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The Presence of Low IQ and Mental Retardation Among Murder Defendants Referred for Pretrial Evaluation*

ABSTRACT: After an overview of definitions of mental retardation and recent case law regarding mental retardation and the death penalty, this paper presents a study of factors associated with a mental retardation (MR) diagnosis among murder defendants. Subjects with a full-scale IQ ≤ 70 ($n = 42$) were compared with other pretrial murder defendants ($n = 228$) referred for forensic evaluation over a 5-year period. Subjects with an IQ ≤ 70 who were diagnosed with MR were compared with subjects with an IQ ≤ 70 who did not receive this diagnosis. Female murder defendants were more likely to receive a diagnosis of MR ($p = 0.03$). MR was also more commonly diagnosed in subjects with an Axis I cognitive disorder ($p = 0.018$). Having an IQ ≤ 70 was more common in subjects with a psychotic and substance use disorder ($p = 0.03$) and did not necessarily lead to a diagnosis of MR in this subgroup. Implications for diagnosing MR among murder defendants are discussed.

KEYWORDS: forensic science, forensic psychiatry, mental retardation, death penalty, murder defendants

In the wake of the U.S. Supreme Court's decision in *Atkins v. Virginia*, the diagnosis of mental retardation (MR) among murder defendants has a profound impact on potential sentencing, specifically for defendants who are eligible to receive the death penalty. As a result of the *Atkins* decision, persons who are mentally retarded and who commit the crime of murder are no longer subject to the death penalty because it violates the 8th Amendment's prohibition against cruel and unusual punishment (1). Many murder defendants' first contact with a psychiatrist or other mental health professional occurs at the time of a pretrial competency evaluation. Therefore, the diagnosis of MR among murder defendants may now become a crucial element of pretrial competency to stand trial evaluations and has ramifications regarding potential death penalty sentencing.

This paper reviews the various definitions of MR proposed by professional organizations and the case law leading up to *Atkins* and the legal developments subsequent to it. Additionally, the authors present a literature review regarding associations between IQ and homicide. Finally, utilizing a database of 270 murder defendants consecutively referred for pretrial competency and criminal responsibility evaluation, this study closely examines those defendants who had a measured full-scale IQ ≤ 70 , compares those defendants to defendants with a full-scale IQ > 70 , and compares defendants with an IQ ≤ 70 who received a formal diagnosis of MR with those who did not receive this diagnosis.

Mental Retardation Defined

Approximately 1–3% of the U.S. population is diagnosed with some form of MR (2,3). MR is defined by the American Psychiatric Association's Diagnostic and Statistical Manual of Mental

Disorders 4th Edition Text Revised (DSM-IV TR) (4) based on the following three criteria: (1) the presence of "significantly subaverage intellectual functioning" equaling full-scale IQ scores of *c.* 70 or below on an individually administered IQ test (for infants, a clinical judgment of "significantly subaverage intellectual functioning" is made), (2) the presence of "concurrent deficits or impairments in present adaptive functioning (i.e., the person's effectiveness in meeting the standards expected for his or her age by his or her cultural group) in at least two of the following areas: communication, self-care, home living, social/interpersonal skills, use of community resources, self-direction, functional academic skills, work, leisure, health, and safety, and (3) the onset of the aforementioned occurs before the age of 18 years. Additionally, a severity rating is given based on IQ score and, in theory, represents the level of severity as follows: "mild" (full-scale IQ 50–55 to *c.* 70), "moderate" (full-scale IQ 35–40 to 50–55), "severe" (full-scale IQ 20–25 to 35–40), and "profound" (full-scale IQ below 20–25). For those persons in whom there is a "strong presumption" of MR, but their IQ is "untestable by standard tests" due to being "too impaired or uncooperative," a DSM-IV TR diagnosis of "Mental Retardation, Severity Unspecified" may be given. This diagnosis may also been given to infants clinically assessed as mentally retarded.

Borderline Intellectual Functioning is a DSM-IV TR diagnosis given for persons with a full-scale IQ in the range of 71–84. This diagnosis represents *c.* 6–7% of the U.S. population. Given the margin of error in the measurement of IQ by standardized instruments, the distinction between MR and Borderline Intellectual Functioning is sometimes less clear and may focus on the defendant's adaptive functioning.

The American Association on Mental Retardation (AAMR) defines MR as "a disability characterized by significant limitations both in intellectual functioning and adaptive behavior as expressed in conceptual, social, and practical adaptive skills" (5). Within this definition, disability originates before age 18. The AAMR definition includes the following assumptions. Limitations are viewed in the "context of community environments typical of the individual's age, peers, and culture." A "valid assessment

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considers cultural and linguistic diversity and communication, sensory, motor, and behavioral factors." Limitations and strengths can exist simultaneously. The limitations should be described in order to identify supportive measures. Finally, functioning is generally improved "with appropriate personalized supports over a sustained period."

Case Law and Statutory Law

In 1989 the U.S. Supreme Court, in *Penry v. Lynaugh*, ruled that the execution of mentally retarded inmates did not constitute a violation of the 8th Amendment's prohibition against cruel and unusual punishment (6). Therefore, with the *Atkins* decision, the Court has essentially reversed itself. In deciding this issue, the Court quoted their prior *Penry* decision which stated, "The clearest and most reliable objective evidence of contemporary values is the legislation enacted by the country's legislatures." In the intervening years between the *Penry* and *Atkins* decisions, 18 states enacted legislation barring the execution of the mentally retarded. The Court stated that more importantly than the number of states enacting these laws, there was clear consistency in the direction of change from allowing the execution of mentally retarded inmates to prohibiting it. The Court failed to outline the due process requirements that the states should use in determining whether a death row inmate is mentally retarded. Like the Court's approach in *Ford v. Wainwright* (7) to the issue of determining a death row inmate's competency to be executed, the development of appropriate procedures to enforce this new constitutional restriction upon the execution of mentally retarded inmates was left to the individual states. Therefore, death penalty states must define the process by which MR is determined in capital defendants. This can be done via statutory or case law. For example, Colorado has enacted a statute requiring the defendant to prove MR by clear and convincing evidence (8). This statute has been upheld as constitutional by the Colorado Supreme Court (9).

A resource document was written by the American Psychiatric Association's Council on Psychiatry and Law to recommend statutory language regarding a definition of MR, procedures relating to assessment, and qualifications of experts (10). This document suggests that one of the aforementioned definitions of MR be used. It also suggests the requirement of one standardized measure of IQ, one standardized measure of adaptive behavior, review of written records, interview of collateral sources, and combining the determination of MR with other mental health assessments conducted in the case. These MR determinations should be completed with the same procedural safeguards afforded other assessments of criminal defendants.

Previous Research on IQ and Homicide

The study of the relationship between the act of homicide and the IQ of those committing the homicide is not new. In their study of "psychosocial" data (early development, vocation, marital status, substance abuse, sexual disorders, and psychiatric diagnosis), Wechsler-Bellevue Intelligence Scale, Hand Test, Thematic Apperception Test, and electroencephalogram (EEG) data on 90 Egyptian murderers, Okasha et al. (11) found no statistically significant differences between murderers incarcerated in prison and normal controls. However, they found that incarcerated murderers had a higher IQ than those institutionalized in mental hospitals.

In a 1977 study comparing 12 convicted murderers to 12 "interpersonal attackers," Wagener and Klein (12) found differences in Wechsler Adult Intelligence Scale (WAIS) results. They also

suggested their findings support a hypothesis that differences may exist among subpopulations of murderers referred for evaluation based on demographics and crime motivation. They suggested a possible relationship between low IQ and irrational behavior because individuals with low cognitive ability may have difficulty assessing reality due to organic brain dysfunction. Tiihonen (13) reported that "intellectual handicap and other mental disorders" resulted in a higher risk of criminal activity among 140 Finnish homicide defendants studied during 1990–1991, but he was unable to identify an association between homicide and a specific diagnosis.

Blake et al. (14) studied 31 males awaiting trial, sentencing, or appeal for murder. Although not obtained for every subject, their data included results of neurological examination; EEG; magnetic resonance imaging (MRI) or computerized tomography (CT); Wisconsin card sorting test; Halstead-Reitan battery; IQ testing; medical history; physical and sexual abuse history; family member interviews; psychiatric assessment; social, school and criminal records review. Five subjects were diagnosed with MR and four with "borderline mental retardation" (full-scale IQ between 70 and 80). They reported a large percentage (97%) of neurological findings consistent with "brain dysfunction." A theorized "explanation" for homicide involves a combination of chronic "severe" abuse, paranoia, and "frontal dysfunction" leading to an inability to cope with frustration, with alcohol use adding to reduced inhibitions (14).

In their study of 1361 criminal cases referred for psychiatric diagnosis in the Tokyo District Public Prosecutor's Office during the period 1987–1991, Inada et al. (15) found a homicide rate of 12.5% among the 96 persons with MR. It was not a statistically significant rate in comparison with other offenses (larceny, injury/violence, house intrusion, burglary, arson, swindling, and others) or to other psychiatric diagnoses (15).

In their study of 693 Finnish murderers, Eronen et al. (16) found that MR did not increase the risk of homicide in men but might result in a slight increased risk for women, although they could not statistically confirm this finding.

Methods

Subjects for this study were murder defendants in South Carolina who had undergone pretrial evaluation by the South Carolina Department of Mental Health (SCDMH) for competency to stand trial and criminal responsibility evaluation over a 5-year period (1995–2000). Each evaluation included a forensic interview, social history from a family member, MRI or CT, EEG, neurological evaluation by a neurologist, and a psychological evaluation that included IQ testing. This study was approved by the SCDMH Institutional Review Board.

The primary database, hereafter identified as Database #1, was composed of 270 consecutive South Carolina murder defendants who received forensic evaluations. This database included all murder defendants, including those with an IQ > 70 as well as those with IQ ≤ 70. The second database, hereafter identified as Database #2, contained essentially the same data fields as the primary database but only for murder defendants with IQ ≤ 70 and with the addition of fields for adaptive functioning data. Database #2 is a subset of Database #1 and includes 42 of the 43 South Carolina murder defendants with IQs in the MR range (≤ 70). (One file could not be located during the data collection phase of this research.)

Database #1 was already in place before the start of this study and was compiled by retrospective record review of SCDMH

charts by a single reviewer using a data collection instrument for standardization. It has been described previously (17). Database #2 was compiled in the same fashion by a single investigator using a version of the data collection instrument employed for generating Database #1 that was modified to include adaptive functioning data.

Collected data included demographics, marital status, education profile (highest grade completed, presence and type of special education and presence of college and type of degree), military service (existence and type of discharge), substance use history (type of substance, first use and duration), IQ (full scale, verbal, and performance scores as measured by Wechsler Adult Intelligence Scale-Revised or Wechsler Adult Intelligence Scale—III), and medical information (Axis I, II, and III diagnosis; a history of a head injury with loss of consciousness; EEG report; MRI or CT results; neurological exam results; presence of psychiatric inpatient and outpatient treatment and longest duration of each; and identification of malingering). DSM diagnoses for Axis I and II were based on clinical interviews by the evaluating forensic psychiatrist and relevant psychological testing results, such as IQ test scores as one criterion for an Axis II MR diagnoses. Collected crime information included charges (other than murder), relationship to the alleged victim, presence or absence of a codefendant, type of weapon used, and presence or absence of substance use at the time of the crime. Forensic evaluation conclusions included Competency to Stand Trial, Criminal Responsibility, and Capacity to Conform opinions. Adaptive functioning information included possession of a driver's license; living arrangements (alone or with someone and description); membership in organized clubs, groups, or social/service organizations; participation in nonschool sports; employment record; financial management; personal care; written communication skills; domestic skills; and presence of realistic domestic long-range goals and plans.

Using Database #1 the subjects with an $IQ \leq 70$ were compared with those with an $IQ > 70$. Within Database #2 (murder defendants with an $IQ \leq 70$), those who received a diagnosis of MR were compared with those who did not. Inferential statistical analysis included cross tabulations, Pearson's χ^2 , Fisher's exact test, Mantel-Haenszel linear association test, and risk estimates using Statistical Package for Social Sciences[®] software.

Results

The demographic data for Database #2 (those with an $IQ \leq 70$) is presented in Table 1. Among those who had received outpatient psychiatric treatment, the average duration was 4.4 years and for inpatient psychiatric treatment the average duration was 2.9 months. Table 2 provides psychiatric diagnostic findings. The most prevalent psychiatric diagnoses were in the substance use disorder category. Table 2 does not include the diagnosis of Polysubstance Abuse (found in 9.5% charts) because it is not an official DSM-IV category. The most common Axis III diagnoses were hypertension (16.7%), asthma (14.3%), peptic ulcer disease (9.5%), and seizure disorder (7.1%). No Axis III diagnoses were recorded for 23.8% of subjects. Other than the MR diagnoses, there were no statistically significant differences between data sets on Axis I, II, or III diagnoses when the diagnoses were compared individually. Significant relationships among diagnoses and between diagnoses and other characteristics are addressed later in this report.

Table 2 notes that malingering was "officially diagnosed" in less cases than it was listed in charts. This refers to the finding that although a diagnosis of malingering was addressed in the text of

TABLE 1—Database #2 characteristics of 42 murder defendants with mental retardation.

Demographic Category	Frequency and Description
Mean age	34.3 years (range 18–79)
Sex	78.6% male; 21.4% female
Race	71.4% Caucasian 26.2% African American 2.4% other
Marital status	54.8% single 19.0% married 11.9% divorced 9.5% separated 4.8% widowed
Mean years of school	9 (SD 2.63)
School class type	42.9% special education 33.3% regular classes 23.8% undetermined
Employment	38.1% competitive 23.8% noncompetitive 16.6% unknown competitive status 21.4% unemployed
Military service	4.8% (one each with Honorable & General Discharge)
Outpatient psychiatric treatment	42.9% yes; 57.1% no
Inpatient psychiatric treatment	28.6% yes; 71.4% no
Head injury with loss of consciousness	33.3% yes; 40.5% no; 26.2% unknown
Neurological examination	71.4% normal; 28.6% abnormal
Magnetic resonance imaging (MRI) or computed tomography (CT) examination	66.7% normal; 28.6% abnormal; 4.8% not performed
electroencephalogram (EEG) examination	80.5% normal; 12.2% abnormal; 7.3% not performed
Substance use	95.2% alcohol 61.9% illicit use—illegal/prescription drugs

the court reports found in charts, it was not always included "officially" as an Axis I finding in these reports.

Crime data for Database #2 is listed in Table 3. In cases where opinions regarding competency to stand trial were rendered ($n = 37$), 89.2% of defendants were found competent to stand trial. When opinions were given regarding criminal responsibility and capacity to conform behavior ($n = 31$), all defendants were opined to be criminally responsible and 96.8% were opined to have sufficient capacity to conform behavior.

The average full-scale IQ test score in Database #2 was 65.93 with a range of 56–70. The mean verbal score was 67.83 with a range of 58–76. The mean performance score was 67.81 with a range of 56–76. MR was diagnosed in 31.0% ($n = 13$) of the cases.

Information regarding adaptive functioning was difficult to ascertain from a retrospective chart review. Only 15 charts contained information regarding the issuance of a driver's license. Of these 15, licenses had been issued in 10 (66.7%) cases. Forty (95%) charts contained information about the defendants' living situations. Of these, almost all defendants (87.5%, $n = 35$) did not live alone.

In Database #1 (all 270 murder defendants) IQ was determined to be invalid or testing was not conducted for 24 defendants. For those with valid IQ results most (88.6%) defendants were male and among male defendants, most (84.4%, $n = 184$) had an $IQ > 70$. Of the females, most (67.9%, $n = 19$) also had $IQ > 70$. Of relevance, 15.5% of the 270 murder defendants had a full-scale $IQ \leq 70$ but only 6% received a diagnosis of MR.

Among the subjects in Database #1, a full-scale $IQ \leq 70$ was 2.6 times more likely to be found among female rather than male defendants ($\chi^2 = 4.69$, $p = 0.03$, 95% confidence interval (CI)). A

TABLE 2—Database #2 psychiatric diagnostic data.

Psychiatric Diagnosis	Frequency (%)
Substance use disorder	61.9
Alcohol abuse	16.7
Alcohol dependence	16.7
Cannabis abuse	9.5
Cannabis dependence	2.4
Cocaine abuse	9.5
Cocaine dependence	2.4
Polysubstance dependence	9.5
Cognitive disorders	21.4
Dementia due to head injury	4.8
Dementia not otherwise specified (NOS)— alcohol and HIV	4.8
Dementia of the Alzheimer's type	2.4
Vascular dementia	2.4
Alcohol-induced persisting dementia	2.4
Dementia due to a medical condition	2.4
Dementia NOS	2.4
Mood disorders	16.7
Major depressive disorder (MDD)	14.3
MDD with psychotic features	4.8
Depressive disorder NOS	2.4
Psychotic disorders	11.9
Schizophrenia, paranoid type	2.4
Schizoaffective disorder	2.4
Psychosis NOS	4.8
Brief reactive psychosis	2.4
Anxiety disorders	7.1
Posttraumatic stress disorder	4.8
Generalized anxiety disorder	2.4
Attention deficit/hyperactivity disorder	4.8
Reading disorder	2.4
Disorder of written expression	2.4
Learning disorder NOS	2.4
Adjustment disorder with mixed emotional features	7.1
Malingering	4.8 officially diagnosed (14.3 noted in chart)
No Axis I diagnosis	11.9
Borderline intellectual functioning	35.7
Mild mental retardation	31.0
Personality disorders	4.8
Antisocial personality disorder	2.4
Borderline personality disorder	2.4
No Axis II diagnosis	28.6

TABLE 3—Database #2 crime data.

Crime-Related Variable	Frequency and Description
Charges other than murder	19.0% armed robbery 7.1% kidnapping 7.1% conspiracy 7.1% larceny/grand larceny 4.8% burglary/burglary 2 4.8% possession of a weapon 4.8% criminal conspiracy 2.4% accessory 2.4% criminal sexual misconduct 2.4% malicious injury to personal property 2.4% lynching 2.4% possession of a firearm 2.4% possession with intent to distribute
Relationship to victim	26.2% acquaintance 26.2% stranger 23.8% spouse/significant other 9.5% relative not a parent/sibling 7.1% parents 4.8% unknown relationship 2.4% siblings
Presence of codefendant	23.8% yes; 76.2% no
Method of causing death	61.0% firearm 26.8% hands, blunt object, suffocation, burning 12.2% knife
Substance use at time of crime	33.3% yes, 57.1% unknown

Discussion

According to the AAMR (18), the prevalence of MR in the general population is 1.5–2.5%, but in the criminal justice system it is 4–10%. This is consistent with the results of this sample (6%), although due to referral bias—i.e., the likelihood that cognitive impairment was the motivating factor for an evaluation, our rate may be higher than the rate among all pretrial murder defendants. Additionally, the AAMR (18) reported that persons with MR are more vulnerable in the criminal system secondary to their lack of caution when talking, lack of awareness regarding potential outcomes of their behavior, and willingness to follow the directions of others.

Before the Supreme Court decision in *Atkins v. Virginia*, Olvera et al. (19) compared the application of an Indiana law preventing the execution of mentally retarded persons to two cases that resulted in opposite outcomes. The disparity in rulings was the result of differences in the application of adaptive functioning criteria and stereotypical views of MR (19). They recommended the following to ensure proper assessment of MR defendants: experts in the study of MR should be involved in the drafting of statutes that outline assessment requirements; evaluations should be based on the AAMR's definition and include its list of adaptive functioning; advocacy groups should educate members of the legal field about MR; persons selected to aid in the court process should have experience and training in the field of MR; expert witnesses testifying about MR should have “sound knowledge of diagnostic criteria, test development, and principles of measurement and statistics and be able to defend the assessment procedures and results” (19).

Based on this study of SCDMH data, education level, special education classes, marital status, driver's license possession, and competitive employment did not statistically distinguish persons with $IQ \leq 70$ who received MR diagnosis from those who did not receive one, although a history of employment and a history of

full-scale $IQ > 70$ was 7.9 times more likely among subjects found competent to stand trial ($\chi^2 = 6.79$, $p = 0.009$, 95% CI). A full-scale $IQ \leq 70$ was 5.6 times more likely to be found among subjects with an Axis I cognitive disorder compared with other diagnoses ($\chi^2 = 12.50$, $p = 0.000$, 95% CI). Among murder defendants in Database #1, a diagnosis of MR was also 4.7 times more likely among defendants with an Axis I cognitive disorder than subjects with any other diagnosis ($\chi^2 = 5.62$, $p = 0.018$, 95% CI). An $IQ \leq 70$ was 4.1 times more likely to occur in defendants with dual psychotic and substance abuse diagnoses when compared with any other diagnosis ($\chi^2 = 4.69$, $p = 0.03$, 95% CI).

When comparing subjects in Database #2 (all defendants with a full-scale $IQ \leq 70$) who received a diagnosis of MR with those who did not, there were no statistically significant differences among demographic, psychiatric history, medical, or crime variables. Although the likelihood of employment was somewhat less for those with a MR diagnosis, it was not to a statistically significant degree (Fisher's exact test $p = 0.09$). The likelihood of alcohol use was somewhat less for those with MR diagnosis, but again not to a statistically significant degree (Fisher's Exact test $p = 0.09$).

alcohol use was less for those with MR. Evaluators may attribute lower IQ scores in some instances to the effects of prolonged alcohol use rather than MR. This data would also indicate that the presence of a psychotic disorder may also explain a lower performance on intelligence measurement.

Based on this dataset, there appears to be potential for confusion when distinguishing low IQ secondary to MR from low IQ attributable to dementia, given the presence of the former diagnosis almost five times more often when there was an Axis I cognitive disorder. Additionally, the low percentage of MR diagnoses may relate to a difficulty in discriminating etiology as well, given the finding of an $IQ \leq 70$ c. four times more often in defendants with dual psychotic and substance abuse. The lack of diagnosis of MR may also relate to adaptive functioning variables.

Additional research is needed to study adaptive functioning variables for potential discriminating factors between murder defendants with and without a MR diagnosis and to assess methods for determining adaptive function in the context of evaluating murder defendants. These defendants were all evaluated before the *Atkins* decision. A South Carolina newspaper, *The State*, reported on August 8, 2002, that states where execution of mentally retarded persons had been outlawed had different standards for determining the diagnosis (20). Although all standards included intelligence, adaptive functioning and onset before 18 years of age, the details of these standards differed. A former president of the AAMR has stated that mild MR is not always obvious to the "casual observer" (21). She further stated mentally retarded persons can hide their disabilities, maintaining jobs, marrying, having children, and interacting with others.

Commonly used adaptive scales might be inappropriate for persons with a criminal history because the scales were developed with children and the normative data is based on reports of others (22). Additionally, historical records (such as those for education and employment) may not be available for many criminal defendants (22). A criminal lifestyle in and of itself may indicate poor adaptive functioning, i.e., poor work history (22). Furthermore, a poor academic record may be difficult to characterize as being because of MR or a lack of motivation (22).

A second issue identified by this study suggests the need for further exploration of potential differences along gender lines. With the 270 murder defendant sample (Database #1), a full-scale $IQ \leq 70$ was more likely among female than male murder defendants. Although not statistically significant, females were more likely to have MR diagnosis given an $IQ \leq 70$. The lack of statistical significance may be the result of the relatively small sample of females with full-scale $IQ \leq 70$. Additional research is needed to assess the differences between male and female murder defendants. Is there a subgroup of women (i.e., the mentally retarded) who are more likely to commit a serious assault or homicide? Low intelligence and antisocial traits have been described as components of dangerousness in a subset of male offenders. In a study of 243 males incarcerated in Georgia prisons for murder, Heilbrun (23) reported that the combination of low IQ and antisociality led to more serious violent acts. This link is based on the theory that if a person lacks sufficient cognitive ability to manage a given event or becomes frustrated by not getting anti-social goals met, he/she could not stop a progression to more violent behavior, due to a lack of "judgment," "planning resources," or "self-control." We also hypothesize that a reduced ability to manage major acute interpersonal conflicts (secondary to low IQ) may lead to increased risk of violence for a subset of female offenders. This deserves further study.

This study identifies the problems associated with adaptive functioning assessment methods. The examination of pretrial murder defendant populations who were evaluated after the *Atkins* decision will add to the understanding of the subgroup of these defendants with MR. A greater understanding will facilitate accurate forensic assessments, equitable courtroom decisions, and ideally, will identify methods of violence prevention among this special population.

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References

1. *Atkins v. Virginia*, 536 U.S. 304, 2002.
2. Cowperthwaite R, Klykko W. Psychiatric disorders in patients with mental retardation. *Hosp Physician* 2002;6(1):2-12.
3. President's Committee on Mental Retardation. Mission 2003. Available at URL: <http://www.acf.dhhs.gov/programs/pcmr/mission.htm>. Accessed 10-10-03.
4. American Psychiatric Association. Diagnostic and statistical manual of mental disorders. 4th ed. text revision. Washington, DC: American Psychiatric Association; 2000.
5. American Association on Mental Retardation. Mental retardation definition, classification, and systems of supports. 10th ed. Washington, DC: American Association on Mental Retardation; 2002.
6. *Penry v. Lynaugh*, 492 U.S. 302, 1989.
7. *Ford v. Wainwright*, 477 U.S. 399, 1986.
8. Colo. Rev. Stat. § 18-1.3-1102.
9. *People v. Vasquez*, 84 P. 3d 1019 (Colo. 2004).
10. Bonnie RJ. The American Psychiatric Association's resource document on mental retardation and capital sentencing: implementing *Atkins v. Virginia*. *J Am Acad Psychiatry Law* 2004;32:304-8.
11. Okasha A, Sadek A, Moneim SA. Psychosocial and electroencephalographic studies of Egyptian murderers. *Br J Psychiatry* 1975;126:34-40.
12. Wagner EE, Klein I. WAIS differences between murderers and attackers referred for evaluation. *Perceptual Motor Skills* 1977;44:125-6.
13. Tiihonen J. Criminality associated with mental disorders and intellectual deficiency. *Arch Gen Psychiatry* 1993;50:917-8.
14. Blake PY, Pincus JH, Buckner C. Neurologic abnormalities in murderers. *Neurology* 1995;45:1641-7.
15. Inada T, Minagawa F, Iwashita S, Tokui T. Mentally disordered criminal offenders: five years' data from the Tokyo district public prosecutor's office. *Int J Law Psychiatry* 1995;18(2):221-30.
16. Eronen M, Hakola P, Tiihonen J. Mental disorders and homicidal behavior in Finland. *Arch Gen Psychiatry* 1996;53:497-501.
17. Frierson RL, Finkbine RD. Psychiatric and neurological characteristics of murder defendants referred for pretrial evaluation. *J Forensic Sci* 2004;49(3):604-9.
18. American Association on Mental Retardation. Fact sheet: the death penalty, 2001. Available from URL: http://www.aamr.org/Polices/faq_death_penalty.shtml. Accessed 10-10-03.
19. Olvera DR, Dever RB, Earnest MA. Mental retardation and sentences for murder: comparison of two recent court cases. *Mental Retardation* 2000;38(3):228-33.
20. Scope C. Legislature, not court, must define mental retardation. *The State*, August 8, 2002, Opinion.
21. Hall K. Decisions hinge on nebulous IQ scores. *The Charlotte Observer*, August 23, 2003, Sect. A.
22. Grinfeld MJ. Being mentally retarded is now a matter of life and death. *Psychiatric Times* 2003;20(1):1 and 5-7.
23. Heilbrun AB. Differentiation of death-row murderers and life-sentence murderers by antisociality and intelligence measures. *J Personality Assessment* 1990;54(3 and 4):617-27.

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