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ABSTRACT

Alcoholism has repeatedly been implicated in many significant social and health problems, yet little is known concerning etiology before age 12. As part of a longitudinal project to investigate alcoholism etiology in preschool children, a study was undertaken which compared families with male preschool children who are statistically at high risk for becoming alcoholic adults (N=9) to a sample of same-aged community control peers (N=9). (Male preschool children are "high risk" if they are the offspring of untreated, alcoholic fathers.) Home interviews and standardized tests were utilized to assess each child's developmental functioning including: activity level; mood; aggression; attention span; concept formation, using Piagetian-like tasks to determine knowledge of alcoholic beverages; and parent-child interaction. Parents completed the self-administered Short Michigan Alcoholism Screening Test (SMAST) and a drinking and drug history. An analysis of the results showed that control boys performed significantly better on indices of language, personal/social, fine motor, and adaptive development than did their at-risk peers. On tasks designed to assess knowledge of alcoholic beverages, the high risk boys had earlier and more sophisticated cognitive structures related to the concept of alcohol than did the control boys. No significant differences were found on parent report measures of temperament or child behavioral symptomatology. The data suggest that education programs about alcohol and its uses could appropriately begin with kindergarten, matching the child's emerging cognitive abilities. (BL)

Developmental Findings From An Alcoholic Vulnerability Study: The Preschool Years

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Abstract

Alcoholism has repeatedly been implicated in many significant social and health related problems, yet little is known concerning etiology before age 12. The present study is a longitudinal project comparing families with male preschool children who are statistically at risk for becoming alcoholic adults to a sample of same-aged community control peers.

The high risk boys in this study are the offspring of untreated but alcoholic fathers contacted by way of their arrest for drunk driving during the child's lifetime. Nine community control boys from families in the same census tract are also studied; matching was done on family social prestige, sibship constellation, age of target child, and birth position of target child. Analysis of parental self-report data on alcohol problems indicates that all fathers of high risk boys met formal diagnostic criteria for alcoholism, but none of the fathers of community control boys were so diagnosed.

Children were assessed with parental reports of children's activity level, mood, aggression, and attention-span persistence. In addition, children were assessed with direct observations of general developmental status and with three Piagetian-like tasks to determine knowledge of alcoholic beverages.

Significant differences were found on developmental assessment; control boys performed significantly better on indices of language, personal/social, fine motor, and adaptive development. On tasks designed to assess knowledge of alcoholic beverages, the high risk boys had earlier and more sophisticated cognitive structures concerning the concept of alcohol. No significant differences were found on parent report measures of temperament or child behavioral symptomatology.

Differences in developmental status are hypothesized to be reflective of differences in socialization and maternal responsivity in alcoholic families;

implications of these findings for the subsequent development of psychopathology are discussed. The knowledge of alcoholic beverages [illegible] are discussed in the context of early learning within the family of origin. Etiological implications of alcohol specific cognitive findings are examined within the framework of current prevention/education programs.

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Alcoholism and its related problems of adulthood are currently considered to be the fourth most serious national health problem involving 10 percent of the adult population. Cross-sectional, but etiologically oriented research, as well as the limited longitudinal evidence, suggests that the developmental roots of alcoholism probably extend quite far back into early childhood (see Zucker & Noll, 1982). Early behavioral markers of the etiology -- whether manifestations of genetic or early learning differences, or both -- would be useful for early identification, and in the design of early intervention strategies that have the potential for mediating the disorder. The earliest prior longitudinal work begins at age 12, too late to identify and trace out potential early etiologic variables (see Zucker, 1979).

The present study involves families with male children between the ages of 2 1/2 and 6-0, who are statistically at considerably elevated risk for developing alcoholism in adult life. The study uses a longitudinal design and will eventually transverse the age period from 2 1/2 to 17, making periodic assessments initially at 3-year intervals and later at 5-year intervals. Possible etiological factors in the ontogeny of alcoholism are examined among the high risk families and matched (yoked) community control families. The theoretical model guiding the research posits that early attention and persistence deficits (i.e. less reflective behavior), coupled with the early development of articulated cognitive structures about the substances of later potential abuse, enhanced over time by parental

interactions and parental modeling, will lead to a later alcohol abusing career. The present paper reports on stage one of the first two elements of the model and also reports on developmental status measures of these children.

Method

Subjects

Due to considerably higher rates of alcoholism among men, all children included in this study are male; they were selected on the basis of paternal alcoholism, since the rate of alcoholism in male children of alcoholic parents is 4 to 6 times (about 30 percent) the prevalence rate in the general population (Cotton, 1979). These families were obtained by contacting fathers who had been recently arrested for drunk driving (DWI or DUIL), with sufficiently high blood alcohol levels (.015 percent) so as to assume tolerance is already present and that a later alcoholic diagnosis can be made. Later data collection, once the family is recruited, using questionnaires and interviews ensured that Research Diagnostic Criteria for alcoholism (Feighner, Robins, Guze, Woodruff, Winokur, & Munoz, 1972) were met. Families were initially asked to participate in "a study of family health and child development." Participation rate (n=10) was 100 percent for alcoholic families.

Control families were recruited via a systematic procedure for canvassing the same census tract as the yoked alcoholic family until a family was obtained with a like-aged male child; secondary matching was also obtained on sibling constellation and social prestige. Results of our matching procedure show no differences between alcoholic and control families on any variables we attempted to match; most notably age of target children was not significantly different and the average age of high risk and control children is 4.09 years. In addition the age of the alcoholic and control parents did

not significantly differ, nor did the current religious backgrounds of the families (see Table 1). "NA" in Table 1 indicates that a clear lack of differences were present so no statistic was computed. Participation rate (n=10) was 91 percent for control families.

Insert Table 1 about here

Instruments and procedures

A series of home visits for direct observations and questionnaires along with laboratory sessions for evaluation of developmental functioning and parent-child interaction were conducted with each family (a total of 18 subject hours of data). Emphasis during initial stages of child evaluation was placed upon potential precursors of (1) impulsivity and aggression, (2) disturbances in mood, (3) general developmental status, and (4) early concept formation related to possible earlier knowledge and identification of alcohol as a special entity. Parent data as it relates to learning, modeling, and subsequent imitation in these areas, was also obtained.

Data reported here are from the first data collection wave and are concerned with precursors of impulsivity, general developmental status, and early concept formation about alcohol. The first two of these areas were assessed via scores on the revised Yale Developmental Inventory (YDI); the Fine Motor and Adaptive tasks on this instrument require persistence and attention in order to perform well (i.e. extent of reflective style as well as of general development). The remaining areas of the YDI involving Language, Personal/Social Functioning, and Gross Motor Development were utilized simply to assess developmental status. The third area, early concept formation about

alcohol, was assessed using three Piagetian-like tasks: (1) Smell recognition, (2) Appropriate beverage identification, and (3) Alcohol concepts. These tasks assess (1) children's ability to recognize and verbally label the smell of various substances including alcoholic beverages (beer, wine, and whiskey), (2) their ability to identify the socially appropriate beverage (alcoholic or non-alcoholic) for festive and non-festive occasions (e.g. New Year's Eve party); situations are depicted by drawings shown to the child, and (3) their ability to correctly group various beverages into the class "alcoholic" or "non-alcoholic." (Detailed descriptions of these tasks are available from R. Noll.)

Results

Adult drinking measures

Each parent completed a SMAST (Selzer, 1975) and on another occasion a Drinking and Drug History (DDH; Zucker, Baxter, Noll, Theado, & Weil, Note 1). Based upon Research Diagnostic Criteria for diagnosis of alcoholism (Feighner et al., 1972), all alcoholic fathers were diagnosed from these questionnaires as either difinite or probable alcoholic, while none of the control fathers were so diagnosed (see Table 2). SMAST scores and total number of drinking related problems (Table 2) reported reflect the extent of difficulties experienced by the alcoholic fathers.

Insert Table 2 about here

Child measures

Matched pair analysis of covariance of YDI performance showed that the more vulnerable boys performed significantly more poorly on Fine Motor and Adaptive tasks as predicted, but in addition the high risk boys were significantly lower in Language and Personal/Social development (see

Figure 1).

Insert Figure 1 about here

Analysis of the alcohol concept task data showed that nearly all children possessed some knowledge of alcohol and its uses, but the high risk boys had significantly greater awareness of, and socially appropriate knowledge about, alcoholic beverages. Specifically, while control and high risk boys did equally well in their overall ability to correctly label alcoholic beverages by smell alone -- with photographs of substances present -- the high risk boys did significantly better than control boys on identification of alcoholic beverages by smell alone with no photographs present (Figure 2). It should be noted that both groups of boys performed

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Insert Figure 2 about here

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equally well on the overall smelling task (Table 3); thus differences on alcoholic beverages were not the result of differences in children's ability on this task.

Insert Table 3 about here

Similar results were found on the appropriate beverage task, where the data clearly showed that these children selected alcoholic beverages as the drink of choice for adults far more frequently than they selected alcoholic beverages as a drink that a child would consume (Table 4; age effect). Also, the high risk boys selected alcoholic beverages as the drink of choice more often on all types of occasions (Table 4; risk effect). When children's choices

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Insert Table 4 about here

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on this task were examined for adult pictures only, the data clearly showed that alcoholic beverages were selected as the beverage of choice for adult males far more frequently than for adult females (Table 5; gender effect).

Insert Table 5 about here

Discussion

Children in alcoholic families are developing considerably more slowly than are children in control families on all indices except gross motor development. These differences were anticipated for fine motor and adaptive skills, but were somewhat surprising on indices of language and personal/social development. The differences are not the result of chronological age or the effects of birth order, number of siblings, or social prestige of the family. Nor are they the result of differences in parental intelligence as Table 6 clearly shows that parental intelligence was the same or higher for the parents of the high risk boys.

Insert Table 6 about here

Why did control boys do so well and high risk boys perform in the average range? The testing was done in the child's home, always in the morning with both parents in the house (but obviously not present during the actual testing). Also, children were systematically encouraged during testing to perform at

optimal levels (limit pushing). We expected all children to perform above age level under these conditions. If this setting was less benign for the children in alcoholic families because their homes are more stressful and chaotic, this could modulate the effects of home testing and limit pushing.

A second feasible explanation for the differences could be that the high risk children's approach to the testing situation was less optimal than the control children's. Subsequent to the completion of each YDI, the examiner wrote an extensive set of clinical notes on the testing experience with each child, recording qualitative aspects of the child's response to the evaluation. Examination of these pilot clinical data showed that no differences in activity level or attention span persistence emerged from the data; equal numbers of control boys demonstrated high activity levels and attention problems. The difference that did seem to differentiate these two groups of boys was that the high risk boys were less inclined to adapt to the demands of the testing situation. They displayed less self-control during testing, and when encouraged to pursue items on the YDI many of the high risk boys became oppositional. At this time it is impossible to determine whether the boys from alcoholic families could control themselves less often, simply didn't care to try, or were deliberately trying to frustrate an adult.

The alcohol concepts data present convincing evidence that this group of young children (average age four years) can correctly identify some forms of alcoholic beverages along with their appropriate uses. First, nearly all (17 of 18 boys) could correctly verbally label or identify a photograph of beer. Second, 85 percent (15 of 18) correctly identified at least one

alcoholic beverage by smell with photographs present and 44 percent were successful by smell alone. Third, when children were asked what adults and children in a variety of different situations might like to drink, they stated overwhelmingly that adults, especially males, would be more likely to drink alcoholic beverages on various occasions than would children. When asked directly "who uses a particular type of alcoholic beverage", their response was preponderantly (84 percent of the time) that only adults consumed these substances.

These data suggest that children's knowledge of alcoholic beverages and its uses develops early in the child's life and seems to reflect the child's life history of live parental modeling of drinking they have observed. The high risk boys performed significantly better on the smells task initially and tended to select alcoholic beverages as the drink of choice by adults more often than controls. Thus children from homes where more alcohol is consumed are more familiar with alcoholic beverages and acquire this knowledge earlier than their peers, even when their general overall development is slower.

While high risk boys showed more knowledge and awareness of alcoholic beverages, all of the boys in this sample already knew some things about alcohol and its uses. These data show that learning about drinking begins to occur "naturally" even before the child enters kindergarten and suggest that education programs about alcohol and its uses could appropriately begin with kindergarten. Programs developed to match the child's emerging cognitive abilities would be received better when presented as children naturally learn about alcohol rather than waiting until children enter junior or senior high school. The present data suggest that attempts at attitude modification at these later ages are commencing long after primary attitudes toward alcoholic beverages have been established.

Reference Notes

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Table 1

Sociodemographic Characteristics of Alcoholic and Community Control Families

		Alcoholic families (n=9)	Community control families (n=9)	F-value[1]
Age in Years				
- target child	$\bar{X}$	4.11	4.07	<1.00
	S.D.	1.17	1.28	
- father	$\bar{X}$	31.78	28.89	1.59
	S.D.	3.90	5.17	
- mother	$\bar{X}$	30.22	28.11	<1.00
	S.D.	4.16	4.70	
- all children living at home	$\bar{X}$	6.50	4.61	3.03
	S.D.	4.68	2.80	
Birth Position of Target Child				
	% 1st	22%	33%	NA
	% 2nd	56%	45%	NA
	% 3rd	22%	22%	NA
Number of Children Currently Living at Home				
	$\bar{X}$	3.22	2.78	<1.00
	S.D.	2.11	1.72	

Table 1 (cont'd.)

Religion				
% Protestant				
- fathers		44%	33%	NA
- mothers		44%	44%	NA
% Catholic				
- fathers		33%	44%	NA
- mothers		44%	33%	NA
% No religion				
- fathers		22%	22%	NA
- mothers		11%	22%	NA
Family Social Prestige[2,3]				
	$\bar{X}$	29.72	27.03	<1.00
	S.D.	9.89	16.04	

[1]Based on univariate F - tests; all p's nonsignificant.

[2]Duncan TSEI2 Socioeconomic Index, Stevens & Featherman (1980). These scores are based upon father's occupation except in one alcoholic family. This man had not worked for over 2 years as he was attempting to claim a work-related physical disability. His wife's occupation was utilized, score 21.2.

[3]Two alcoholic fathers had been chronically unemployed. Phone contact with the Michigan Employment Security Commission established that "laborer" jobs at the minimum wage are available in the Lansing area and that the job classification "laborer" is not currently on the surplus labor list. Both of these men had been working previously as semi-skilled laborers.

Table 2

Alcoholic Diagnosis and Drinking Problem Scores

In Alcoholic and Community Control Families

		Alcoholic Families (n=9)	Community Control Families (n=9)	X^2 Value[1]
% With Diagnosis of Alcoholic[2] During Life of Target Child				
- fathers				
% probable		22%	0%	<1.00
% probable + definite		100%	0%	37.98***
- mothers				
% probable		0%	11%	<1.00
% probable + definite		22%	11%	<1.00
- fathers and mothers				
% probable		0%	0%	<1.00
% probable + definite		22%	0%	<1.00
Total Number of Drinking Problems (ever)				F Value[3]
- fathers	$\bar{X}$	9.89	2.11	18.16***
	S.D.	5.11	1.96	
- mothers	$\bar{X}$	1.67	.89	<1.00
	S.D.	2.91	1.29	

Table 2 (cont'd.)

Mean SMAST[4] Scores				
- fathers	$\bar{X}$	7.56	.89	29.33***
	S.D.	3.61	.78	
- mothers	$\bar{X}$	1.22	.67	<1.00
	S.D.	2.39	1.00	

[1] X^2 computed with Yates correction for continuity.

[2] Using Feighner et al. (1972), Research Diagnostic Criteria and best estimate data from SMAST and Drinking and Drug History.

[3] Based on univariate F - tests.

[4] SMAST - Short form Michigan Alcohol Screening Test; data are best estimates from multiple information sources.

*** p <.001.

Table 3

Children's Ability to Verbally Label Substances Using Smell Alone for the Stimulus

	High risk (N=9)	Control (N=9)	F Value[1]
Smell Alone[2]			
$\bar{X}$	4.22	2.78	2.38
S.D.	1.79	2.17	
Smell and Photographs			
$\bar{X}$	4.38	4.13	<1.00
S.D.	1.18	1.25	

[1] Based on univariate F-tests, all p's nonsignificant.

[2] Note: The children smelled nine different substances: coffee, play doh, popcorn, beer, whiskey, wine, apple juice, tobacco, and perfume.

Table 4

Appropriate Beverage Task: Comparison of Beverage Selections of High Risk and Control Boys (Risk Status) for Festive and Non-festive Occasions (Type of Occasion) Involving Pictures of Adults and Children (Age Effect).[1]

Source	SS	df	MS	F
Total	2.019	56		
A. Risk status	.100	1	.100	3.71*
B. Type occasion	.025	1	.026	.63
C. Age effect	1.648	1	1.648	48.86**
A x B	.022	1	.022	1.06
A x C	.011	1	.011	.51
B x C	.030	1	.030	1.41
A x B x C	.003	1	.003	.26
Error	.180	49	.004	

*p<.10, **p<.003.

[1]Note: These data were analyzed using a matched pair analysis of variance design (N=8 pairs). One pair was not available for this analysis because the youngest matched pair of children (ages 31 and 32 months) did not understand the task and it was not administered.

Table 5

Appropriate Beverage Task: Adult Pictures Only: Comparison of High Risk and Controls (Risk Status) for Festive and Non-festive Occasions (Type of Occasion) Involving Pictures of Adult Males and Females (Gender Effect)[1]

Source	SS	df	MS	F
Total	2.136	56		
A. Risk status	.192	1	.192	2.18
B. Type occasion	.000	1	.000	.00
C. Gender effect	1.147	1	1.147	29.88**
A x B	.004	1	.004	.06
A x C	.074	1	.074	.29
B x C	.038	1	.038	1.03
A x B x C	.010	1	.010	.11
Error	.671	49	.014	

**p< .001.

[1]Note: These data were analyzed using a matched pair analysis of variance design (N=8 pairs). One pair was not available for this analysis because the youngest matched pair of children (ages 31 and 32 months) did not understand the task and it was not administered.

Table 6

Estimated[1] Full Scale, Verbal, and Performance I.Q.s

Prorated from WAIS Scores for Alcoholic vs. Community Control Families

		Alcoholic Families (n=7)[2]	Community Control Families (n=7)	F - Value[3]
Estimated Full Scale I.Q.				
- fathers	$\bar{X}$	109.00	94.57	8.96*
	S.D.	9.75	6.65	
- mothers	$\bar{X}$	106.29	107.57	<1.00
	S.D.	12.95	15.81	
Estimated Verbal I.Q.				
- fathers	$\bar{X}$	110.00	90.29	17.56**
	S.D.	8.98	7.22	
- mothers	$\bar{X}$	98.57	96.29	<1.00
	S.D.	14.82	10.51	
Estimated Performance I.Q.				
- fathers	$\bar{X}$	106.86	99.00	1.52
	S.D.	14.02	6.09	
- mothers	$\bar{X}$	115.57	122.43	<1.00
	S.D.	18.12	22.66	

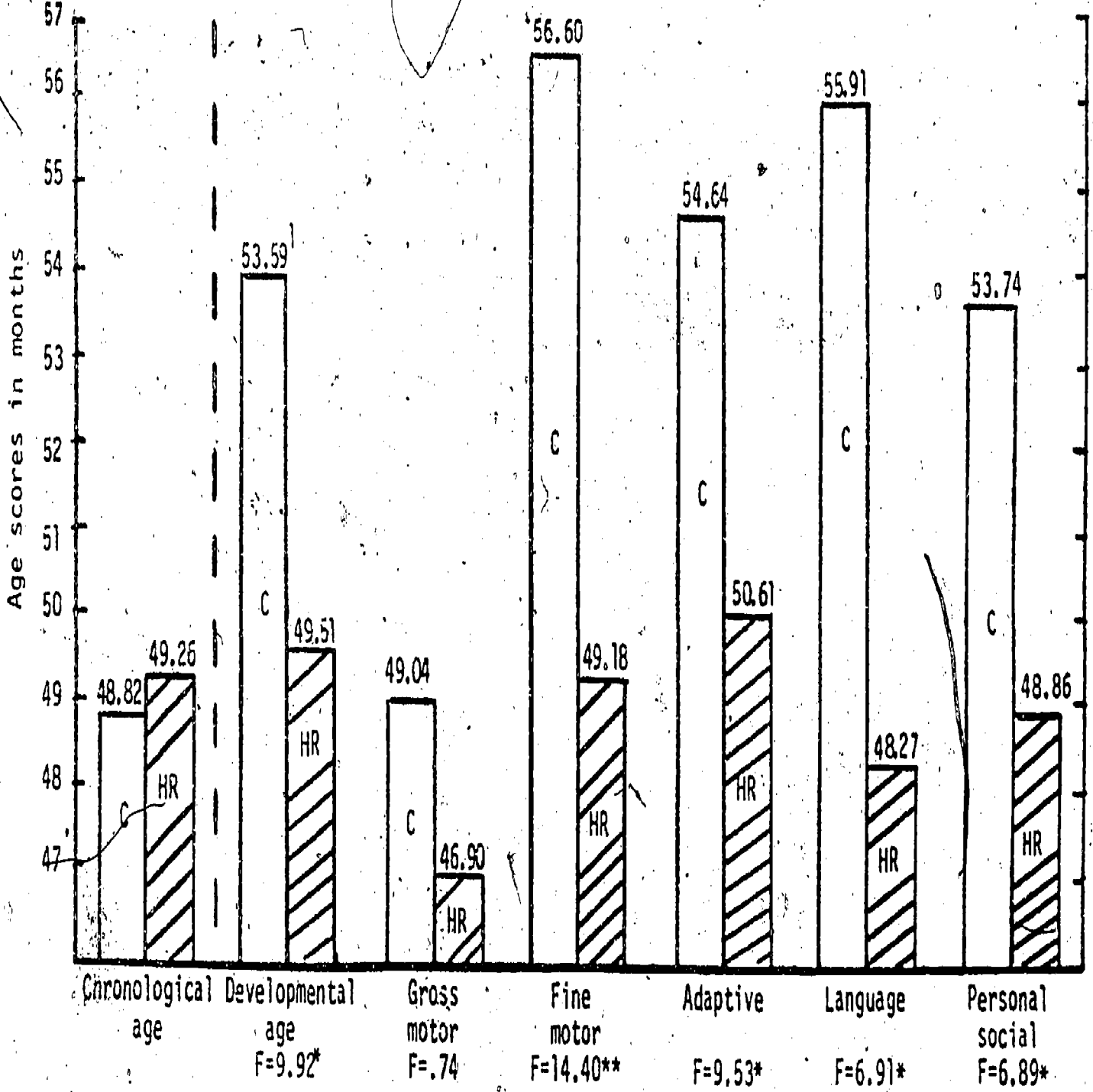
[1] Estimate of verbal I.Q. from Information subtest; performance I.Q. from Digit Symbol subtest; and full scale I.Q. from combining subtests.

[2] Data reported here based upon seven alcoholic and seven control families as I.Q. data had not been collected yet from two alcoholic families.

[3] Based on univariate F - tests.

*p <.05; **p <.01.

Figure 1. Scores on Yale Developmental Inventory-Revised. Matched Pair Comparisons Between High Risk (HR) and Control (C) Children.

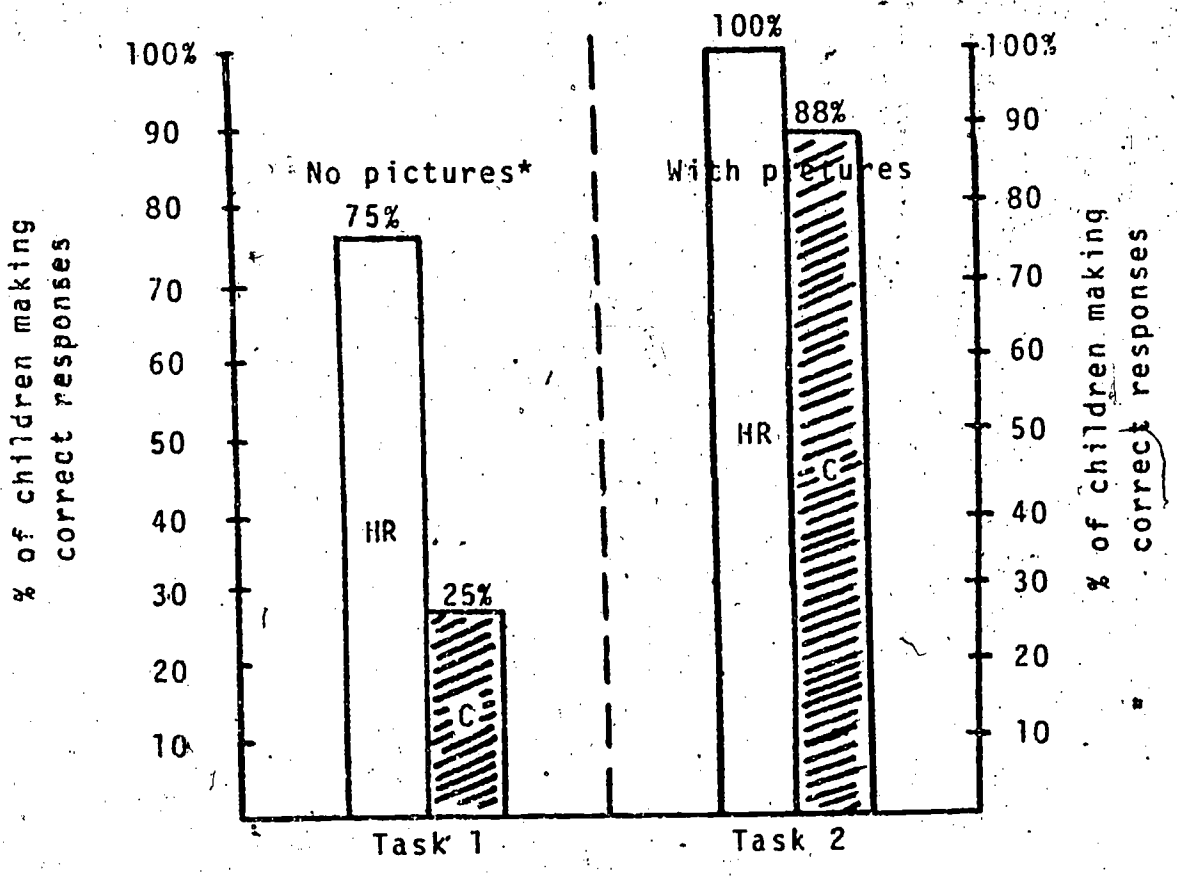


[1]All mean ages are adjusted cell means

*p<.05, **p<.01. (All matched pairs ANACOVA, chronological age as covariate, N=9 pairs)

Figure 2

Children's Ability to Identify Alcoholic Beverages Using Smell[1]. High Risk vs. Controls[2].



[1]Children first attempted the smelling task (Task 1) without pictures. If a child could not correctly identify 1 alcoholic beverage plus 3 other smells, they attempted it again with photographs of the substances placed before them (Task 2). If a child succeeded with Task 1, the task ended.

[2]N=8 pairs. The youngest pair of children ages 32 and 31 months did not comprehend the task.

*$\chi^2=4.25$, $p<.05$. (χ^2 computed with Yates continuity correction).