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# The Association of Early Risky Behaviors and Substance Dependence and Depression in an Ethnically Diverse Sample

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# Background

- Early involvement with substances and other risky behaviors is associated with negative outcomes
  - Early substance use is correlated with substance dependence
  - Early manifestations of deviant behavior is also associated with substance abuse and dependence
- This study
  - Investigated the effects of risky behavior (substance use as well as other risk-taking behaviors) on outcomes of depression and substance abuse and dependence
  - Uses latent class analysis to group six variables to reflect traits of risky behaviors
  - Uses a diverse sample of African Americans and European Americans to test the differences between African Americans and European Americans in outcome due to early risky behavior
- Questions Asked
  - Is there a correlation between general early risky behavior and substance abuse/dependence and depression?
  - Is there a difference between African Americans and European Americans in such correlations?

# Missouri Family Study (MOFAM)

- General population sample of families, ascertained using Missouri birth records
- Designed to be comparable to twin-family studies conducted in our research group
- Index children selected from birth years to be aged 13,15,17,or 19 at first interview
- Prospective design, with offspring interviewed every 2 years
- Oversample of African American families
  
- High risk design using telephone screening interviews with mothers to collect high risk families
  - Mothers of index child interviewed about family structure and her own health behaviors and those of the child's father
  - Families are designated high risk (HR) if mother reports child's father as an excessive drinker; otherwise low risk (LR)
- Second type of high risk family – families of men with 2 or more DUI's on driving record – “Recurrent Drunk Driving” or RDD families

# Sample Characteristics

	<u>EA</u>	(%)	<u>AA</u>	(%)	<u>Total</u>
<u>Total</u>	n=444		487		931
<u>Female</u>	224	(50.5)	249	(51.1)	473
<u>Low Risk</u>	134	(30.2)	244	(50.1)	378
<u>High Risk</u>	105	(23.6)	140	(28.7)	245
<u>RDD</u>	205	(46.2)	103	(21.1)	308
<u>Mean Age</u>	18.54		18.87		18.71

- **Baseline Data** from MOFAM was used for the analysis
- Sexual Intercourse was used as a variable in a Latent Class Analysis. Respondents younger than age 15 were not asked questions about sexual intercourse and, therefore, were left out of the analysis.
- This results in a **931 Sample Total of Age 15 or older**

Note: RDD-Recurrent Drunk Driving Families, AA-African American, EA-European American

# Latent Class Analysis

## Variables included

### Substance Use

- **Alcohol use**
- **Tobacco use**
- **Marijuana use**

### Behavioral Variables

- **Oppositional Defiant Disorder**
- **Conduct Disorder**
- **Sexual Intercourse**

▪ Substance Use and Sexual Intercourse were categorized based on age onset:

- 0 = None
- 1 = Late
- 2 = Early (Youngest 25% of Users)

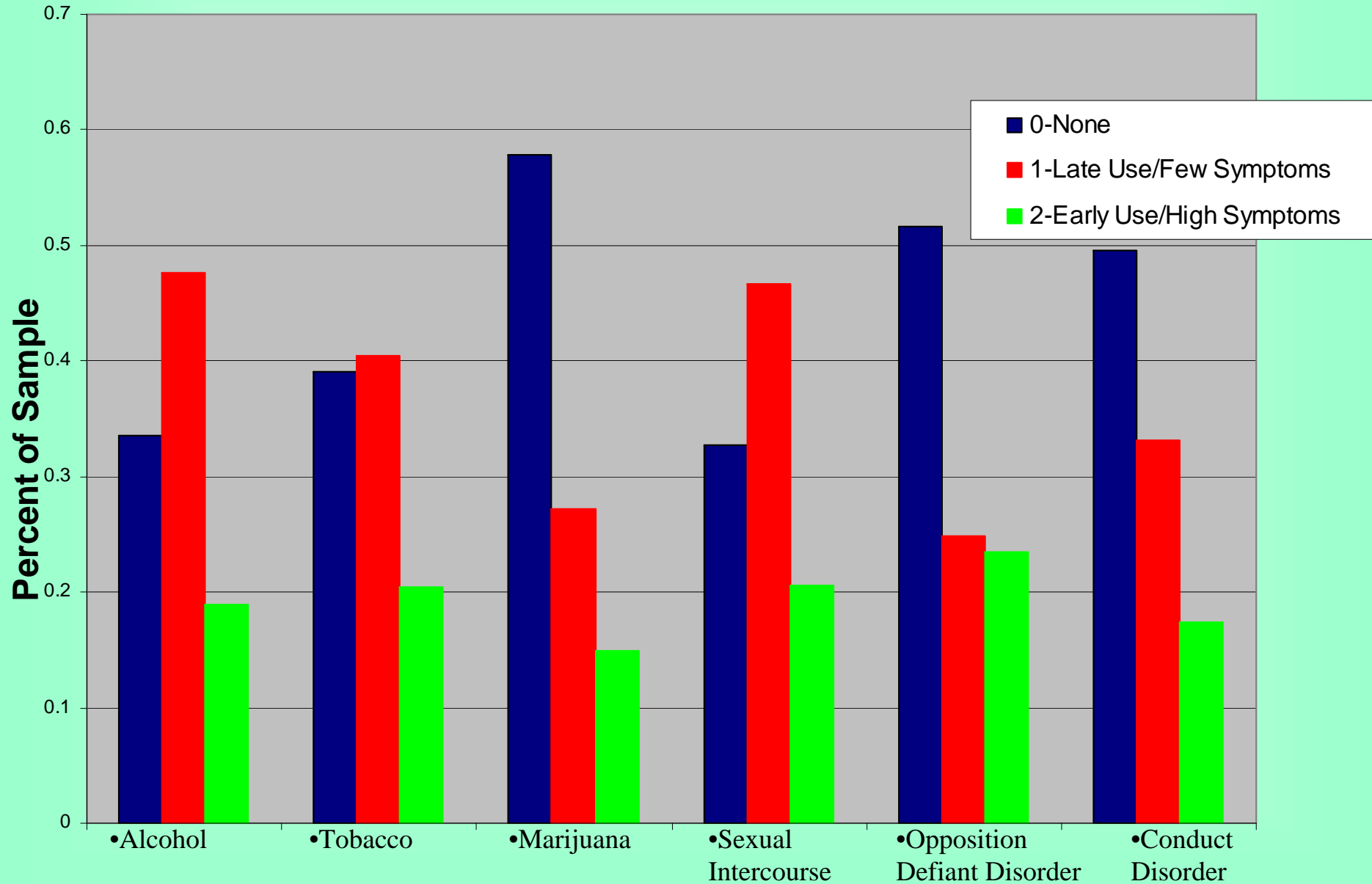
#### Early Use Criteria

Alcohol Use	14 or younger
Tobacco Use	12 or younger
Marijuana Use	15 or younger
Sexual Intercourse	14 or younger

- For Oppositional and Conduct variables, a symptom count was used instead of onset age
  - 0 = No Symptoms
  - 1 = At least one symptom and fewer than diagnostic criteria
  - 2 = Symptom count reached diagnostic criteria for the associated disorder

# Prevalence of Behaviors

Total Sample Population Results (n=931)



# Latent Class Determination

Number of Latent Classes	BIC	Vuong-Lo-Mendell-Rubin Likelihood Ratio Test (VLMR-LRT)
2	10611.182	--
<b>3</b>	<b>10357.018</b>	<b>0.0000</b>
4	10378.327	0.2292
5	10416.66	0.0464

- 3 Class solution results in lowest BIC
- 3 Class solution is a better fit vs. 2 Class Solution in VLMR-LRT
- 4 Class solution is not a better fit vs. 3 Class Solution in VLMR-LRT



# Latent Class Outcome

## Endorsement Probabilities

	None	Late/Few	Early/High
Alcohol Use	0.798	0.161	0.041
Tobacco Use	0.9	0.056	0.044
Marijuana Use	0.996	0.004	0
Intercourse	0.721	0.233	0.047
Oppositional	0.597	0.215	0.188
Conduct	0.661	0.289	0.05

	None	Late/Few	Early/High
Alcohol Use	0.073	0.826	0.1
Tobacco Use	0.152	0.733	0.115
Marijuana Use	0.454	0.52	0.027
Intercourse	0.144	0.781	0.076
Oppositional	0.586	0.246	0.168
Conduct	0.566	0.364	0.069

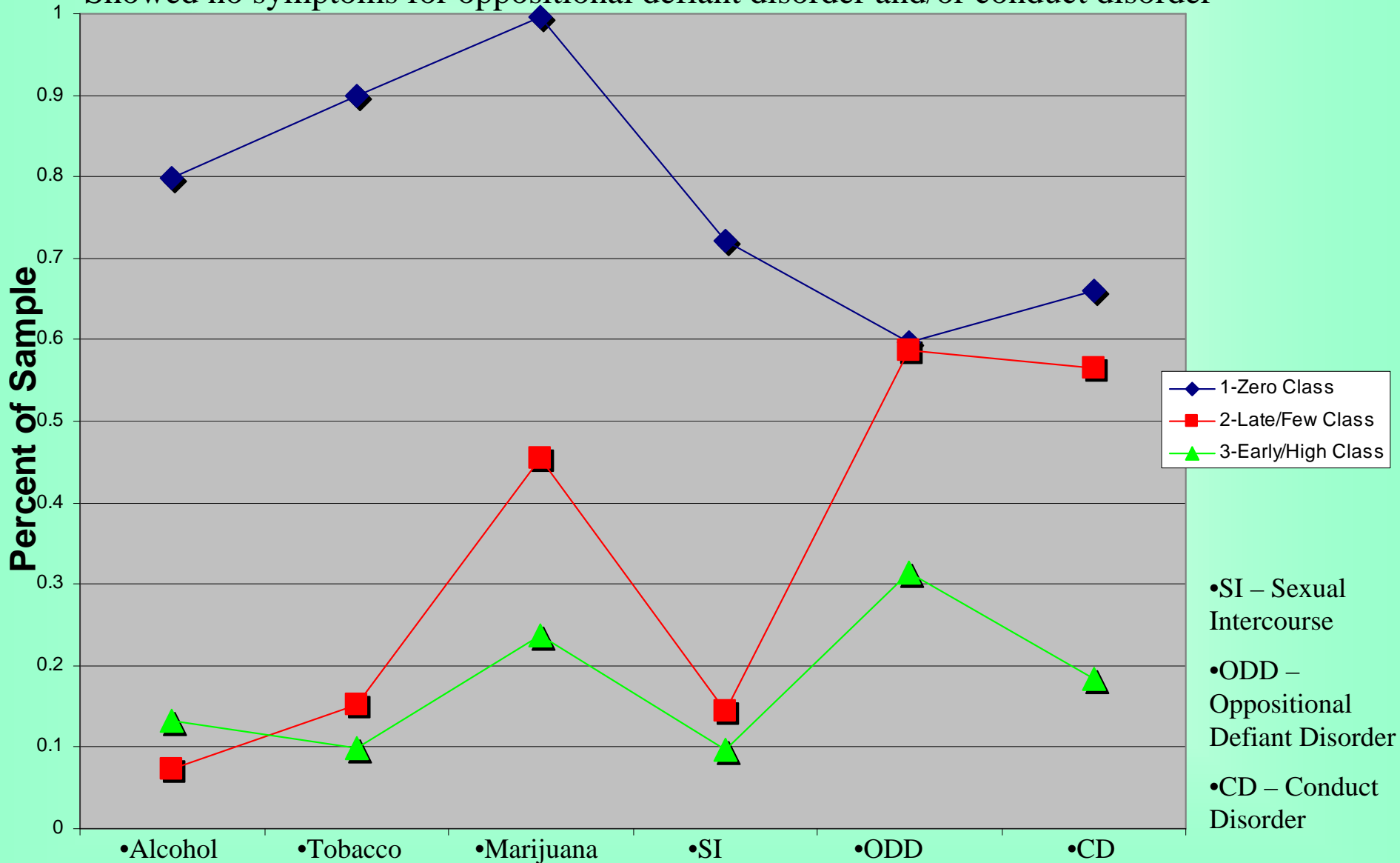
	None	Late/Few	Early/High
Alcohol Use	0.133	0.364	0.503
Tobacco Use	0.098	0.364	0.539
Marijuana Use	0.237	0.249	0.514
Intercourse	0.096	0.308	0.596
Oppositional	0.315	0.293	0.392
Conduct	0.184	0.335	0.481

- 931 Sample Total
- 298 (32.0%) – **“Zero Class”**  
→
- 388 (41.7%) – **“Late/Few Class”**  
→
  - Normative Class
- 245 (26.3%) – **“Early/High Class”**  
→
  - High Risk Class
  - Target of Analysis

# None

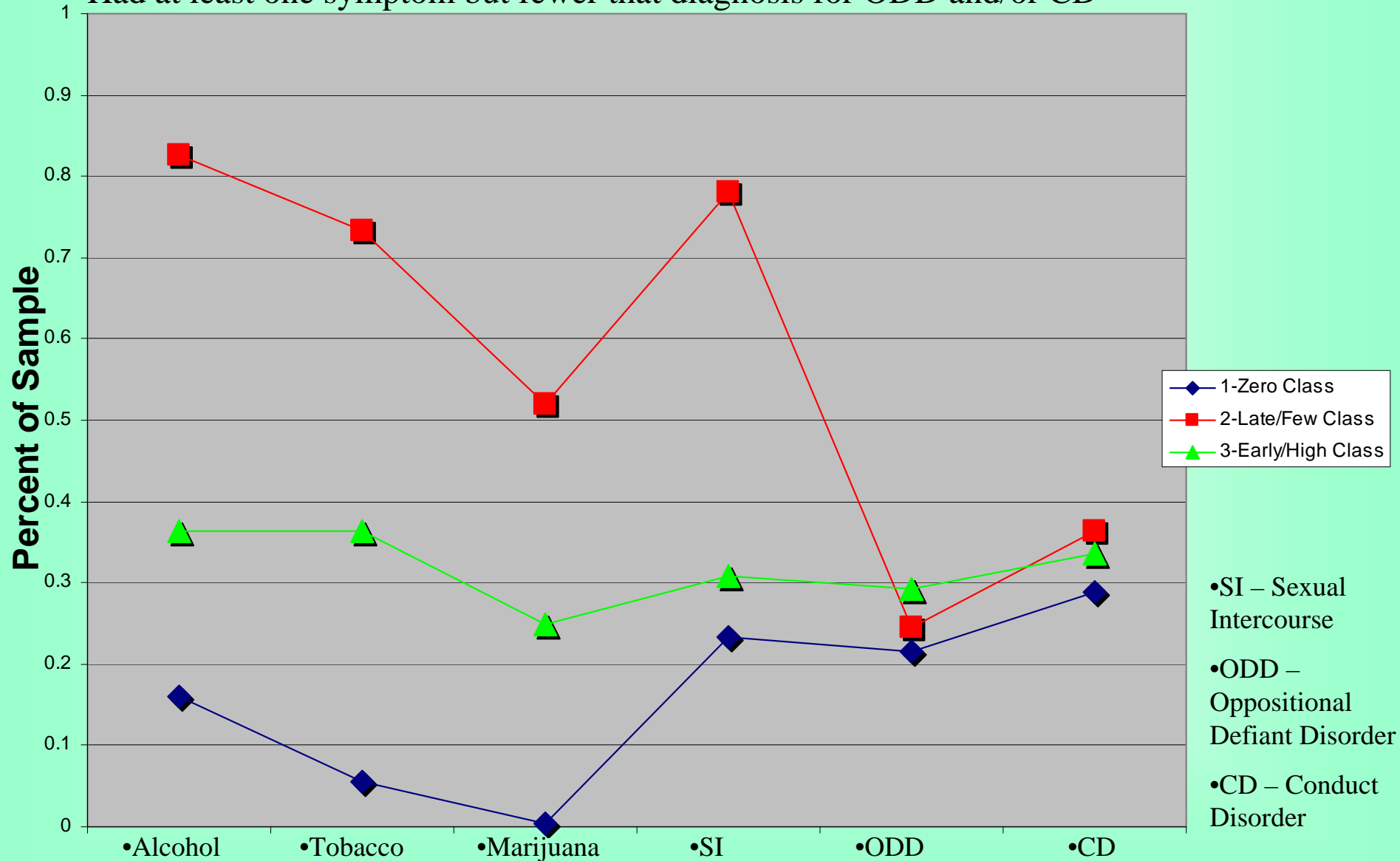
•Did not use any substance or engage in sexual intercourse

•Showed no symptoms for oppositional defiant disorder and/or conduct disorder



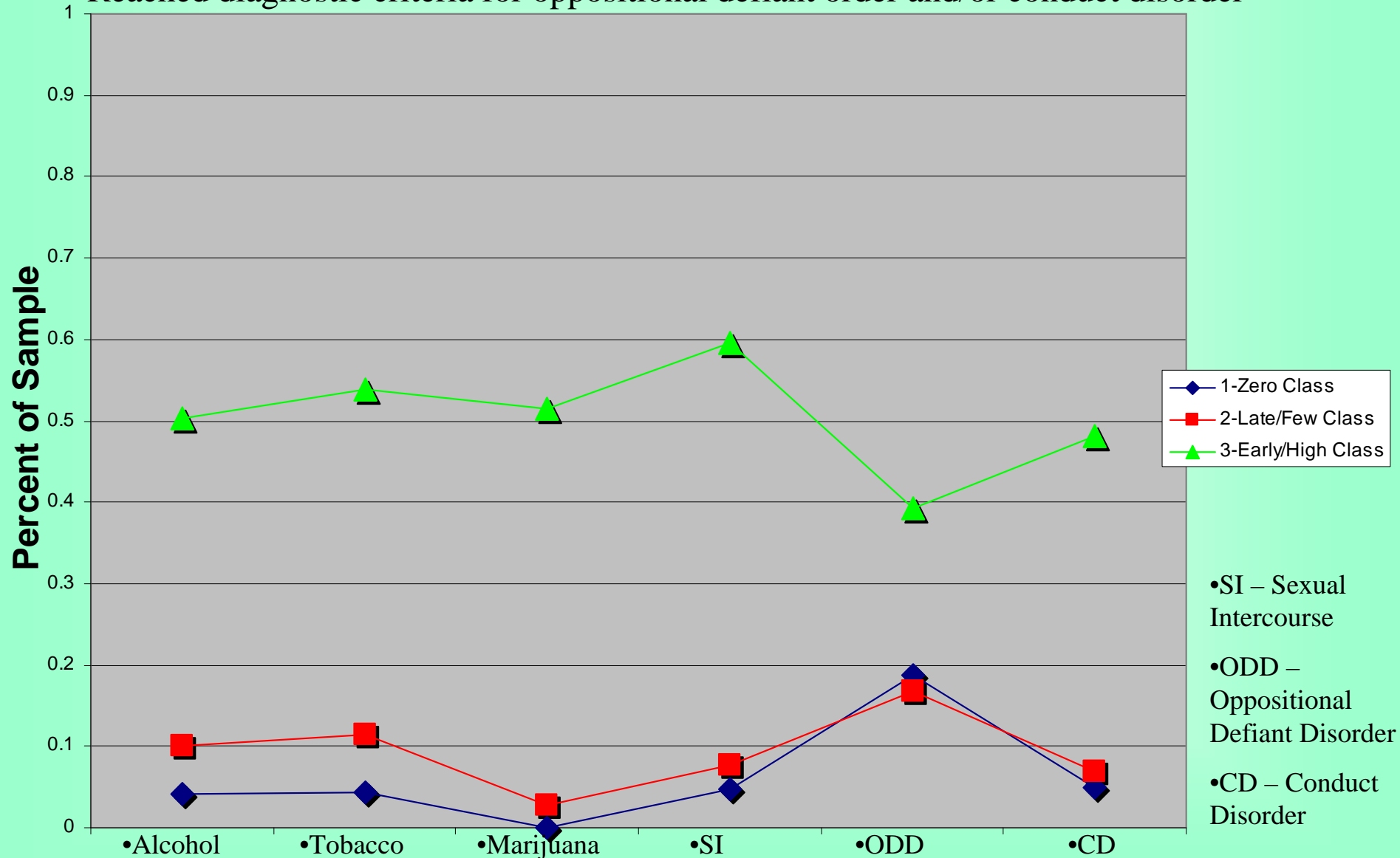
# Late Use / Few Symptoms

- Used substances and/or engaged in sexual intercourse at a later age
- Had at least one symptom but fewer that diagnosis for ODD and/or CD



# Early Use / High Symptoms

- Used substances and/or engaged in sexual intercourse at early age
- Reached diagnostic criteria for oppositional defiant order and/or conduct disorder



- SI – Sexual Intercourse
- ODD – Oppositional Defiant Disorder
- CD – Conduct Disorder

# Logistic Regression Models

Modeling probability of latent class membership using the Late/Few Class as the comparison - Controlling For Age -

## Early/High Class Vs Late/Few Class

	OR	95% CI
<b>AA</b>	<b>1.89***</b>	<b>1.33 - 2.70</b>
<b>Male</b>	<b>1.72**</b>	<b>1.21 - 2.44</b>
<b>HR</b>	<b>1.91**</b>	<b>1.24 - 2.94</b>
<b>RDD</b>	<b>1.88**</b>	<b>1.24 - 2.86</b>

## Zero Class Vs Late/Few Class

	OR	95% CI
AA	1.2	0.82 - 1.74
<b>Male</b>	<b>0.68*</b>	<b>0.49 - 0.96</b>
HR	0.72	0.46 - 1.12
<b>RDD</b>	<b>0.62*</b>	<b>0.40 - 0.97</b>

Note: HR-High Risk Families, RDD-Recurrent Drunk Driving Families, AA-African American, EA-European American

+ Odds Ratios have a P value <0.1

\* Odds Ratios have a P value <0.05

\*\* Odds Ratios have a P value <0.01

\*\*\* Odds Ratios have a P value <0.001

# Logistic Regression Models by Ethnicity

Modeling probability of latent class membership using the Late/Few Class as the comparison - Controlling For Age -

## European Americans

### Early/High Class Vs Late/Few Class

	OR	95% CI
Male	1.02	0.58 - 1.79
<b>HR</b>	<b>4.40**</b>	<b>1.74 - 10.95</b>
<b>RDD</b>	<b>4.34**</b>	<b>1.88 - 10.01</b>

### Zero Class Vs Late/Few Class

	OR	95% CI
<b>Male</b>	<b>0.62*</b>	<b>0.34 - 0.98</b>
HR	0.67	0.32 - 1.38
RDD	0.6	0.32 - 1.14

## African Americans

### Early/High Class Vs Late/Few Class

	OR	95% CI
<b>Male</b>	<b>2.78***</b>	<b>1.78 - 4.34</b>
HR	1.5	0.88 - 2.54
RDD	1.15	0.64 - 2.06

### Zero Class Vs Late/Few Class

	OR	95% CI
Male	0.79	0.52 - 1.22
HR	0.78	0.45 - 1.37
RDD	0.68	0.38 - 1.21

Note: HR-High Risk Families, RDD-Recurrent Drunk Driving Families, AA-African American, EA-European American

+ Odds Ratios have a P value <0.1

\* Odds Ratios have a P value <0.05

\*\* Odds Ratios have a P value <0.01

\*\*\* Odds Ratios have a P value <0.001

# Substance Abuse/Dependence and Depression Risk

**Logistic Regression Models – Modeling probability of Substance Dependence or Depression for each Latent Class using the Late Use Latent Class as the comparison - Controlling For Age, Race, Gender, HR Families, and RDD Families -**

## Early/High Class Vs Late/Few Class

	OR	95% CI
<b>Alcohol Abuse/Dep</b>	<b>2.89***</b>	<b>1.89 - 4.42</b>
<b>Tobacco Dependence</b>	<b>3.01***</b>	<b>1.81 - 5.01</b>
<b>Marijuana Abuse/Dep</b>	<b>2.23*</b>	<b>1.18 - 4.19</b>
<b>Depression</b>	<b>1.87*</b>	<b>1.06 - 3.29</b>

## European Americans

	OR	95% CI
<b>Alcohol Abuse/Dep</b>	<b>4.62***</b>	<b>2.39 - 8.96</b>
<b>Tobacco Dependence</b>	<b>4.00***</b>	<b>2.05 - 7.79</b>
Marijuana Abuse/Dep	1.58	0.59 - 4.21
Depression	1.35	0.58 - 3.17

## African Americans

	OR	95% CI
<b>Alcohol Abuse/Dep</b>	<b>2.25**</b>	<b>1.22 - 4.15</b>
Tobacco Dependence	2.3 <sup>+</sup>	0.94 - 5.63
<b>Marijuana Abuse/Dep</b>	<b>3.12*</b>	<b>1.12 - 8.64</b>
Depression	2.14 <sup>+</sup>	0.99 - 4.60

## Zero Class Vs Late/Few Class

	OR	95% CI
Depression	0.98	0.48 - 1.99

## European Americans

	OR	95% CI
Depression	0.84	0.30 - 2.36

## African Americans

	OR	95% CI
Depression	0.99	0.38 - 2.58

Note: HR-High Risk Families, RDD-Recurrent Drunk Driving Families, AA-African American, EA-European American

+ Odds Ratios have a P value <0.1

\* Odds Ratios have a P value <0.05

\*\* Odds Ratios have a P value <0.01

\*\*\* Odds Ratios have a P value <0.001

# Comments

- Subjects are at **higher risk** to fall within the **Early/High latent class** when the subject is:
  - Male
  - African American
  - From a High Risk family or Recurrent Drunk Driving Family
- Subjects were **more likely** to be placed in the **Zero latent class** when the subject is:
  - Female
  - From a Low Risk or High Risk Family
- Subjects among the **Early/High class** are at **higher risk** compared to Late/Few class to have:
  - Alcohol Dependence or Abuse
  - Tobacco Dependence
  - Marijuana Dependence or Abuse
  - Depression
- **European Americans** within the **Early/High class** compared to Late/Few class are at **higher risk** for:
  - Alcohol Dependence or Abuse
  - Tobacco Dependence
- **African Americans** within the **Early/High class** compared to Late/Few class are at **higher risk** for:
  - Alcohol Dependence or Abuse
  - Marijuana Dependence or Abuse
- Our data suggest a class reflecting general early use of all substances, but not early use of a particular substance
- Level of conduct disorder and oppositional defiant disorder symptoms did not differentiate the **Zero** class from the **Late/Few** class