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Academic Achievement Among Juvenile Detainees

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Abstract

The literature has long pointed to heightened frequencies of learning disabilities (LD) within the population of law offenders; however, a systematic appraisal of these observations, careful estimation of these frequencies, and investigation of their correlates and causes have been lacking. Here we present data collected from all youth (1,337 unique admissions, mean age 14.81, 20.3% females) placed in detention in Connecticut (January 1, 2010–July 1, 2011). All youth completed a computerized educational screener designed to test a range of performance in reading (word and text levels) and mathematics. A subsample ($n = 410$) received the Wide Range Achievement Test, in addition to the educational screener. Quantitative (scale-based) and qualitative (grade-equivalence-based) indicators were then analyzed for both assessments. Results established the range of LD in this sample from 13% to 40%, averaging 24.9%. This work provides a systematic exploration of the type and severity of word and text reading and mathematics skill deficiencies among juvenile detainees and builds the foundation for subsequent efforts that may link these deficiencies to both more formal, structured, and variable definitions and classifications of LD, and to other types of disabilities (e.g., intellectual disability) and developmental disorders (e.g., ADHD) that need to be conducted in future research.

Keywords

reading; mathematics; juvenile detainees

The literature has long registered elevated, compared to the general population, frequencies of learning disabilities (LD) amid law offenders (Critchley & Critchley, 1978; Ross, 1977). More recent literature highlights these elevations among both delinquent juveniles (Grigorenko, 2006) and law-offending adults (Harlow, 2003); yet a methodical evaluation of the literature, careful appraisal of these frequencies, and examination of their correlates and causes have been lacking (Rankin, 2005). Furthermore, the studies that have addressed these questions have returned widely different incidence rates of LD among law offenders (Alm &

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Notes

Andersson, 1997; Baker & Ireland, 2007; Dalteg, Lindgren, & Levander, 1999; Jensen, Lindgren, Wirsén Meurling, Ingvar, & Levander, 1999; Reid & Kirk, 2001; Rice, Howes, & Connel, 2002; Samuelson, Herkner, & Lundberg, 2003; Selenius, Dåderman, Meurling, & Levander, 2006; Snowling, Adams, Bowyer-Crane, & Tobin, 2000), and other than suggesting that these rates might be differentiated by the type and severity of crimes committed, they provide no clear picture of these rates (Baker & Ireland, 2007; Hill-Smith, Hugo, Hughes, Fonagy, & Hartman, 2002; Lewis, Shanok, Balla, & Bard, 1980; Putnins, 1999; Svensson, Lundberg, & Jacobson, 2001).

In light of the uncertainty of these findings and lack of systematic research on the association between LD and delinquency, it is of a note that since the early 1990s, groundbreaking work on the unique mental health needs of juvenile offenders has been unfolding and transforming the scene of juvenile justice in the United States (Abram et al., 2004; Abram et al., 2007; Abram, Teplin, McClelland, & Dulcan, 2003; Connor, Ford, Chapman, & Banga, 2012; Ford, Chapman, Mack, & Pearson, 2006; Ford, Hartman, Hawke, & Chapman, 2008; McClelland, Elkington, Teplin, & Abram, 2004; Pajer, Kelleher, Gupta, Rolls, & Gardner, 2007; Teplin, Abram, McClelland, Dulcan, & Mericle, 2002; Teplin, Abram, McClelland, Washburn, & Pikus, 2005; Teplin, Elkington, et al., 2005; Teplin et al., 2006; Teplin, Mericle, McClelland, & Abram, 2003). This research qualifies and quantifies the unique mental health profile of this population and argues that since the needs and developmental trajectories of court-involved youth are both distinct and definitive, they should be taken into account in decisions or practices pertaining to this population. In this article, it is argued that, similar to the mental health profile of this population, the academic profile is also distinct and definitive (Crusie, Evans, & Pickens, 2011; Zhang, Barrett, Katsiyannis, & Yoon, 2011) and therefore should be considered as a cornerstone in juvenile justice policies.

Although frequently mentioned in contemporary literature and juvenile justice practice, the relationship among education, LD, and criminal behavior among young people has been rarely researched and is poorly understood. Even as organizations such as the Office of Juvenile Justice and Delinquency Prevention describe the existence of a “school to prison pipeline”—and its existence is difficult to dispute—there are limited empirical data contributing to the understanding of this phenomenon. Similarly, there is a shortage of research and, correspondingly, knowledge of the presentation, course, and comorbidities of LD among juvenile delinquents. Moreover, data on the general educational attainment and specific strengths and weaknesses in the learning profiles among these individuals are also lacking. In general, these populations, especially juveniles who are court involved, have been viewed as understudied (Bouregy, Chapman, & Grigorenko, 2012). Research questions pertaining to the manifestations, comorbidities, and etiologies of LD in court-involved juveniles have been referred to as one of the most recalcitrant issues in the field of LD (Geib, Chapman, D’Amaddio, & Grigorenko, 2011).

Yet even if there is little agreement on the incidence rates of LD in this population, there is much agreement that educational interventions, completion of academic degrees, and continuous education are some of the most effective strategies for starting offenders on the path of desistance (Brier, 1994; Davies & Byatt, 1998; Klein, 1998; Reid & Kirk, 2001).

Thus, it is necessary to quantify and qualify the levels of academic performance of juvenile law offenders for the purposes of providing both concurrent and future educational support and planning. Such quantification and qualification may be performed in a number of ways, thus generating a gauge on the level of achievement (e.g., an estimate with regard to population norms or grade equivalents) or a reference to the qualitative state (e.g., affected vs. unaffected with a specific form of LD). The latter, although more interpretable from a public health point of view (i.e., permitting a derivation of estimates of prevalence and incidence), is problematic because it requires an adoption of a particular definition of LD, of which there are many, some being contradictory (Grigorenko, 2008). Correspondingly, it appears that a less contentious, but no less informative, way of quantifying the level of academic performance among juvenile law offenders may be to consider standard scores, percentiles, and the grade equivalence of this performance. To illustrate, although grade equivalents have limitations in their interpretation (i.e., a 14-year-old student who earns a grade equivalent of 2.0 in reading is not comparable to a typical reader beginning second grade), they are useful for providing guidance about appropriate educational placement.

Although a number of standardized instruments can be used to identify a youth's grade-equivalent level of academic functioning (e.g., Kaufman & Kaufman, 2004; Wilkinson & Robertson, 2006), most of them require a relatively lengthy one-on-one interaction with a qualified examiner, often not available in a detention facility. Furthermore, although information on an individual's specific gaps in academic knowledge may be extremely helpful in determining what needs to be taught to a given person, most standardized instruments do not offer these details. Finally, "off-the-shelf" generic screening and short-form tests generally do not provide enough differential data on what, specifically, needs to be taught to an individual to meet "local" (country-, state-, and district-specific) educational standards. Based on these observations, an educational screener has been developed for use in detention facilities that (a) rapidly provides a grade-equivalent estimate for proper educational placement, (b) generates a functional report on concept/skill mastery that could be used for educational planning purposes, and (c) can be administered in a group setting with a minimum of professional expertise and time demand. The psychometric properties of the screener are adequate and have been reported in detail elsewhere (Hart et al., 2012); here the results of the statewide usage of the screener in the state of Connecticut for the duration of 18 months are presented.

METHOD

Participants

Data were collected from all youth detained by Connecticut law enforcement, arrested, and placed in detention during the period of January 1, 2010, to July 1, 2011. The research was approved by the institutional review boards at Yale University and the Connecticut Court Support Services Division. Altogether, in the three state-run detention centers, there were 1,337 unique admissions (mean age = 14.81, mode grade = 9, range = 5–12), of which 20.3% were females. The ethnic distribution was as follows: 17.8% European American, 41.9% African American, 38.9% Hispanic American, and 1.4% Other. A subsample of 410 youth (mean age = 15.5, mode grade = 10), 14.6% females, referred to as the reference

sample, received the third edition of the Wide Range Achievement Test (WRAT; Wilkinson, 1993), in addition to the educational screener. The ethnic distribution in this sample was as follows: 18.8% European American, 40.6% African American, 38.7% Hispanic American, and 1.9% Other. Although all detention centers in the state of Connecticut participated in the data collection with the screener, the WRAT was administered in only one of the centers (see Note 1).

Assessments

Studies aimed at obtaining estimates of rates of LDs and levels of academic performance among law offenders have used both maximum performance measures (e.g., Snowling et al., 2000) and self-reports (e.g., Baker & Ireland, 2007). Both approaches have their advantages and disadvantages, but, given the biases that are characteristic of self-reports, the preference in the field is given to maximum performance measures. Among the latter, both screeners and comprehensive assessment tools have been used. Here again, both have their advantages and disadvantages, but the main differentiating factors are time requirements and the usability/comprehensiveness and completeness of the data. Screening devices are typically quick to administer, score, and interpret, but they provide only an initial estimate of a person's level of academic functioning; comprehensive assessments demand more time and expert administrators, but generate a more comprehensive picture of the level of functioning. As our intention was to work with a complete population of juvenile offenders placed in detention during the 18 months of the study (i.e., a complete sampling was used), a screening device was the most practical. For the purposes of this work, we generated a computerized, adaptive version of a previously validated screener (Hart et al., 2012; see Note 2). The interface allowed us to administer the screener such that every subsequent item was selected based on the level of performance on previous items (Wainer, 2010); that is, each item was selected to target the ability level of the participant based on the participant's responses to previous items. In this way, the computerized version of the screener updated itself throughout administration to estimate the ability level of the test taker. A large corpus of population data was used to concurrently score the performance on the screener (using the mean of 100 and SD of 15). As the screener is a new addition to the instruments available in the field, we used the WRAT, a well-established, conventional, brief standardized assessment, to assess a subset of the juveniles who received the screener.

Educational Placement Screener—The educational screener was designed to cover a range of performance in reading (language arts) and mathematics. As recommended by Fletcher, Lyon, Fuchs, and Barnes (2007), reading was assessed at two levels of performance: word level (to evaluate the skill of decoding) and text level (to evaluate the skill of comprehension). Correspondingly, the proposed items formed three subtests: Reading–Word Level, Reading–Text Level, and Mathematics. To our knowledge, none of the available screening instruments meet all of the requirements above. The lack of proper

¹The population of this particular detention center, as all other centers, is representative of the general population of youth in the state. The decision to collect the Wide Range Achievement Test data in only one center was driven by financial considerations (appropriate funding and personnel were not available at other centers).

²For clarity and full disclosure, the data presented in Hart and colleagues (2012) and here are derived from two completely different data collections, the former with the paper-and-pencil version of the screener and the latter with the computerized version of the screener.

assessment tools is perhaps the primary reason educational screening for placement purposes is not conducted among detained or incarcerated juveniles, although, by law, all of them have to be educated while in detention. As the screener was developed to serve juveniles in the state of Connecticut, all items were developed in correspondence with the state's educational standards (Connecticut standards) for language arts and mathematics (<http://www.sde.ct.gov/sde/site/default.asp>; see Note 3). However, these standards are comparable to those adopted by other states.

Reading—As indicated above, reading performance was assessed at two levels, the word level and the text level.

Word level—Abundant research shows that reading comprehension requires good basic-level reading skills (Perfetti, 1985). That is, to comprehend text, one must first be able to read (or “decode”) the words, then understand what each word means (know vocabulary), and finally construct the meaning of the text as a whole. To meet Connecticut standards for reading comprehension, a student must first have adequate decoding skills and a large enough reading vocabulary to support reading comprehension. However, juvenile detainees often appear to lack these skills (Houchins, Jolivet, Krezmien, & Baltodano, 2008). Moreover, the category of special education needs referred to as specific reading disability (SRD) is characterized by problems with decoding even beyond the early grades in which the skill of reading is typically taught (Fletcher et al., 2007). Given the reported elevated prevalence of SRD among youth in detention (Grigorenko, 2006), assessing this skill is important, for both diagnostic and remediation purposes. Generally speaking, decoding skills are required to convert the letters of a word (or letter string) into sounds, and then to put the sounds together to form the word (or pseudoword). The 60 items of the screener (6 items with 6 optional words and one “none” answer are clustered within 10 echelons of difficulty for Grades 3–12) ask youth to decode strings of letters and establish whether, when pronounced, the word “sounds like a word” or not. For example, decoding “infermayshin” gives the same pronunciation as “information,” whereas decoding “complegrend” does not give the pronunciation of an actual word. Thus, although this appears to be a single task, there are actually two steps: (a) decoding and (b) comparing these pseudowords to real words. The echelons are graded by written frequency (Kucera & Francis, 1967) and are available through the psycholinguistic database (http://websites.psychology.uwa.edu.au/school/MRCDDatabase/uwa_mrc.htm). Each item was formed by taking a word of a given frequency and altering one or two aspects to make a decodable letter string that sounded the same as the original word; for each word, two foils that did not sound like the original word were also created. All words with modified spelling and nonword foils were grouped within a given echelon to form six items per echelon/grade, with a combination of six modified words and nonwords. The manipulations of letter/sound changes and frequency gradations were carried out in a manner such that the following subskills were tested: (a) understanding consonants (“has” changed to “haz”), (b) understanding vowels (“wake” changed to “waik”; see Note 4), (c) understanding r-

³Due to the space limitations imposed by the journal, example items cannot be included in this report but are available from the authors upon request, along with the raw data that underlie these analyses.

⁴In some instances, a and b were manipulated simultaneously.

controlled vowels (“fir” changed to “fer”), (d) understanding irregularly pronounced words (“of” changed to “uv”), and (e) understanding complex changes in both with consonants and vowels (“cortex” changed to “coartecks”). The screener generated scores to indicate the student’s mastery at each level (Grades 3–12) of competency.

Text level—A total of 24 items in this subtest are based directly on the Connecticut standards for language arts. The standards designate 13 objective skills expected to be mastered by all students (see Note 5), regardless of grade. They also specify 12 genres within which these objectives should be tested (see Note 6); the mastery of the specific genres (or their variations) is grade based. To encompass this variation and provide item consistency and overlap, five separate strata of 24 items for grade pairs spanning Grades 3 to 12 were created, so that each stratum covered two grades. Each of these strata comprised 12 paragraphs (one for each genre) and included two questions. In addition, approximately half of the questions required literal processing, and the other half required inferential processing of the paragraphs. The design of the strata allowed for all objectives and all genres to be tested at all strata. The differences between the strata, then, determined the difficulty of the texts. This was calibrated using the Lexile system (<http://www.lexile.com/EntrancePageFlash.html?1>), which uses Rasch statistical analysis to identify the difficulty of a text based on word frequency and sentence complexity (roughly defined by sentence length). Lexiles are becoming more widespread as a way to grade the difficulty of text, and ranges of Lexile scores expected of typical students within a grade level have been identified. The screener generates scores for a student’s mastery at 5 levels (Grades 3/4, 5/6, 7/8, 9/10, and 11/12) of competency.

Mathematics—The items in this subtest are based on current Connecticut Standards for Mathematics, which provide the 25 areas of competence expected of children in a specific age/grade range (e.g., Grades 3–8 for the purposes of this study). Competencies at grade levels greater than 8 require specialized courses (e.g., geometry, calculus) and are more difficult to tap into with a screener. Because it is likely that few court-involved youth have participated in advanced courses and because functional everyday mathematics is addressable using math at the level of eighth grade or below, the decision was made to cover general competencies in mathematics for Grades 3 through 8. Thus, the screener includes separate strata of 24 questions for each corresponding grade level presented in a multiple-choice format and covers a range of competencies from simple operations (e.g., addition and subtraction) to equations and word problems. The screener also generates scores for items with and without heavy reading demands, to address the influence of reading on mathematics performance.

WRAT—The WRAT (Wilkinson, 1993) is a widely used age-normed assessment designed to measure the basic academic skills of reading, spelling, and math computation in individuals aged 5 to 94 years. The Reading subtest assesses an individual’s capacity to recognize and name 15 letters and pronounce 42 words out of context. The Spelling subtest (55 items) includes writing one’s own name and writing dictated letters and 40 dictated

⁵With the exception of selected skills not expected of students in Grade 3 but expected of all students thereafter.

⁶For simplicity, certain genres were combined (e.g., adventure and narrative) to form fewer categories.

words. The Arithmetic subtest (55 items) includes both oral and written sections that assess counting, recognition of letter and number symbols, and computation. The test is administered individually; administration takes a minimum of 35 minutes.

RESULTS

As mentioned above, multiple approaches have been used to quantify levels of academic skills among law offenders. Here, applying previously utilized methodologies, we present data in four steps. First, descriptive statistics for both the screener and the WRAT are shown and group differences based on gender and ethnicity are investigated. Second, the correlations between the two instruments are presented. Third, using equipercentile equating scores for both the screener and the WRAT, low scorers on both assessments are identified and counted. Finally, grade-equivalence indicators are analyzed.

Descriptive Statistics

Table 1 presents the descriptive statistics for both assessments (i.e., the screener and the WRAT), for the total sample and by two grouping factors—gender and ethnicity. Two comments are in order here. First, the standard scores for the screener and the WRAT are comparable in magnitude, although the screener was standardized on a sample from Connecticut limited in its representativeness (Hart et al., 2012) and the WRAT was standardized on a nationally representative sample (Wilkinson & Robertson, 2006). Second, for the screener, there were no group differences for gender, but there were significant differences for ethnicity, both multivariately with all three academic indicators (Roy's largest root = .077, $p < .001$) and univariately for reading at the world level ($F = 2.91$, $p < .05$, partial $\eta^2 = .03$) and mathematics ($F = 3.45$, $p < .05$, partial $\eta^2 = .04$). For the WRAT, there were significant differences for gender both multivariately (Roy's largest root = .042, $p < .01$) and univariately for spelling ($F = 8.14$, $p < .01$, partial $\eta^2 = .02$) and mathematics ($F = 3.92$, $p < .05$, partial $\eta^2 = .01$). Finally, there was a statistically significant effect for ethnicity multivariately (Roy's largest root = .095, $p < .001$) and univariately for all three dependent measures: reading ($F = 5.80$, $p < .001$, partial $\eta^2 = .09$), spelling ($F = 4.76$, $p < .01$, partial $\eta^2 = .07$), and mathematics ($F = 3.13$, $p < .05$, partial $\eta^2 = .05$).

Intercorrelations Between the Screener and the WRAT

Table 2 presents intercorrelations between the screener and WRAT. Two observations are noteworthy here. First, all correlations are significant at $p < .001$, suggesting convergence between estimates of academic performance as gauged by the two assessments. Second, although the skills that are assessed by the two instruments do not directly map onto each other, the correlations between skills that are more aligned with each other (e.g., pseudoword decoding on the screener and word reading and spelling on the WRAT, and mathematics on both instruments) correlated statistically more highly with each other ($r = .351$ and $r = .381$, compared to the highest correlation for text comprehension on the screener; and $r = .266$, compared to the second highest correlation for mathematics on the screener, for mathematics skills). In summary, despite substantial differences in the way the instruments were constructed (i.e., based on grade-specific educational standards for the screener vs. global domain competencies for the WRAT), there is a substantial amount of convergence between

the two instruments as evidenced in both the distributions of scores and the pattern of intercorrelations.

Rates of Low Scorers

Equipercentile equating (Han, Kolen, & Pohlmann, 1997) was used to link performance on the screener and WRAT for the reference subsample, allowing us to assess the proportion of the larger sample who manifested deficiencies in reading, math, and both reading and math. Specifically, we adopted the 5th percentile (i.e., the standard score of 75 on the WRAT) as a stringent operational definition of the presence of a deficiency. Table 3 presents the rates of such deficiencies among those assessed when the screener performance was linked to the WRAT performance. Specifically, when the standard score on the WRAT Reading subtest was used, 13% of juveniles scored deficiently on Word-Level Reading, 14% on Text-Level Reading, and 14% on the Mathematics subtest of the screener. The rate of deficient performance was even greater when the two other subtests of the WRAT were used for equipercentile equating—21% for the Spelling subtest and approximately 40% for the Mathematics subtest. Of interest here is the overlap between these deficiencies. As indicated by chi-square and Kendall's statistics, there appears to be a substantial amount of clustering between levels (1 or 0) on the three indicators of the screener (Word- and Text-Level Reading and Math) for each of the WRAT threshold variables (Reading, Spelling, and Mathematics). In other words, for those juveniles who perform below the threshold of a standard score less than or equal to 75 on the WRAT, there are many more concordant than discordant observations on the three screener variables, indicating the presence of a substantial amount of comorbidity. Specifically, there were more individuals observed than expected who demonstrated deficiency on all three indicators of the screener: 0.8% versus 0.6%, 2.1% versus 1.7%, and 10.4 versus 9.2%, for Reading, Spelling, and Math Calculations, respectively. The same pattern of strong comorbidity was observed for the pairwise comparison of all three WRAT thresholds: Reading—2.6% versus 1.3%, 4.1% versus 2.0%, 2.3% versus 1.3%; Spelling—6.2% versus 3.3%, 8.0% versus 4.5%, 5.5% versus 3.5%; and Mathematics—18.3% versus 13.6%, 23.9% versus 16.1%, 16.9% versus 13.6%; for Mathematics versus Word- and Text-Level Reading and Word-versus Text-Level Reading, respectively. These consistently elevated levels of comorbidity are particularly interesting in light of the relatively modest correlations between the indicators of the screener: $r = .286$, $.302$, and $.472$ (all at $p < .001$) for Word- and Text-Level Reading, Word-Level Reading and Math, and Text-Level Reading and Math, respectively.

Grade-Equivalence Indicators

Using the WRAT and the screener's (Hart et al., 2012) grade-equivalence scores, the codistributions of nominal grades (i.e., the grade a juvenile is in according to official records) and grade equivalence scores were analyzed. Nominally, the juveniles in this sample attended Grades 5 to 12. WRAT grade-equivalence scores ranged from 1 to 9, and the screener's range was 3 to 12, with a special category of less than 3 when performance below the Grade 3 threshold was established but could not be quantified further. Table 4 presents the moments of the distributions of nominal and equivalent grade indicators. A number of findings emerged from these analyses. First, according to the comparison of means, the juveniles in detention underperform compared to their nominal grade level, both

consistently (i.e., on all indicators measured in this study) and substantially (i.e., the least conservative estimate of this underperformance is approximately six grade levels with regard to the difference between the screener's Word-Level Reading grade equivalent and the nominal grade, and the most conservative estimate is approximately 3 grade levels with regard to the WRAT Reading subtest). Also of note is that Kendall's τ values were statistically significant (at $p < .005$ or smaller) for all contingency table comparisons between nominal grades and grade-equivalence scores for both the WRAT and the screener, indicating a deviation in the observed codistribution of the nominal and the actual level of performance from what was expected. Second, notwithstanding the performance on the Word-Level Reading subtest of the screener, the areas of most serious deficiency appear to be mathematics computation and reasoning. Third, as evident from estimates of standard deviations in Table 4 as well as the analyses of the corresponding contingency tables, a non-negligible number of youth perform at (1.5% for Word- and 5.9% for Text-Level Reading and 5.0% for Math) or above (3.3% for Word- and 16.9% for Text-Level Reading and 8.8% for Math) their grade level.

DISCUSSION

Based on the literature (Bullis & Yovanoff, 2006; Grigorenko, 2006; Larson & Turner, 2002; Morris & Morris, 2006; Quinn, Rutherford, Leone, Osher, & Poirier, 2005) and our previous work (Hart et al., 2012; Macomber et al., 2010), we estimate that at least 10% to 15% of juveniles in detention (i.e., at least twice the rate in the general population) have various forms of severe LD, often comorbid with other developmental and neuropsychiatric conditions, particularly attention-deficit/hyperactivity disorder (ADHD; Connor et al., 2012). Yet these estimations have not been substantiated in large-scale studies. Here we attempt to make a step toward obtaining such estimates.

We do not utilize or propose an operational definition of LD here, but rather use the concept of "deficient academic performance," recognizing that such performance is a facet of any definition of LD, however diverse these definitions might be. The definition of "deficient" that we use in this work is rather conservative: only those who perform below the 5th percentile on a standardized and recently renormed conventional assessment of academic skills, that is the WRAT. Even with this unadventurous definition, the rate of deficiency in this sample is high, ranging from 13% to 40% depending on the "anchor" skill (e.g., the subtest of the WRAT used as the basis for the definition) and averaging 24.9%. In that, our results are consistent with those that find heightened rates of learning problems among law offenders. For example, Alm and Andersson (1997) reported that 64% of Swedish prison inmates had reading skills below the sixth grade level. These estimates are quite close to what we found with the range of means on both the WRAT and the screener—5.38. It is interesting to note that although the results of the WRAT and the screener for the mean values are quite convergent, the median and the mean are quite divergent. In understanding this discordance, it is important to consider that the WRAT is a very general gauge of academic skills, containing a relatively limited number of items to test the range of performance between the ages of 5 and 94. With a more targeted assessment, that is, our screener—aimed at capturing much more specific skills, thereby providing an opportunity to fine-tune establishing grade equivalence—the median grade level lingered, depending on

the subtest of the screener, at around Grade 4 (6 for the WRAT), and the mode at Grade 3 (7.33 for the WRAT).

It is well established that adults with deficient academic skills tend to attain a lower level of education compared with others of the same intelligence level (van der Leij, de Jong, & Rijswijk-Prins, 2001), to be more frequently unemployed, to be more likely to experience depression (Feldman et al., 1993), and to abuse substances at higher rates and severity (Lundberg, 1994). All of these outcomes appear to be present more often among law offenders compared to the general population. Given that these and previously reported data (Hart et al., 2012) attest to both the high rates (e.g., approximately 25%, as in this sample) of academic deficiencies and non-negligible rates (e.g., approximately 7%, as it is in this sample) of at- or higher-than-grade-level performance among detained youth, it is important to understand what differentiates these subgroups, what their criminal portfolios in the past and the future are, and what critical points in their criminal careers can put them on the path of desistance. Clearly, such research has the potential to contribute to both understanding the etiology and manifestation of juvenile delinquency and the field of LD. Given the observed severity of the deficiencies in academic skills, it is important to juxtapose these deficiencies with the concept of LD, especially severe LD, since understanding the etiology of severe LD in this population may enhance the relevant research in the general population by defining a particular etiological pathway (i.e., a conduct-problem-related pathway of LD), thus parsing out the heterogeneity of LD in the general population (Lyon et al., 2005).

Various definitions and classifications of LD have been used when studying the prevalence of these disabilities among criminal offenders. Alm and Andersson (1997) and Jensen and colleagues (1999) provided examples showing the range of such classifications. It is important, of course, to recognize the simplicity of the effort presented here, with the screener as a limitation of the study. In exchange for access to every youth who was detained during the 18 months of the study, we needed to minimize the amount of time with each participant. By transforming the paper-and-pencil version of the screener into a computerized adaptive testing (CAT) device, we were able to reduce both the participants' and the proctors' time involvement, thereby guaranteeing a large sample size for these analyses. However, we recognize that such a screening is short on the characteristics of a comprehensive cognitive assessment (Snowling et al., 2000) and lacks a control for general intellectual abilities (Elbeheri, Everatt, & Al Malki, 2009).

In sum, this work provides a systematic exploration of the type and severity of word and text reading and mathematics skill deficiencies among juvenile detainees. It builds the foundation for subsequent efforts that may relate these deficiencies both to more formal, structured, and variable definitions and classifications of LD and to other types of disabilities (e.g., intellectual disability) and developmental disorders (e.g., ADHD) that need to be conducted in future research. In spite of being limited in scope and not embedded in any particular theoretical conceptualization of LD, this study provides systematic data derived from a sample representative of the subpopulation of juvenile offenders on the level of academic functioning among juvenile detainees, which have been largely missing from the field.

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Table 1

Descriptive Statistics for Standard Scores Obtained From the Educational Placement Screener and the WRAT.

Assessment	Boys		Girls		AA		EA		HA		Others		Total	
	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD
Educational placement screener														
Reading														
Word level	81.1	18.5	81.3	17.3	78.6	17.8	88.6	19.5	80.5	17.3	75.7	10.2	79.6	19.0
Text level	96.6	17.9	98.5	16.5	95.1	18.2	101.9	19.4	97.0	15.9	93.4	14.2	100.8	18.9
Mathematics	95.2	22.7	99.0	23.3	95.0	22.8	103.0	25.5	93.3	21.3	106.2	16.5	97.1	23.0
WRAT														
Reading	90.8	15.2	92.6	14.4	86.5	14.4	95.7	13.5	85.1	13.1	83.3	8.4	91.1	15.1
Spelling	87.6	14.7	94.2	14.9	87.2	15.2	93.1	15.7	82.9	13.4	74.5	8.5	88.4	14.9
Mathematics	79.1	14.9	83.6	14.2	80.3	15.3	84.9	15.8	76.5	12.2	75.8	9.0	79.7	14.9

Note. AA = African American; EA = European American; HA = Hispanic American; WRAT = Wide Range Achievement Test.

Table 2

Intercorrelations Between Assessment Indicators.

WRAT	Screeners		
	Reading (word)	Reading (text)	Mathematics
Reading	.351	.265	.198
Spelling	.381	.270	.158
Mathematics	.275	.273	.266

Note. All correlations are significant at $p < .001$. WRAT = Wide Range Achievement Test.

Table 3

Rates of Deficient Performance in Reading (word-and-text-levels) and Mathematics Based on the WRAT Equipercentile Equating.

Screener	WRAT 5th Percentile (SS 75)		
	Reading	Spelling	Mathematics
Word level (%)	13.0	21.0	40.0
Text level (%)	14.0	21.0	39.0
Mathematics (%)	14.0	21.0	40.0
Comorbidity			
Pearson χ^2	11.26 ($p < .001$)	29.54 ($p < .001$)	33.48 ($p < .001$)
Kendall τ	.115 ($p < .009$)	.187 ($p < .001$)	.199 ($p < .001$)

Note. SS = standard score; WRAT = Wide Range Achievement Test.

Table 4

Descriptive Statistics and Distributions of Grade-Equivalent Scores on the WRAT and the Educational Placement Screener.

	Grade	WRAT			Screener ^a		
		Reading	Spelling	Math	Word ^b	Text ^c	Math
<i>M (SE)</i>	9.40 (0.034)	6.48 (0.13)	5.95 (0.12)	5.03 (0.10)	3.51 (0.07) 4.27 (0.08)	6.01 (0.09) 6.22 (0.09)	5.28 (0.08) 5.64 (0.08)
<i>Mdn</i>	9.00	7.00	6.00	5.00	3.00 3.00	5.00 5.50	4.00 5.00
Mode	9.00	9.00	9.00	4.00	3.00 3.00	3.00 3.00	3.00 3.00
<i>SD</i>	1.20	2.52	2.41	1.98	2.32 2.31	3.25 3.17	2.91 2.79
Skewness (<i>SE</i>)	−0.48 (0.07)	−0.42 (0.13)	−2.22 (0.13)	0.39 (0.13)	1.94 (0.07) 1.94 (0.08)	0.53 (0.07) 0.53 (0.07)	0.76 (0.07) 0.79 (0.07)
Kurtosis (<i>SE</i>)	0.34 (0.14)	−1.25 (0.25)	−1.07 (0.25)	−0.61 (0.25)	3.61 (0.14) 2.87 (0.17)	−1.05 (0.14) −1.11 (0.14)	−0.46 (0.14) −0.54 (0.15)

Note. WRAT = Wide Range Achievement Test.

^aThe first row presents results with the category of grade < 3 recoded with the value of 1.5; the second row presents results with the category of grade < 3 recoded as missing.

^bWord-level reading.

^cText-level reading.