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ABSTRACT

The research concerning intellectual functioning in addict populations has not addressed basic questions concerning why and how intelligence quotients (IQ) might be related to drug addiction. A study was undertaken to estimate intellectual functioning based upon a demographic profile for Wechsler Adult Intelligence Scale-Revised (WAIS-R) Full Scale IQ in order to determine its relationship with variables representing initiation, continuation, relapse, and cessation of daily opioid use. Estimated IQs were used to describe a large former opicid addict sample (N=486) from the 12-year follow-up study of the Drug Abuse Reporting Program (DARP). Results were compared with those from previous studies of various drug users and non-users, and a correlational analysis was performed. The results indicated that the average estimated IQs for the DARP sample were comparable to mean IQs for both the WAIS-R standardization sample (N=1,880) and previous studies. IQ was significantly related to length of addiction career; the higher the IQ, the shorter the career. Other more complex relationships were found for variables used to represent intraindividual factors such as satisfaction with self or family, interpersonal factors such as family or peer influence, and other variables of interest. (NRB)

Estimated Full Scale IQ In An Adult Heroin Addict Population

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Abstract

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This study estimated intellectual functioning based upon a demographic profile for Wechsler Adult Intelligence Scale - Revised (WAIS-R) Full Scale IQ in order to determine its relationship with variables representing initiation, continuation, relapse, and cessation of daily opioid use. Estimated IQs were used to describe a large former opioid addict sample from the 12-year follow-up study of the Drug Abuse Reporting Program (DARP). Results were compared with those from previous studies using meta-analysis. In addition, a correlational analysis was performed. Average estimated IQs for the DARP sample were comparable to mean IQs for both the WAIS-R standardization sample and previous studies. IQ was significantly related to length of addiction career; the higher the IQ, the shorter the career. Other more complex relationships were found for variables used to represent intraindividual factors such as satisfaction with self or family, interpersonal factors such as family or peer influences, and other variables of interest.

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The research concerning intellectual functioning in addict populations has not addressed basic questions concerning why and how IQ might be related to drug addiction. Generally there have been two contrasting pictures of what the typical addict looks like in terms of intellectual functioning. Although the more common picture is one of lower intellectual functioning than for the nonaddict counterpart, Cohen and Klein (1970) reported significantly higher total Wechsler Adult Intelligence Scale (WAIS) IQs for an extreme drug use group when compared to a control group in a young psychiatric population. But perhaps these divergent views may be attributed to the types of drugs the addicts have abused or to the different socioeconomic backgrounds in the diverse addict samples.

IQ has been investigated in a few studies, but with differing emphases. DeLeon and Jainchill (1981-82) investigated Alpha IQ as evidence of psychological improvement in a mainly black opioid addict sample. Intellectual functioning was low (dull-normal IQ scores) at initial testing, but was substantially higher after treatment for males. Levi and Seborg (1972) looked at both Alpha and Raven IQs to determine significant differences between racial and ethnic groups among women addicts. Various measures of IQ have been used to compare different groups of drug addicts or controls (Marcus, Hans, Patterson,

& Morris, 1984; Noble, Hart, & Nation, 1972; Platt, Hoffman, & Ebert, 1976), but without clear or consistent reasons why or how IQ is useful.

Although there may not be empirical evidence to suggest neurological impairment in addict populations, it does not appear possible to measure IQ for one who is or has been a long term addict apart from the effects of the drug(s) on IQ. Assuredly, a concern centers on how these effects are likely to have depressed the current level of intellectual functioning. This concern may be particularly appropriate for those addicts who started their addiction career at an early age where the addiction lifestyle may have interfered with their educational or occupational attainment. A similar problem has occurred in estimating the premorbid intellectual functioning level of adults or children with head or neurological trauma. Most of the previous attempts to estimate premorbid intellectual functioning relied heavily upon clinical judgement and intuition which have quite low interrater reliabilities. This has led to attempts to estimate premorbid IQ by alternate methods. The use of demographic measures to estimate premorbid intelligence as measured by the Wechsler Scales has shown considerable promise. Demographic indices for estimating IQ have been developed by Reynolds and Gutkin (1979) on the Wechsler Intelligence Scale for Children-Revised (WISC-R; Wechsler, 1974); Wilson, Rosenbaum, Brown, Rourke, Whitman, and Grisell (1970) on the WAIS (Wechsler, 1955); and Barona,

Reynolds, and Chastain (1984) on the Wechsler Adult Intelligence Scale-Revised (WAIS-R; Wechsler, 1981). These indices have provided a standardized and quanitative procedure for the estimation of premorbid IQs based upon large, nationally representative, stratified random samples.

The present study attempts to describe a large opioid addict sample in terms of estimated IQ from a demograpnic profile adapted from the previous research on WAIS-R IQs (Barona, Reynolds, & Chastain, 1984). The estimated WAIS-R Full Scale IQ will be compared to previous studies and examined in relation to aspects of initiation, continuation, relapse, and cessation of daily opioid use.

Method

Subjects

The analyses for this study were based on the total interviewed sample of former opioid addicts who were admitted to the Drug Abuse Reporting Program (DARP) between 1969-1971 and selected for a 12-year follow-up study. All were daily opioid users at the time of DARP admission. The sample included 18% females and 82% males, 51% blacks and 49% whites, with a median age of 34 years at the time of the 12-year follow-up interview. Further details are provided by Simpson (1984a,b).

Procedure

A weighted demographic profile to estimate WAIS-R Full Scale IQ was developed from a multiple regression analysis based upon the 1981 WAIS-R standardization sample (N=1880).

This standardization sample was stratified and randomly selected according to 1970 U.S. Census figures and more recent statistical abstracts of the U.S. on seven demographic variables (age, sex, race, geographic region of residence, occupation, education, and urban-rural residence). A more complete description of the standardization sample is provided elsewhere (Wechsler, 1981; Chastain, & Reynolds, 1984). A subsample (N=1265) was chosen omitting those adults under 25 years of age because: (1) the DARP sample contained no adults under 25 years of age, and (2) for those groups aged 16-19 years of age the standardization sample was stratified according to the occupation of the head of the subject's household. The subsample was further restricted to only black and white adults since the DARP sample contained only blacks and whites. The demographic variables entered into the regression equation were age, sex, race, education, occupation, and region of residence. These accounted for approximately 46% of the variance in WAIS-R Full Scale IQ and had significant regression weights. The unstandardized regression coefficients were then used in estimating IQ for the DARP subjects using the variables of age, sex, race, education, occupation, and region of residence at 12-year follow-up. Because the largest weights were given to education and occupation which were also likely to have been depressed through drug use, the estimated IQ is believed to be a conservative estimate of actual IQ. The resulting

estimated IQs were compared to IQs reported in the literature using the DARP sample as a control group and calculating effect sizes with meta-analysis techniques (Glass, McGaw, & Smith, 1981) to determine whether the DARP estimated IQs were very different from IQs presented in the literature. Bivariate correlations and analysis of variance (ANOVA) were also used to detect relationships between estimated IQ and variables concerning initiation, continuation, relapse, and cessation of daily opioid use.

Results and Discussion

Effect sizes were calculated for studies involving either the WAIS or Revised Beta IQs using estimated IQs for the total DARP sample as a control. Since the study by Marcus et al. (1984) contained only black females, these IQs were compared to estimated IQs for black females in the DARP sample. Results from the meta-analysis are shown in Table 1. The average effect size was approximately .85 standard deviation lower for the DARP sample than the comparison IQs on the average. However, most of this is due to effect sizes from the Cohen and Klein study (1970) identified by a single asterisk. This study looked at IQs of young white females in a private, voluntary, psychiatric hospital located in a predominantly white, Jewish, middle-class neighborhood. Since this sample was not typical of the DARP sample, a second average effect size was calculated without those from this study and is also shown in Table 1. The average effect size changed from .85 to about .03 standard

deviation. Since both average effect sizes had extemely large confidence intervals which contained zero average effect, it is not likely that either average effect size was substantially greater than zero. Even with certain problems of incomparability it can be stated that the DARP estimated IQs are not very different from the IQs reported in the literature when comparing appropriate subsamples in terms of socioeconomic or demographic variables. Table 2 displays estimated mean IQs for race and sex separately, and for race by sex. Even though race and sex were also used to estimate IQ it is interesting to note that the results are similar to findings from studies of standardization samples (Kaufman & Doppelt, 1976; Chastain & Reynolds, 1984). Males were approximately 2 IQ points higher than females on the average. The difference between black and white adults was approximately 10 points which was smaller in magnitude than the expected 15 point (1 SD) usually found, but the 10 IQ points represented a larger difference relative to its standard deviation (1.4 SD). The results for race by sex were very close to the IQs reported for the WAIS-R standardization sample with the exception that DARP black males had higher estimated IQs while DARP white males had slightly lower estimated IQs than their respective counterparts from the standardization sample.

Estimated IQ was correlated with variables representing initiation to use, continuation, relapse, and cessation of daily opioid use. Zero-order correlations are presented in

Table 3. These indicate that estimated IQ was significantly related to length of addiction career, socioeconomic status of parents at admission, quitting daily opioid use, and other variables of interest.

An analysis of variance (ANOVA) was subsequently performed to determine IQ differences between those former addicts who had quit daily opioid use for over a year and those who had not at the 12-year follow-up. The results from the ANOVA indicated significantly higher IQ for those who had quit daily opioid use for over a year ($F=4.77$; $df=1,484$; $p=.0295$). This suggests that as a group more intelligent addicts are more likely to eventually get off drugs or find better jobs or go back to school. These may have implications for treatment in attending to differences and abilities among addicts. Although education and occupation are confounded with estimated IQ since these were used in estimating IQ, this may be a reflection of the hypothesis that addicts who possess more resources are more likely to be successful in leaving the addict lifestyle. In this case these resources may be in the form of intelligence, education, or employment.

Conclusions

Intellectual functioning of opioid addicts has not been thoroughly investigated for a large, representative sample. This study was an attempt to explore intellectual functioning for such a sample by using a demographic profile based upon the WAIS-R standardization sample. Results from

a meta-analysis of previous studies showed that estimated IQs from the DARP were not substantially different from other addict samples where IQ was measured directly. A comparison of estimated IQs from the DARP with Full Scale IQs from the WAIS-R standardization sample showed that estimated addict IQ is not very different from a normal population, contrary to either popular or professional opinion. These results are not conclusive, but they suggest that drug addicts are not overrepresented by either the mentally impaired or the mentally superior. Although the distribution of estimated IQ among opioid addicts does not appear to differ from normal populations, variables related to the addiction career, intraindividual influences, and interpersonal influences had significant bivariate relationships with estimated IQ. These are of considerable interest and suggest very complex, dynamic relationships between intelligence and opioid addiction. However, these relationships must be interpreted carefully in light of the special nature of the sample involved. Significant bivariate relationships were found between estimated IQ and several variables concerning length of time addicted. Addicts who had a longer time since last daily use, had not used daily in the year preceding the 12-year follow-up had shorter overall addiction careers, and quit opioid use for reasons other than the unavailability or poor quality of drugs tended to have higher estimated IQs. As discussed above, this is consistent with other findings; those addicts

with more resources are more likely to get off drugs and out of the addict lifestyle.

Other relationships found were considerably more complex. For example, satisfaction with self and life in general is positively related to IQ in normal populations, but is negatively related to estimated IQ in the DARP sample. In addition, the findings indicated that those addicts with higher levels of estimated intelligence were more likely to have fought with their parents during adolescence or addiction and to have spent less time with their family than addicts with lower levels of estimated intelligence. On the other hand, addicts with lower estimated IQs were more likely to have had friends who fought or were in gangs, to have used opioids for the pleasurable sensation when they last used opioids daily, to have reported happier mothers, and to have received public assistance.

Those results may suggest interactions between intellectual functioning and certain dynamics of opioid use. Although addicts with higher levels of intelligence may have greater family conflict and higher levels of dissatisfaction that could lead to drug experimentation and addiction, the length of addiction may be shorter for these addicts since they tend to have greater resources. Since addicts with lower levels of intellectual functioning seem to have less family turmoil and more satisfaction with self and life, perhaps these addicts become involved with addictive drugs

out of pathological family dependencies in which the mother attempts to maintain the addiction of her offspring by fostering dependence (Starton & Coleman, 1979). The addict has fewer resources to leave the addict lifestyle and their career is longer.

The relationships presented here are suggestive and speculative because intellectual functioning was not measured directly. It was inferred from demographic characteristics so that any relationship with estimated IQ will be confounded with these demographic characteristics. However, evidence was presented which showed estimated IQ to be comparable to IQ in other addict samples and to a national standardization sample. Therefore, these results may have important implications for understanding and treating addiction. As such, further study of actual intellectual functioning in large, representative samples of addicts is needed.

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Table 1. Effect Sizes Using Estimated IQs From DARP Sample as Control Group

GROUP	N	EFFECT SIZE
Control Group Adolescent Girls (WAIS IQ) *I	39	0.34267
Moderate Marijuana Users Adolescent Girls (WAIS IQ) *I	15	0.26867
Moderate Mixed Drug Users Adolescent Girls (WAIS IQ) *I	16	0.84933
Extreme Drug Users Adolescent Girls (WAIS IQ) *I	39	0.99733
Methadone Users - Black Females (Verbal WAIS IQ) *II	18	0.09133
Methadone Users - Black Females (Performance WAIS IQ) *II	18	0.36467
Methadone Users - Black Females (Full Scale WAIS IQ) *II	18	0.18467
Comparison - Black Females (Verbal WAIS IQ) *II	24	0.33133
Comparison - Black Females (Performance WAIS IQ) *II	24	0.59133
Comparison - Black Females (Full Scale WAIS IQ) *II	24	0.43133
Male and Female Amphetamine Abusers (WAIS IQ) *III	30	0.90906
Heroin Nonusers 1968 (Revised Beta IQ) *IV	66	-0.56294
Heroin Nonusers 1969 (Revised Beta IQ) *IV	91	-0.18828
Heroin Nonusers 1970 (Revised Beta IQ) *IV	69	-0.20894
Heroin Nonusers 1971 (Revised Beta IQ) *IV	41	-0.45361
Heroin Nonusers 1972 (Revised Beta IQ) *IV	37	-0.06361
Heroin Users 1968 (Revised Beta IQ) *IV	36	-0.05028
Heroin Users 1969 (Revised Beta IQ) *IV	70	0.03172
Heroin Users 1970 (Revised Beta IQ) *IV	59	-0.08628
Heroin Users 1971 (Revised Beta IQ) *IV	104	-0.02694
Heroin Users 1972 (Revised Beta IQ) *IV	121	-0.03361
Control Group Adolescent Girls (Nonspecified IQ) *V	100	-0.34800
Non-narcotic Adolescent Girls (Nonspecified IQ) *V	154	-0.02133
Progressor Group Adolescent Girls (Nonspecified IQ) *V	40	0.13200
Narcotic Group Adolescent Girls (Nonspecified IQ) *V	33	0.13867
Drug Addicts - White Females (Alpha IQ) *VI	200	0.92533
Drug Addicts - Mexican American Females (Alpha IQ) *VI	67	0.97400
Drug Addicts - Black Females (Alpha IQ) *VI	68	0.67133
Drug Addicts - White Females (Raven's IQ) *VI	200	0.85867
Drug Addicts - Mexican American Females (Raven's IQ) *VI	67	0.77400
Drug Addicts - Black Females (Raven's IQ) *VI	68	0.93800

Average Effect Size (N=11) = 0.4874 Standard Deviation = 0.3065
Average Effect Size (N=21) = 0.1771 Standard Deviation = 0.4191
Average Effect Size (N=31) = 0.2826 Standard Deviation = 0.4592

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*VI. Levi, M. & Seborg, M. (1972)

Table 2. Comparisons Between DARP IQs and Standardization IQs

Group	Estimated Full Scale IQ (DARP Sample)			WAIS-R Full Scale IQ (Standardization Sample)		
	MEAN	SD	N	MEAN	SD	N
Blacks:	89.86	6.35	257	86.81	12.94	192
Whites:	99.41	7.19	229	101.39	14.69	1664
Females:	92.39	8.50	84	98.74	14.97	940
Males:	94.78	8.17	402	100.89	15.30	940
Black Females:	86.93	5.19	43	86.35	12.32	99
Black Males:	90.46	6.41	214	87.30	13.61	93
White Females:	98.12	7.47	41	100.38	14.55	828
White Males:	99.70	7.12	188	102.40	14.77	836
Total Sample:	94.36	8.27	486	99.82	15.17	1880

Table 3. Correlations Between Estimated IQ and Variables of Interest

Variable	IQ	PROB
01. Time Since Last Used Daily	.203	.000
02. Addiction Career Length	-.143	.003
03. Total Times Relapsed	-.038	.433
04. Relapse Ratio	.025	.607
05. Parent Socioeconomic Status	.330	.000
06. Era of Drug Use	.002	.966
07. Sex	.176	.000
08. Race	.571	.000
09. Years of Education	.843	.000
10. Cut Back Due To Unavailability	.052	.291
11. Moved To Find New Drug Supply	-.052	.290
12. Quit For Over A Year	.149	.002
13. Quit-Availability/Quality	-.142	.004
14. Quit-Cost/Money	-.067	.171
15. Used Nonopioids When Favorite Opioid Not Available	.091	.063
16. Times Jailed or Arrested	.010	.837
17. Moved to Escape Police	-.093	.057
18. Times Harassed By Police	.027	.575
19. Satisfaction With Self At Initiation	-.194	.000
20. General Satisfaction At 12-Year Follow-Up	.105	.031
21. Satisfaction With Family When First Used Daily	-.168	.001
22. Satisfaction With Family When Last Used Daily	-.164	.001
23. Legitimate Job Before Addiction	.017	.723
24. Legitimate Job During Addiction	.063	.198
25. Public Assistance	-.183	.000
26. Illegal Activities During Addiction	.005	.915
27. Occupation During Addiction	.200	.000
28. Illegal Support During Addiction	.023	.636
29. Got Good Grades in School	.207	.000
30. Delinquent From School	-.093	.057
31. First Used For Sensation	-.055	.260
32. Last Used For Sensation	-.245	.000
33. Relapsed For Pleasure	.131	.007
34. Relapsed For Relaxation	.112	.022
35. Spent Leisure Time on Hobbies	.052	.288
36. Spent Leisure Time Reading	.047	.332
37. Tried To Overdose On Purpose	.070	.154
38. Spent leisure Time With Family	-.182	.000
39. Lived With Single Parent	-.128	.009
40. Lived With Both Parents	.196	.000
41. Mother Was Happy	-.124	.011
42. Fought With Parents During Adolescence	.155	.001
43. Fought With Parents When Last Used Daily	.102	.036
44. Relapsed To Show Toughness	.045	.359
45. Had Friends Who Fought	-.154	.002
46. Had Friends In Gangs	-.168	.001