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# Do genetic influences on abuse and dependence overlap? Explorations using cannabis and alcohol diagnoses.

**Julia D. Grant and Kathleen K. Bucholz**

Washington University School of Medicine

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# ABSTRACT



# INTRODUCTION



# Sample

- The Vietnam Era Twin Study Registry (VETS) is a national registry of male-male twin pairs in which both individuals were in the military during the Vietnam-era
    - 8,169 individuals completed a telephone diagnostic interview in 1992
      - 3537 complete twin pairs (MZ=1923, DZ=1529, unknown zygosity=85)
      - 1095 singletons (MZ=467, DZ=578, unknown zygosity=50)
    - Respondents with known zygosity were included in the present analyses
-

# SAMPLE, cont.

## Race

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Caucasian	94%
African-American	6%
Other	< 1 %

## Marital Status

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Married	77%
Widowed	< 1%
Separated	2%
Divorced	13%
Single	7%

## Educational Level

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< High school	3%
High school	31%
Some college	26%
Voc./Tech. degree	16%
Bachelor's degree	13%
Some graduate work	4%
Graduate degree	7%

NOTE: race and educational level were asked in 1987;  
marital status was asked in a 1992 interview

# MEASURES

- Alcohol use:
    - Drinkers (at least once a month for 6+ months, or 5+ lifetime)
    - DSM-III-R abuse
    - DSM-III-R dependence
  - Cannabis use:
    - Ever tried
    - DSM-III-R abuse
    - DSM-III-R dependence
  - See Table 1 for percentages of respondents who have used the substances and the mean age of initiation
-

# Table 1

	% of sample (n=8169)		Mean age of initiation
Drinkers	91%	(n=7440)	18.4 yrs
Alcohol abuse ever (w/ or w/out depend.)	59%	(n=4388)	---
Alcohol abuse only (no depend.)	21%	(n=1543)	---
Alcohol dependence (w/ or w/out abuse)	39%	(n=2916)	---
Ever tried cannabis	48%	(n=3884)	20.0 yrs
Cannabis abuse ever (w/ or w/out depend.)	26%	(n=998)	---
Cannabis abuse only (no depend.)	14%	(n=531)	---
Cannabis dependence (w/ or w/out abuse)	14%	(n=540)	---

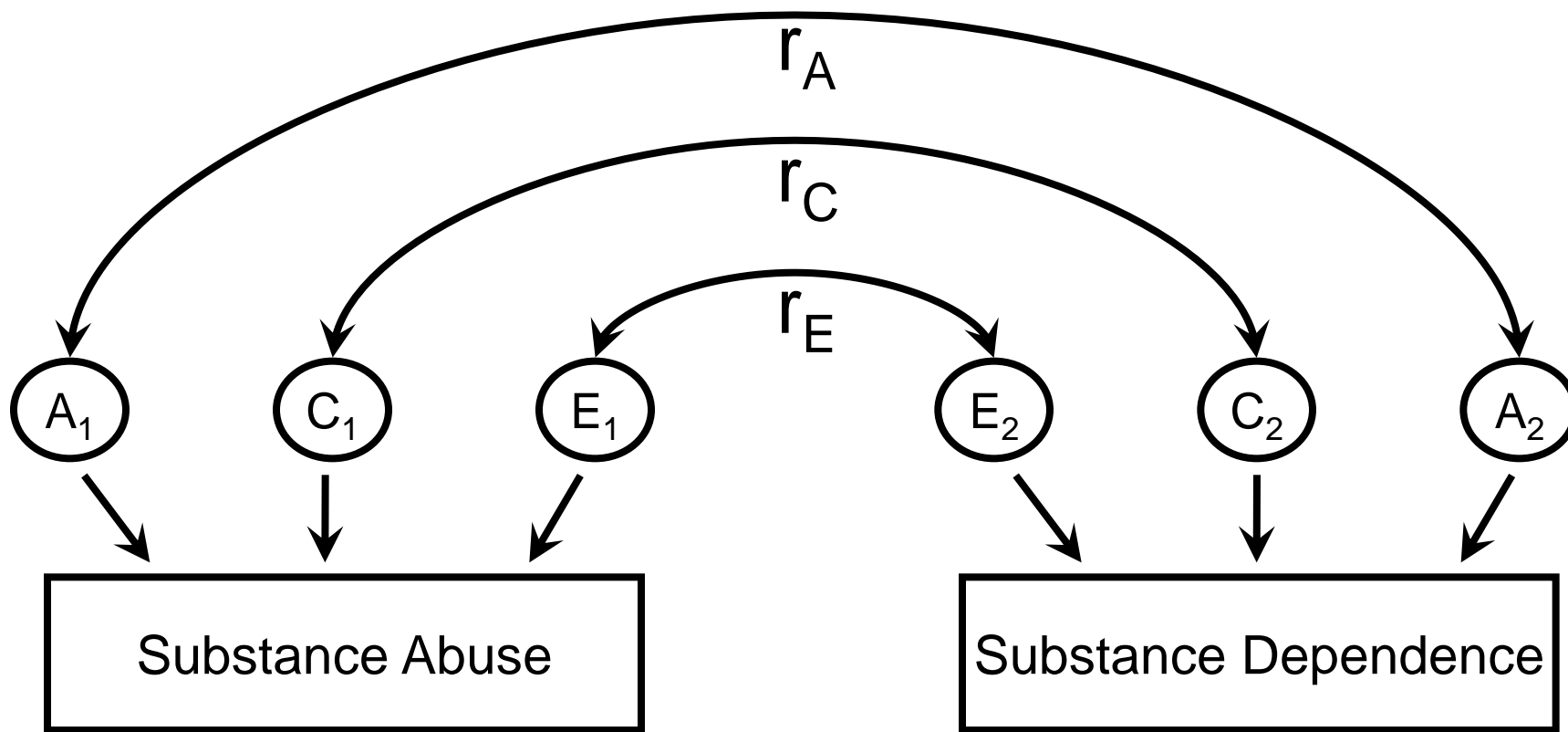


# ANALYSES

- Bivariate quantitative genetic analyses were conducted separately for alcohol abuse/dependence and cannabis abuse/dependence
  - The variables included for each substance were:
    - Having ever had an abuse diagnosis
    - Having ever had a dependence diagnosis
  - The basic model is depicted in Figure 1
  - The significance of overlap between variables was tested by dropping the paths from  $A_1$ ,  $C_1$ , and  $E_1$  to variable 2
  - The significance of influences specific to variable 2 was tested by dropping the paths  $A_2$ ,  $C_2$ , and  $E_2$  to variable 2
-

# Figure 1

## Bivariate Model



A = additive genetic

C = shared environment

E = nonshared environment

# RESULTS

- Alcohol abuse and dependence were best explained by a model that included additive genetic (A) and nonshared environmental (E) influences
    - Proportions of variance are shown in Table 2
  - Cannabis abuse and dependence were best explained by a model that included additive genetic (A), shared environmental (C), and nonshared environmental (E) influences,
    - Proportions of variance are shown in Table 3
    - Note that the shared environmental parameter only reached statistical significance for cannabis dependence
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# Table 2

## Proportions of Variance for Alcohol

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\* indicates  $p < .05$

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# Table 3

## Proportions of Variance for Cannabis

	Cannabis Abuse	Cannabis Dependence
Genetic	.32* (.03-.43)	.38* (.24-.52)
Shared Environmental	.06 (.00-.31)	.14* (.0003-.37)
Nonshared Environmental	.62* (.51-.73)	.48* (.37-.60)

\* indicates  $p < .05$

# RESULTS, cont.

- For cannabis, correlations between genetic (and environmental) influences on abuse overlapped highly with those on dependence, with all correlations estimated at 0.75 or greater (see Table 5)
-

# Table 4

## Genetic and Environmental Correlations between alcohol abuse and alcohol dependence

\* indicates significant at  $p < .05$

(note that the confidence intervals for correlations can range from -1 to +1)

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# Table 5

## Genetic and Environmental Correlations between cannabis abuse and cannabis dependence

Genetic	1.00* (0.77-1.00)
Shared environmental	1.00* (0.01-1.00)
Nonshared environmental	0.75* (0.68-0.83)

\* indicates significant at  $p < .05$

(note that the confidence intervals for correlations can range from -1 to +1)

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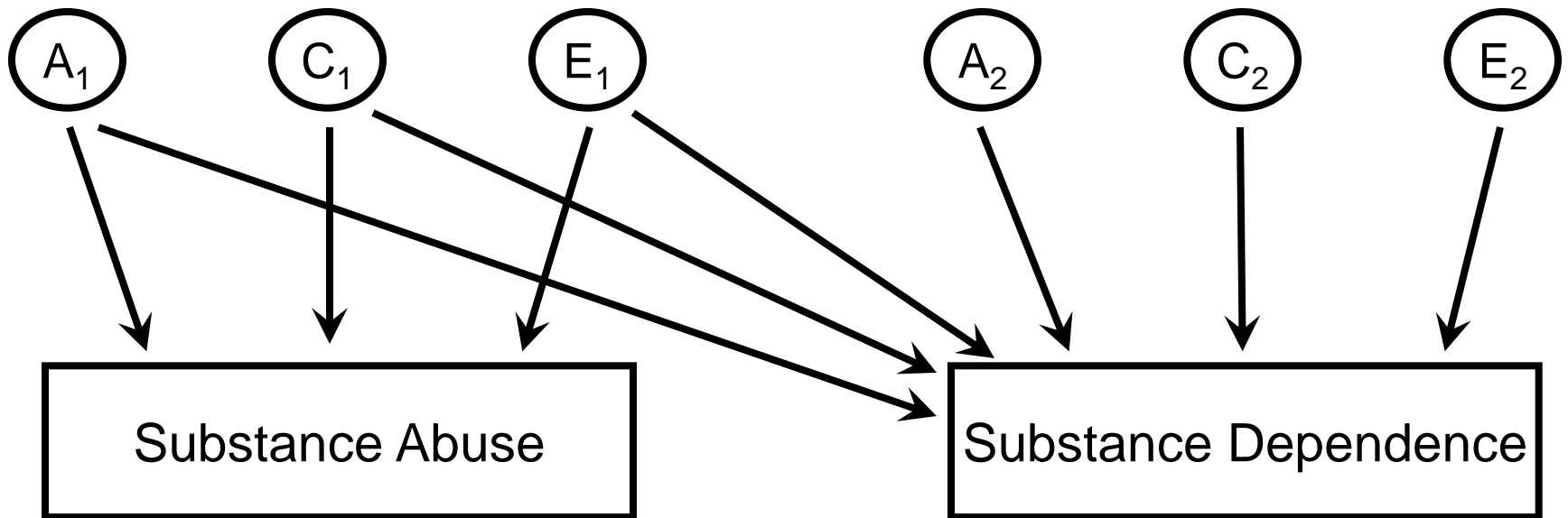


# CONCLUSIONS

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# Figure 1

## Bivariate Model



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