Cognitive Performance in Long-Term Abstinent Elderly Alcoholics

George Fein and Shannon McGillivray

Background: To date, there is a wealth of literature describing the deleterious effects of active alcoholism on cognitive function. There is also a growing body of literature on the extent of cognitive recovery that can occur with abstinence. However, there is still a dearth of published “ndings on cognitive functioning in very long-term abstinence alcoholics, especially in the elderly population.

Methods: The current study examines 91 elderly abstinent alcoholics (EAA) (49 men and 42 women) with an average age of 67.3 years, abstinent for an average of 14.8 years (range 0.5 to 45 years), and age and gender comparable light/nondrinking controls. The EAA group was divided into 3 subgroups: individuals that attained abstinence before age 50 years, between the ages 50 and 60 years, and after age 60 years. Attention, verbal ”uency, abstraction, cognitive ”exibility, psychomotor, immediate memory, delayed memory, reaction time, spatial processing, and auditory working memory were assessed. The AMNART and cranium size were used as estimates of brain reserve capacity, and the association of all variables with alcohol use measures was examined.

Results: Overall, the EAA groups performed comparably to controls on the assessments of cognitive function. Only the abstinent in group before 50 years of age performed worse than controls, and this was only in the domain of auditory working memory. EAAs had larger craniums than their controls. This effect was strongest for those who drank the longest and had the shortest abstinence. Such individuals also performed better cognitively.

Conclusions: Our data showed that elderly alcoholics that drank late into life, but with at least 6 months abstinence can exhibit normal cognitive functioning. Selective survivorship and selection bias probably play a part in these “ndings. Cognitively healthier alcoholics, with more brain reserve capacity, may be more likely to live into their 60s, 70s, or 80s of age with relatively intact cognition, and to volunteer for studies such as this. Our results do not imply that all elderly alcoholics with long-term abstinence will attain normal cognition.

Key Words: Alcoholism, Long-Term Abstinence, Cognition, Neuropsychology, Aging.

THE DELETERIOUS EFFECTS of chronic alcoholism on cognitive functioning have been well documented for over a century beginning as early as the 1880s with Wernicke and Korsakoff (Korsakoff, 1887; Wernicke, 1881). In the 1980s, Finn5.3(n92(r)0.40 TJ T* -0.0205 Tc [(e)-4.6(t)-302.1(al.)-6.6(,)-296.8(1)-4.2(9)1.5(9)-4.2(6)1.5(;)-302.5(H)-0.9(a)-4.2(r)0.3 2000a).

Despite research efforts in studying cognitive recovery in abstinent alcoholics, there is a scarcity of data on long-term abstinence, with most studies focusing on treatment samples and 3- to 12-month follow-up after treatment. The lack of research on cognitive functioning in long-term abstinence is even more pronounced in the elderly population. To our knowledge, there has not been a single study published on the cognitive functioning of elderly alcoholics with very long-term

From the Neurobehavioral Research, Inc., Corte Madera, California, and Honolulu, Hawaii.

Received for publication December 18, 2006; accepted July 4, 2007.

Reprint requests: George Fein, PhD, Neurobehavioral Research, Inc., 201 Tamal Vista Boulevard, Suite 200, Corte Madera, CA 94925; Fax: 415-924-2903; E-mail: george@nbresearch.com

DOI: 10.1111/j.1530-0277.2007.00481.x

-scored test that assesses important neurocognitive function in adults. MicroCog was designed to be sensitive to detecting cognitive impairment across a wide range, and takes into account levels of premorbid intellectual functioning by providing age- and education-level adjusted norms.

Normative scores derived from a nationally representative sample of -adults(ea)rte3aipbdyoolegicb)5t17(a)f9e5fromthe insreatotus aor adrraA9(r)-2 -243189 Tc [tribuatosoofthets.

rmasuorserde c-1

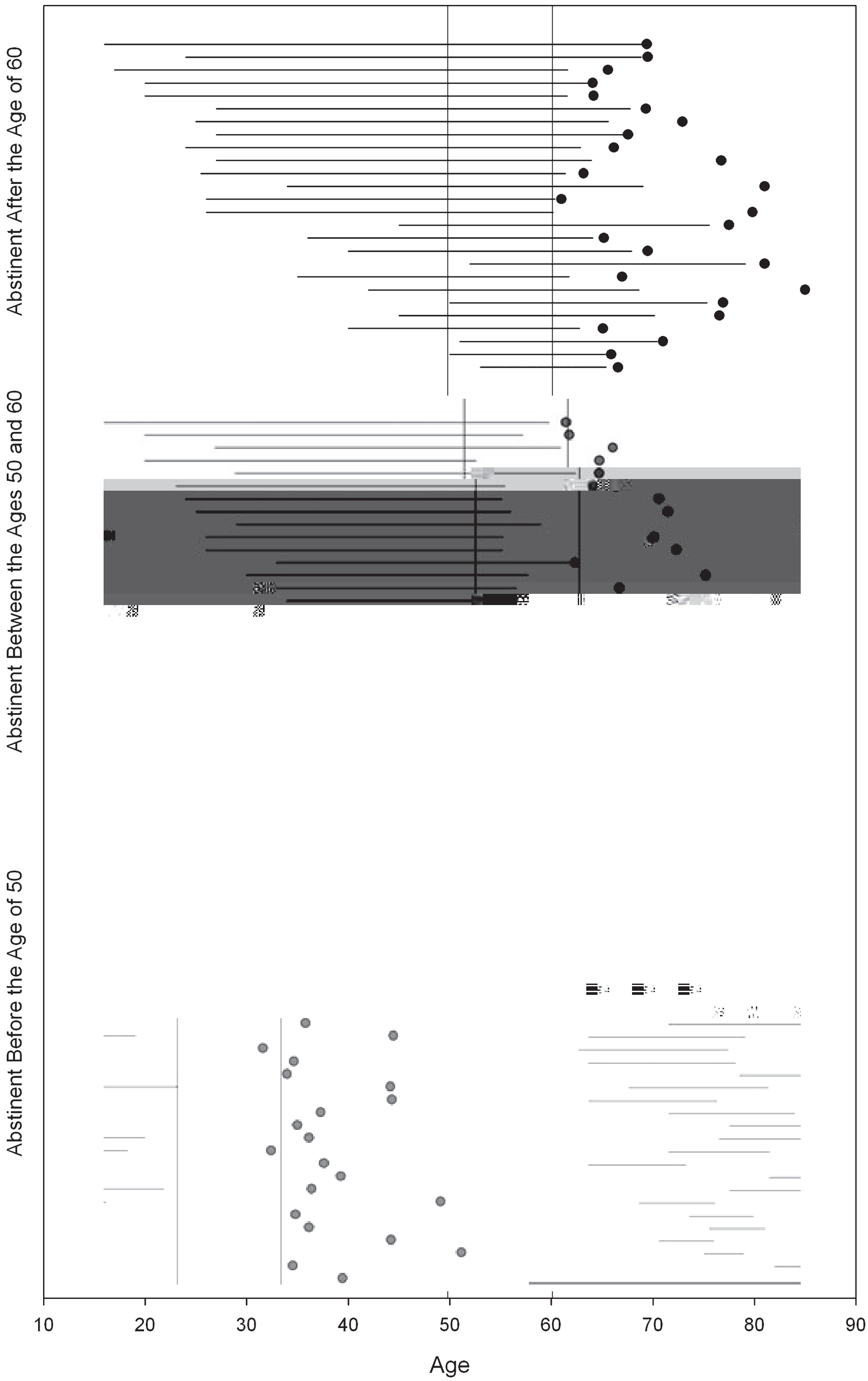

Fig. 1. In the Þgure, the horizontal lines begin at the onset of heavy drinking and end at the ages at which abstinence was achieved for each member of the abstinent alcoholic groups.

delayed memory ($F_{2,84}$ = 6.15, p = 0.003) and spatial processing ($F_{2,84}$ = 3.80, $p < 0.03$) with the EAA3 performing the best and the EAA1 group performing the worst on both domains. Multivariate analyses did not reveal any significant gender or group by gender effects. However, data uncorrected for multiple comparisons revealed 1 group by gender interaction difference on the assessment of verbal ability ($F_{2,84}$ = 3.16, $p < 0.05$).

Table 1. Characteristics of the Elderly Abstinent Alcoholic Groups

	Alcoholics that achieved abstinence						Effect size (%)		
	Before 50 years		Between 50 and 60 years		After 60 years				
Variables	Males (n = 16)	Females (n = 23)	Males (n = 16)	Females (n = 10)	Males (n = 17)	Females (n = 9)	Group	Gender	Group · gender
Age (years)	66.4 ± 5.5	65.0 ± 4.7	65.4 ± 4.8	68.6 ± 6.8	70.2 ± 4.8	71.5 ± 9.3	12.6**	0.8	2.9
Family drinking density[a]	0.39 ± 0.30	0.45 ± 0.33	0.19 ± 0.15	0.29 ± 0.26	0.22 ± 0.20	0.35 ± 0.25	8.8*	3.3	0.2
Treated versus untreated[b]	12, 4	15, 8	13, 3	6, 4	12, 5	9, 0	N ‡A	N ‡A	N ‡A
Years education	14.6 ± 2.8	15.9 ± 2.4	16.5 ± 3.1	16.3 ± 3.7	16.2 ± 2.2	14.0 ± 1.8	4.0	0.4	6.5
AMNART (estimated verbal IQ)	116.9 ± 6.5	118.3 ± 5.5	120.2 ± 5.0	120.4 ± 4.1	123.1 ± 5.5	118.2 ± 7.0	6.0	0.9	5.2

month than the EAA3 group (adjusted for the difference

Heavy alcohol consumption has been shown to negatively impact life expectancy both directly and indirectly (Goldacre et al., 2004; Jarque-Lopez et al., 2001; McDonnell and Maynard, 1985; Ojesjo et al., 1998; Poldrugo et al., 1993; Rehm et al., 2006; Sher, 2005; Wojtyniak et al., 2005). Furthermore the CDC reported that in 2001, there were approximately 75,000 deaths attributable to either excessive or risky drinking in the United States, making alcohol the third leading actual cause of death (Centers for Disease Control, 2004). Given the negative impact of alcoholism on life expectancy, selective survivorship increases the likelihood that cognitively healthier alcoholics are more likely to survive into their 60s, 70s, or 80s of age.

Third, it is also possible that the abstinent alcoholics we studied may never have suffered from significant cognitive impairments, even while they were actively drinking. There have been a number of studies through the years these cognitively normal patients with a high quantity of plaque were signi“cantly greater than those of the control group. Katzman et al. (1988) concluded that these clinically healthy individuals with a high quantity of plaque had incipient Alzheimer•s disease, but were cognitively intact because of a greater neuronal reserve associated with their larger than average brains.

Our results showed that it is possible for elderly alcoholics with at least 6 months abstinence to exhibit essentially normal cognitive functioning, even if they drank during their 50s or 60s. These “ndings argue against the hypothesis that aging brain is more vulnerable to the effects of alcohol. However, we noted that it is also possible that the aging brain is indeed more vulnerable, but that cognitive de“cits resulting from chronic alcohol abuse tend to resolve with signi“cant abstinence, or that a subgroup of elderly alcoholics exist who have suf“cient brain reserve capacity to have normal cognitive performance once they have had a reasonable period of abstinence. These results do not suggest by any means that all elderly chronic alcoholics with long-term abstinence will attain normal cognitive function.

Finally, our results suggested that brain reserve capacity is important in modulating the clinical manifestations of chronic alcoholism on cognitive function, especially in an elderly sample. In multigenerational alcohol- or drug-dependent individuals, reduced reserve capacity is a likely result of a less than optimal prenatal and postnatal environments (Fein and Di Sclafani, 2004; Gilman et al., 2007). This reduced reserve capacity may exacerbate cognitive impairments secondary to alcohol abuse, and should be examined as a modulating variable where possible.

ACKNOWLEDGMENTS

This work was supported by Grants AA11311 (GF) and AA13659 (GF), both from the National Institute of Alcohol Abuse and Alcoholism.

REFERENCES

American Psychiatric Association (2000) DSM-IV-TR: Diagnostic and Statistical Manual of Mental Disorders. 4th ed. American Psychiatric Publishing, Washington, DC.

Bates ME, Voelbel GT, Buckman JF, Labouvie EW, Barry D (2005) Short-term neuropsychological recovery in clients with substance use disorders. Alcohol Clin Exp Res 29:367…377.

Bechara A, Damasio AR, Damasio H, Anderson SW (1994) Insensitivity to future consequences following damage to human prefrontal cortex. Cognition 50:7…15.

Benton AL, Hamsher K (1983) Multilingual Aphasia Examination. AJA Associates, Iowa City.

Block RI, Erwin WJ, Ghoneim MM (2002) Chronic drug use and cognitive impairments. Pharmacol Biochem Behav 73:491…504.

Brokate B, Hildebrandt H, Eling P, Fichtner H, Runge K, Timm C (2003) Frontal lobe dysfunctions in Korsakoff•s syndrome and chronic alcoholism: continuity or discontinuity? Neuropsychology 17:420…428.

Brun A, Andersson J (2001) Frontal dysfunction and frontal cortical synapse loss in alcoholism„the main cause of alcohol dementia? Dement Geriatr Cogn Disord 12:289…294.

Butterworth RF (1995) Pathophysiology of alcoholic brain damage: synergistic effects of ethanol, thiamine de“ciency and alcoholic liver disease. Metab Brain Dis 10:1…8.

Centers for Disease Control (2004) Alcohol-attributal deaths and years of potential life lost„United States, 2001. MMWR Morb Mortal Wkly Rep 53:866…870.

Denman SB (1987) Denman Neuropsychology Memory Scale. SB Denman, Charleston, SC.

Di Sclafani V, Clark HW, Tolou-Shams M, Bloomer CW, Salas GA, Norman D, Fein G (1998) Premorbid brain size is a determinant of functional reserve in abstinent crack-cocaine and crack-cocaine-alcohol-dependent adults. J Int Neuropsychol Soc 4:559…565.

Di Sclafani V, Ezekiel F, Meyerhoff DJ, MacKay S, Dillon WP, Weiner MW, Fein G (1995) Brain atrophy and cognitive function in older abstinent alcoholic men. Alcohol Clin Exp Res 19:1121…1126.

Diamond I, Messing RO (1994) Neurologic effects of alcoholism. West J Med 161:279…287.

Emsley R, Smith R, Roberts M, Kapnias S, Pieters H, Maritz S (1996) Magnetic resonance imaging in alcoholic Korsakoff•s syndrome: evidence for an association with alcoholic dementia. Alcohol Alcohol 31:479…486.

Fama R, Pfefferbaum A, Sullivan EV (2004) Perceptual learning in detoxi“ed alcoholic men: contributions from explicit memory, executive function, and age. Alcohol Clin Exp Res 28:1

alcoholism-induced cognitive de“cit: impaired thiamine utilization found in alcoholics and alcohol abusers. Psychiatr Genet 12:217…224.
Heaton RK, Grant I, Maththews CG (1991) Comprehensive Norms for an Expanded Halstead-Reitan Battery: Demographic Corrections, Research Findings, and Clinical Applications. Psychological Assessment Resources, Inc., Odessa, FL.
Jarque-Lopez A, Gonzalez-Reimers E, Rodriguez-Moreno F, Santolaria-Fernandez F, Lopez-Lirola A, Ros-Vilamajo R, Espinosa-Villarreal JG, Martinez-Riera A (2001) Prevalence and mortality of heavy drinkers in a general medical hospital unit. Alcohol Alcohol 36:335…338.
Katzman R, Terry R, DeTeresa R, Brown T, Davies P, Fuld P, Renbing X, Peck A (1988) Clinical, pathological, and neurochemical changes in dementia: a subgroup with preserved mental status and numerous neocortical plaques. Ann Neurol 23:138…144.
Kim JM, Shin IS, Stewart R, Yoon JS (2002) Alcoholism in older Korean men: prevalence, aetiology, and comorbidity with cognitive impairment and dementia in urban and rural communities. Int J Geriatr Psychiatry 17:821…827.
Korsakoff S (1887) Disturbance of psychic activity in alcoholic paralysis. Vestn Klin Psichiat Neurol 4:1…102.
Krabbendam L, Visser PJ, Derix MM, Verhey F, Hofman P, Verhoeven W, Tuinier S, Jolles J (2000) Normal cognitive performance in patients with chronic alcoholism in contrast to patients with Korsakoff•s syndrome. J Neuropsychiatry Clin Neurosci 12:44…50.
Mann RE, Sobell LC, Sobell MB, Pavan D (1985) Reliability of a family tree questionnaire for assessing family history of alcohol problems. Drug Alcohol Depend 15:61…67.
McDonnell R, Maynard A (1985) Estimation of life years lost from alcohol-related premature death. Alcohol Alcohol 20:435…443.
McMurtray A, Clark DG, Christine D, Mendez MF (2006) Early-onset dementia: frequency and causes compared to late-onset dementia. Dement Geriatr Cogi

Wechsler D (1997) Wechsler Adult Intelligence Scale„Third Edition: Administration and Scoring Manual. The Psychological Corporation, San Antonio, TX.
Wernicke C (1881) Lehrbuch der Gehrinkrankheiten fur Aerzte und Studirende, Volume 2. Theodor Fisher, Kassel, Berlin, pp 229…242.
Wetzel L, Boll T (1987) Short Category Test Booklet Format. Western Psychological Services, Los Angeles, CA.
Wojtyniak B, Moskalewicz J, Stokwiszewski J, Rabczenko D (2005) Gender-speci“c mortality associated with alcohol consumption in Poland in transition. Addiction 100:1779…1789.
Zinn S, Stein R, Swartzwelder HS (2004) Executive functioning early in abstinence from alcohol. Alcohol Clin Exp Res 281338…1346.