appeal (e.g., Endler & Kocovski, 2001). Empirical evidence in support of this position suggests that the combination of an adverse home environment and poor neuropsychological test performance increases the risk of aggression (Moffitt, 1993, p. 682). Collectively, therefore, theory and research suggest that low IQ, parental SES and their interaction are likely to increase the likelihood of crime. Accordingly, the current article aims to contribute to the literature by examining the relationships between parental SES, IQ and their interaction with the incidence, frequency and onset of crime, that are widely acknowledged criminological outcomes (Blumstein & Cohen, 1987).

2. Method

2.1. Participants and procedure

Data were extracted from the NLSY 1979 survey (Bureau of Labor Statistics, 2008). This is a US-based national probability cohort of people interviewed from 1979 to 1994 annually and then bi-annually till 2006 (n = 12,686). There was systematic oversampling of African Americans, Hispanics, and economically disadvantaged whites. These data were chosen since the way the analysis was conducted in the Bell Curve could be extended, as previously discussed. The current study used IQ measured in 1981 with a prospective follow-up of incarceration from 1982 to 2006.

2.2. Measures

To assess parental SES the standardized average was calculated from highest parental grade educated, the father’s occupational prestige based on the Duncan index, and family income (e.g., Ganzach, 1998). IQ was assessed with the Armed Forces Vocational Aptitude Battery (ASVAB) that was administered in 1981. The scale average of the sections on word knowledge, arithmetic reasoning, paragraph comprehension, and numerical operations was used to compute IQ, adjusted for age at assessment and sex. These IQ measures have satisfactory psychometric properties of reliability and validity, have been reported to be taken annually by over half a million young adults on entry to the armed services (Bock & Moore, 1986), and have been widely used in research (e.g., Ganzach, 1998). Both measures were coded so that high scores represented high IQ and high SES. Crime indices were derived from whether or not the interview location was in prison, like previous analyses (e.g., Herrnstein & Murray, 1994). Indices of crime included time to first imprisonment, and frequency and incidence of imprisonment from 1982 to 2006.
2.3. Analytic approach and missing values analysis

First, descriptive statistics were computed to examine bivariate correlations and differences between those who were and were not convicted. Second, moderated Cox survival, binary regression and Poisson models were analyzed to assess the time to, incidence of and frequency of incarceration, respectively, as a function of the predictors (IQ, SES and their interaction). Survival analysis is a biostatistical method that is widely used to predict the time to an event over time in, for example, criminology (Blumstein & Cohen, 1987; Chung, Schmidt, & Witte, 1991; Farrington, 1997) and cognitive epidemiology (Deary & Batty, 2006; Hart et al., 2005; Whalley & Deary, 2001). Cox regression is a form of survival analysis that resembles the traditional regression model and accounts for censoring. Cox regression has predictors known as covariates ($\beta$, standard error terms and Hazard rates), and an outcome that is the time it takes for a conviction to occur as the function of the covariates.

IQ scores were standardized and adjusted for age-tested and sex, so that the mean was 100 (SD = 15). SES was computed by taking the summed Z-scores of paternal occupation, wages and years of education. In the survival and logistic regression models the predictors (SES and IQ) were centered (i.e., computed scores were subtracted from the mean), to reduce multicollinearity among the predictors in the models. An interaction term was created from the product of the predictors. A hierarchical model was conducted with all variables were significant predictors of the time to, frequency and incidence of incarceration (see Table 1). Model fit indices improved from step 1 without the interaction term to step 2 with the interaction term. Specifically, Nagelkerke $R^2$ increased from 0.077 to 0.083 in the logistic regression model and a significant improvement from previous step was observed in the Cox regression model ($\chi^2 = 21.41, df = 1, p < 0.001$).

To examine the interaction term, IQ and SES were plotted onto the probability of incarceration incidence. Examination of the top right hand corner of Fig. 1 indicates that if IQ and SES scores were low, crime was predicted to reach the highest levels. The lower right hand corner of Fig. 1 indicates that if IQ and SES scores are high the risk of incarceration is predicted to be lowest. Thus those with the lowest SES and lowest IQ were most likely to be incarcerated, whereas those with the highest IQ and SES scores were least likely to be incarcerated (see Fig. 1; this trend replicated for time to incarceration using survival probability). Collectively, these results were modestly consistent with the hypothesis that low IQ and low SES interact to predict an increased risk of participation in, frequency of and earlier onset of crime.

### 3. Results

#### 3.1. Descriptive statistics

There was a significant positive correlation between SES and IQ ($r = 0.38, p < 0.001$). A total of 496 (4.3%) respondents were incarcerated during the follow-up period. Those incarcerated during the follow-up period had significantly lower IQ scores ($M = 89.61, SD = 13.18$) than those not subsequently in jail during the follow-up period ($M = 100.65, SD = 14.89$), corresponding with a moderate effect size ($r = -0.16, df = 11,435, p < 0.001$, Cohen’s $d = 0.77$).

Similarly, participants imprisoned had lower SES scores ($M = -0.30, SD = 0.76$) than those not imprisoned ($M = -0.019, SD = 0.75$) during the follow-up period, corresponding to a small effect size ($r = 0.17, df = 11,435, p < 0.001$, Cohen’s $d = 0.37$). Their mean age of first conviction was 29.74 (SD = 6.36), mean number of jailed years was 0.18 (SD = 0.15) and age last in jail 33.71 (SD = 7.13). Majority groups of ethnic origin groups included: English ($n = 2259, 29.22$%), Black or African Americans ($n = 2788, 24.59$%), and Germans ($n = 1661, 14.65$%). For the sex ratio, there were 5651 (49.4%) males, and 5786 (50.6%) females.

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<tr>
<th>Table 1</th>
<th>Prediction of the incidence of and time to incarceration in the NSLY.</th>
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<tr>
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<tr>
<td><strong>Logistic regression to predict incidence of conviction</strong></td>
<td><strong>Survival analysis to predict time to conviction</strong></td>
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<tr>
<td>SES</td>
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<td>IQ</td>
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<td>Intercept</td>
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Note. All values $p < 0.001$, df = 1, HR = hazard ratio and OR = odds ratio. 95% CI refers to the 95% confidence interval range bands. All coefficients were from the second step of the model $n = 11,437$ for all cells.
the over-sampled underprivileged and non-over-sampled groups separately, and those who were present at the final interview.

4. Discussion

The current study, based on the nationally representative NLSY data, follows incarceration over a 24-year period. This represents the longest prospective examination of the NLSY crime data to date, since previous analyses have been shorter and is not prospective (Herrnstein & Murray, 1994). With the aim of providing greater confidence in the results, unlike prior analyses the current study uses three major criminological outcomes (onset, incidence and frequency of incarceration), and not one (incidence of incarceration). Based on theoretically reformulated associations between the study variables, the results show that low IQ, low parental SES and their interaction modestly predict the incidence of, frequency of and time to incarceration.

Theoretically, a low IQ may make coping and decision-making difficult and increase the likelihood of crime. Taken in isolation the association between low IQ and increased risk of crime in the current results may be taken as evidence that is consistent with the Bell Curve (Herrnstein & Murray, 1994). Concurrently, however, the present results also indicate that a low parental SES increases the risk of crime, potentially through an inadequate familial environment (Bradley & Corwyn, 2002). These family characteristics may include little emphasis on social attainment. Thus, the current findings indicate that the family environment may provide a route to influence the association between IQ and crime. This possibility is not considered in the Bell Curve view on crime that emphasizes neighborhood SES (Herrnstein & Murray, 1994). The results show effect sizes of modest magnitude and statistically significant results. Even small inconsequential differences, however, can be statistically significant in large samples such as the present one. This seems not to necessarily be the case in these data since the effect sizes are moderately substantial, as differences ranged between about one-third and three-quarters of a standard deviation. Also associations would be weakened due to multiple methods and a considerable follow up period.

Collectively, however, the effects of IQ and parental SES on crime are modestly amplified, as captured by the interaction reflecting unfavorable conditions (i.e., particularly if both IQ and parental SES are low). A possible explanation of this interaction is that a disadvantaged home environment does not encourage social attainment and a low IQ makes coping and decision-making difficult. Taken together this increases the likelihood of crime. Thus these findings support an interactional perspective of crime. Their interpretation is consistent with the usually competing theoretical notions that contrast low SES (Fischer et al., 1996) or low IQ (Herrnstein & Murray, 1994) as factors that increase the likelihood of crime.

4.1. Limitations, future research and conclusions

The current analysis may be limited by its focus on IQ and SES. This focus is driven by previous contentions in the literature that the positions of IQ and SES researchers offer competing explanations of crime (e.g., Fischer et al., 1996; Herrnstein & Murray, 1994). There are, however, many other key factors that may increase the likelihood of crime (e.g., trauma, time and culture). Also, since there are too few females with convictions in the NLSY for separate analyses, only a sub-analysis of males was conducted. Future research, however, appears to be appropriate to examine female crime, since the ability to extrapolate the current findings (based predominantly on males) to females is limited.

This study does not separate genetic–environmental influences, unlike past research (e.g., Koenen, Caspi, Moffitt, Rijndijk, & Taylor, 2006). SES may not purely be an environmental factor that is unrelated to IQ. Parents may give children both genes for IQ and SES (i.e., passive gene–environment associations), and a parent’s SES is partly based on their IQ as a result of life-long active gene–environment interactions. Accordingly, IQ and SES may be moderately correlated due to common genetic influences. Also, as the participants in this study mature, they become increasingly free to create their own environments, partly due to both IQ and SES. The current study, however, affords no assessment of genetics, or upward or downward social mobility, thereby highlighting key directions for future research.

The current study examines incarceration based on interview locations over 24 years (Herrnstein & Murray, 1994). Information regarding the type of crime from official records is unavailable.
Thus future research into various types of crime appears to be warranted. Also, it is possible that those who are not incarcerated manage to avoid police detection due to their higher IQs and higher SES. Other research indicates, however, that the relationship between crime and low IQ remains after accounting for the possibility that those with lower IQs have a greater likelihood of being detected by the law (Moffitt & Silva, 1988). Future research is nonetheless warranted to cross-validate these findings with other measures of crime.

Despite these limitations, however, the current findings are based on a large-scale longitudinal dataset that consists of a large representative sample. Collectively, the results generally suggest that low SES, low IQ and their interaction prospectively predict crime modestly yet fairly consistently. Thus it may be concluded that low SES, low IQ and their interaction prospectively predict crime modestly yet fairly consistently. Thus it may be concluded that it is appropriate to integrate both low IQ and SES in explanations of crime.

References