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Disentangling **Social-Genetic** From Rearing-Environment Effects for **Alcohol Use Disorder** Using Swedish National Data

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Presenters: Aiman Hanif, Han Tran



Meet...

Jessica Salvatore, Ph.D

- ✓ Author of the study
 - VCU News: 24 August 2020
- ✓ Claim: If your spouse was raised by a parent with Alcohol Use Disorder (AUD), you are at an increased risk for developing the disorder yourself



BAD DECISIONS

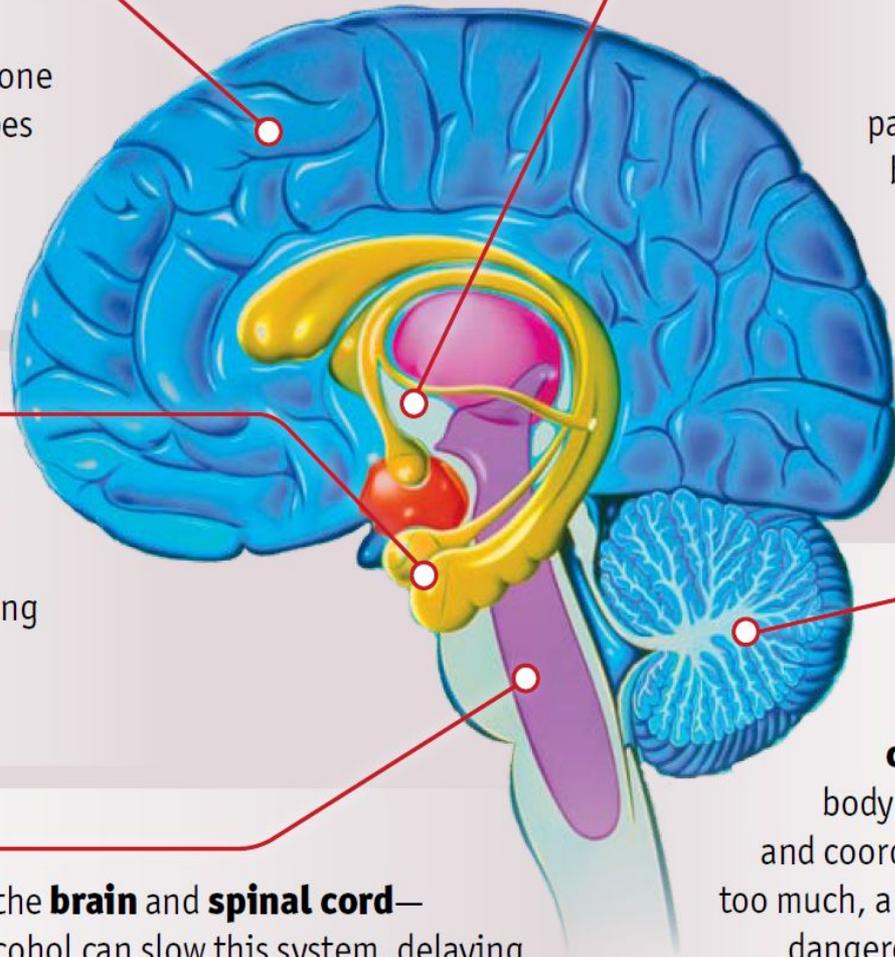
Alcohol can permanently damage the **frontal lobes** and make people more prone to developing depression. The frontal lobes control emotions and impulses, and are responsible for planning, forming ideas, and making decisions.

LEARNING AND MEMORY

Drinking alcohol can permanently damage the **hippocampus**, which is key for learning and remembering. Of all the damage that alcohol can do to a developing brain, underage drinking harms memory the most.

SLUGGISH SYSTEM

The central nervous system—made up of the **brain** and **spinal cord**—sends messages throughout the body. Alcohol can slow this system, delaying a person's responses to external stimuli—even in emergency situations.



BASIC FUNCTIONS

Alcohol can impair the **hypothalamus**. This part of the brain controls basic—and important—body functions like blood pressure, body temperature, and heart rate.

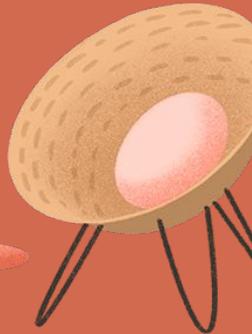
SLOWED SENSES

Alcohol affects the **cerebellum**, which the body relies on for awareness and coordination. After drinking too much, a person might misjudge dangerous situations or be too uncoordinated to prevent accidents.



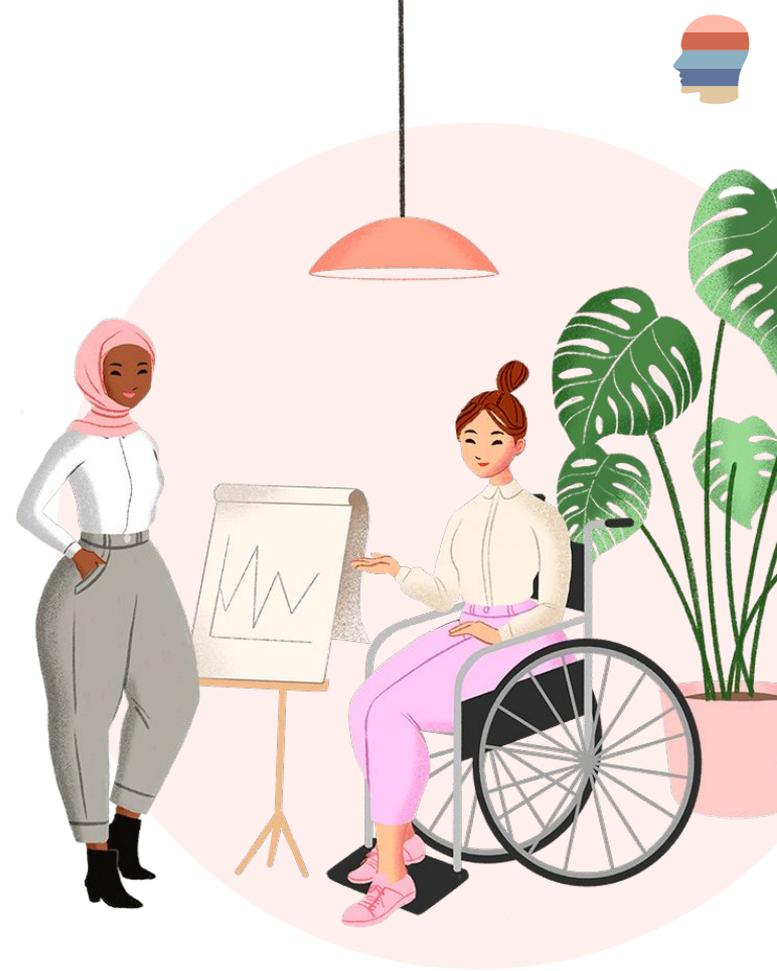
“Alcohol Use Disorder (AUD)

- ✓ Chronic relapsing brain disorder
- ✓ Characterized by an impaired ability to stop/control alcohol use despite adverse social, occupational, or health consequences
- ✓ Under the (DSM)-5, anyone who meets any 2 of 11 criteria during the same 12-month period receives a diagnosis of AUD



Who were the subjects?

- ✓ 300,000+ Swedish couples randomly picked through a 10-digit serial number
- ✓ Data about the subjects derived via:
 - The Total Population Register
 - The Multi-Generation Register
 - The Hospital Register
 - The Prescribed Drug Register
 - The Outpatient Care Register
 - The Crime Register
 - The Swedish Suspicion Register
 - The Mortality Register



How were the subjects examined?

- ✓ 2 study groups
 - Couples born between 1955-1990 who were married before 35
 - *Extended-family sample*: couples married before 35 with data about life with biological parents
 - LWPs: lived with parents in the same household for 80% of their life before age 15
 - NLWPs: lived with parents for only 10% of their life before age 15
 - None of the couples were AUD affected before the examination



How AUD was identified?

- ✓ Must occur within 10 years of marriage
- ✓ Identified by the record from...
 - Swedish medical registries
 - The prescribed drug register
 - Conviction or suspicion of at least 2 alcohol-related crimes
 - AUD predisposition identified by examining AUD in biological parents.



Table 1. Descriptive Statistics Regarding Alcohol Use Disorder (AUD) Predispositions (Indexed by Parental History of AUD) and AUD Registration Within the First 10 Years of Marriage for Husbands and Wives in Opposite-Sex First Marriages

Group and variable	Total	No parental history of AUD in husband or wife	Parental history of AUD in husband but not wife	No parental history of AUD in husband but in wife	Parental history of AUD in husband and wife
Husbands	367,398	300,578 (81.8%)	30,299 (8.20%)	32,074 (9.6%)	4,447 (1.20%)
Husband AUD in 10 years	1,912 (0.52%)	1,257 (0.42%)	357 (1.18%)	211 (0.66%)	86 (1.93%)
Criminal behavior (prior to marriage)	43,182 (11.75%)	30,831 (10.26%)	6,154 (20.31%)	4,979 (15.52%)	1,218 (27.39%)
Low parental education	88,902 (24.20%)	72,927 (24.26%)	6,822 (22.52%)	8,079 (25.19%)	1,074 (24.15%)
Mid parental education	156,883 (42.70%)	126,371 (42.04%)	14,086 (22.58%)	14,288 (44.55%)	2,138 (48.08%)
High parental education	121,613 (33.10%)	10,128 (33.70%)	9,391 (30.99%)	9,707 (30.26%)	1,235 (27.77%)
Age at marriage (years)	28.53 (2.43)	28.55 (3.41)	28.49 (3.47)	28.46 (3.48)	28.24 (3.58)
Birth year	1966.53 (7.64)	1966.45 (7.67)	1966.92 (7.41)	1966.76 (7.61)	1967.15 (7.36)
Wives	367,398	300,578 (81.80%)	30,299 (8.20%)	32,074 (9.6%)	4,447 (1.2%)
Wife AUD in 10 years	871 (0.24%)	530 (0.18%)	103 (0.34%)	197 (0.61%)	41 (0.92%)
Criminal behavior (prior to marriage)	11,146 (3.03%)	7,800 (2.60%)	1,186 (3.91%)	1,797 (5.60%)	363 (8.16%)
Low parental education	80,644 (21.95%)	66,197 (11.01%)	6,753 (22.29%)	6,716 (20.94%)	978 (21.99%)
Mid parental education	162,891 (44.23%)	13,120 (21.82%)	13,975 (46.12%)	15,485 (24.83%)	2,230 (50.15%)
High parental education	123,863 (33.71%)	103,180 (34.33%)	9,571 (31.59%)	9,873 (30.78%)	1,239 (27.86%)
Age at marriage (years)	26.92 (3.54)	26.94 (3.52)	26.95 (3.95)	26.76 (3.46)	26.56 (3.72)
Birth year	1968.14 (7.59)	1968.07 (7.61)	1968.48 (7.47)	1968.45 (7.51)	1968.83 (7.38)

Note: The table shows *ns* for all variables except age at marriage and birth year, for which means are given. For the two rows showing *ns* for husbands and wives, values in parentheses are percentages of the total sample. For the next five rows below each heading, values in parentheses are either percentages of the total sample (Column 2) or percentages of the subsample in that column (Columns 3–6). For age at marriage and birth year, values in parentheses are standard deviations.

How was the data measured?

- ✓ Actor-partner interdependence model to examine the association b/w a spouse's AUD predisposition and the proband's risk of developing AUD marriage
- ✓ Logistic regression model used to examine what was causing the risk: genes or the environment
- ✓ Parental education used to account for socioeconomic status background of proband.
 - 3 categories:
 - 1 = compulsory school (grades 1-9)
 - 2 = high school (grades 10-12)
 - 3 = university
- ✓ Distance to the spouse's parents used as an alternative measurement of interpersonal contact
- ✓ All analyses conducted using SAS software Version 9.4 for Windows (SAS Institute, Cary, NC)



What were the results?

1

Did a spouse's predisposition to AUD lead to the development of AUD in the proband?

Marriage to a spouse with predisposition to AUD DID increase risks of the proband also developing AUD.

2

Is the risk explained by family's socioeconomic status, spouse's AUD, or contact with spouse's parents?

Both parental education and contact with spouse's parents had no significant effect on the risk of developing AUD.

3

Is the risk due to socio-genetic or rearing environmental factors?

Spouse from LWP family increased more risks in comparison to a spouse from NLWP family.



“

Indeed, our findings suggest that the **risk** associated with a spouse's AUD predisposition reflects **rearing-environment** effects rather than social-genetic effects. ”



Were there any limitations?

- ✓ Data from national registries
- ✓ Geographical distance used to analyze contact with spouse's parents
- ✓ Only legally married opposite-sex couples included
- ✓ Follow-up censored by divorce
- ✓ Only parental education calculated to account for parents' socioeconomic status
- ✓ The critical test in the extended-family design was of differences in relative risks (ORs), which are known to be sensitive to base rates





Impact!

- ✓ New possibility of spousal AUD influence due to parent's AUD
- ✓ New Hypothesis:
 - Growing up with AUD parent might cause spouse to practice habits that could lead to AUD
 - Individual (s) with predisposition to AUD might use alcohol as a solution to marital problems
 - Spouses with AUD predisposition might be psychologically unable to pursue healthy habits of marriage

Let's Discuss!

- ✓ **DO YOU THINK IT IS PLAUSIBLE TO GENERALIZE THE FINDINGS TO THE U.S POPULATION WHEN THE STUDY WAS CONDUCTED ON SWEDISH SUBJECTS?**

The audience agreed that such generalization would *NOT* be plausible because the demographics of the US are different from that of the Sweden which would lead to inaccuracies.



Let's Discuss!

- ✓ **FOR PERSONAL OPINION ONLY: NOW THAT YOU KNOW THE FINDINGS OF THIS RESEARCH, WILL YOU ADD HAVING NON-AUD PARENT(S) AS AN ADDITIONAL CRITERION IN FINDING YOUR (FUTURE) SPOUSE?**

The audience had contrasting opinions. Some said that they would consider having non-AUD parents as an additional criterion because one's spouse plays a critical role in the kind of lifestyle they adopt. Others disagreed saying that one can't choose their parents and shouldn't be judged based on their parents' irresponsible decisions.



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