



Peers and Pot: Selection and Influence Mechanisms Associated with Marijuana Use in Adolescent Friendship Networks

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SRA Biennial Meeting, March 9 2012

Peers and Pot

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- **Funding**
 - R01DA030380 from the National Institute on Drug Abuse (PI: Joan Tucker)

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Marijuana Use In Adolescence: Prevalence and Risks

- **In the U.S., 6% of adolescents have tried marijuana by 8th grade, and 42% have done so by 12th grade (Johnston et al., 2007)**
- **Adolescence is a critical period for marijuana (MJ) and drug use interventions**
 - Early initiation of MJ use, and regular use in adolescence, predict drug use disorders in adulthood (Swift et al., 2008)
 - Experimental drug use in adolescence is associated with poorer young adult outcomes (Tucker et al., 2005)

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Adolescent Substance Use: The Role of Peers and Friends

- **Many risk and protective factors**
- **Peer influence is argued to play a central role**
 - Key factor in theories of adolescent problem behavior
 - Peer/friend substance use is often correlated/predictive
 - A key focus of prevention programs
- **Some evidence that *friendships* are an important contributing factor to adolescent marijuana use**
 - Adolescent drug use is more strongly predicted by friend drug use than wider peer group norms (Duan et al., 2009)
 - Friends may be key social referents for illicit (covert) substance use and may provide opportunities for use

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Friends and Marijuana Use: An Evolving Social System

- **Substance use in adolescent social systems**
 - Youth are influenced by their peers
 - And influence their peer setting via their selection of friends
 - **Socially meaningful behaviors: a basis for friendship choices and socialization**
- **Marijuana: social selection and influence dynamics**
 - Do adolescents seek out friends based on marijuana use?
 - Do friends also influence adolescent marijuana use?
 - Both selection and socialization effect observed for other substance use behaviors
 - Few studies teasing apart these processes for MJ use – a more *covert* behavior- with mixed results (e.g., Pearson et al., 2006)

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Susceptibility to Peer Effects on Marijuana Use

- **It is unclear if particular adolescents are more/less susceptible to peer influence on marijuana use**
- **Multiplicative model of risk: Personal, family, and social risk factors may heighten risk of peer influence**
 - Peer similarities in risk behaviors are stronger for youth with risk factors
 - Depression, social anxiety, internalized distress
 - Low academic achievement
 - Family dysfunction, parent substance use
- **Peer effects on substance use also seem to be moderated by experiential differences**
 - Gender, race/ethnicity, age (and variables related to developmental stage), social status

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Research Questions

- **Q1: To what extent are friendships based on marijuana use, and do friends also influence marijuana use?**
 - Lifetime marijuana use (initial initiation of MJ use)
 - Frequency of marijuana use
- **Q2: What personal, family, and school factors moderate friendship selection and influence associated with marijuana use?**
 - Explore moderators of friendship choices
 - Test if risk factors heighten peer influence

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Study Sample & Procedure

- **Sample**
 - National Longitudinal Study of Adolescent Health (Add Health)
 - Saturated school sample: all students invited to participate
 - Focus on the two largest high schools
 - Wave 1 (1994-1995) and Wave 2 (1996)
 - Students captured at both waves (Grade 10/11 at Wave 1)
 - N = 1,612, nested in two schools
 - School 1: N = 1,193; School 2: N = 419
 - Retention rates 87-88%
- **Procedure**
 - In school questionnaires (baseline)
 - In home student and parent questionnaires (Wave 1 & Wave 2)

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Measures

- **Friendships**
 - Name up to 5 male and 5 female friends
 - About 5% of sample limited to 1 M / 1 F nomination
- **Marijuana use**
 - Any lifetime use: number of times used marijuana in their lifetime (W1) and in the past year (W2) (1 = any use)
 - Frequency of past month use: number of times used marijuana in the past 30 days
 - Recoded to 5 pt, scale: 0 = none, 4 = 33 times or more
- **Control attributes**
 - Gender, grade cohort, family SES (parent report of education attainment)

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Measures

- **Respondent-level moderators**
 - Personal factors
 - Depression: 19 item CES-D (Radloff, 1977), $\alpha = .86$
 - Self-esteem: 6 items, $\alpha = .84$
 - Delinquency: 15 items, $\alpha = .80$
 - School factors
 - GPA: 4 items, $\alpha = .75$
 - School attachment: 3 items, $\alpha = .72$
 - Trouble at school: 4 items, $\alpha = .69$
 - Popularity: respondent indegree (# of friend nominations)
 - Family factors
 - Family bonding: 13 items, $\alpha = .75$
 - Exposure to drugs in the home: 1 dichotomous item

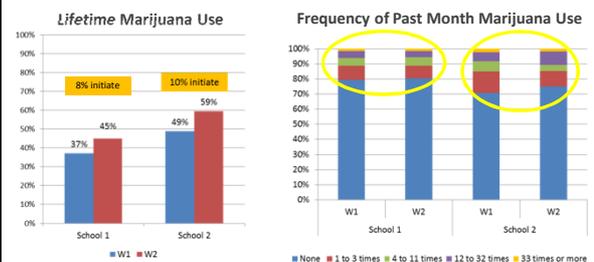
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Sample Descriptive Statistics

Respondent attribute	School 1 (N = 1193)	School 2 (N = 419)
Male (%)	51	57
Male Wave 1	16.3	16.5
Race/ethnicity (%)		
Hispanic	40	1
Non-Hispanic white	23	99
Non-Hispanic black	25	0
Asian	33	1
Other	1	0
Parent education (%)		
Less than high school	25	4
High school	20	32
Some college or trade school	29	35
Graduate of college/university	19	29

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Marijuana Use Descriptive Statistics



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Network Descriptive Statistics

Characteristics of the friendship network: Wave 1 to Wave 2

Characteristic	School 1		School 2	
	Wave 1	Wave 2	Wave 1	Wave 2
<i>M</i> (<i>SD</i>) friends nominated	2.04	1.75	3.34	2.55
Range nominations received	0 – 15	0 – 8	0 – 17	0 – 13
Reciprocity index	.27	.34	.39	.45
Transitivity index	.21	.23	.24	.23
	Period 1		Period 1	
<i>M</i> stable friendship ties	0.59		0.98	
<i>M</i> new friendship ties	0.78		1.21	
<i>M</i> friendship ties dissolved	1.04		1.93	

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Statistical Model for Networks and Behavior

- Stochastic actor-based (SAB) model for the co-evolution of networks and behavior (Snijders, Steglich, & Schweinberger, 2007)
 - RSiena version 4.0

Model component	Friendship dynamics submodel	Behavior dynamics submodel
Purpose	Predicts change to friendship ties	Predicts change to marijuana use
Parameters	Marijuana use <ul style="list-style-type: none"> adolescent use parental friend use parental friend simultaneous use Covariate effects <ul style="list-style-type: none"> gender race/ethnicity grade parent education limited nomination control Structural effects <ul style="list-style-type: none"> reciprocity transitivity degree distribution 	Friend influence <ul style="list-style-type: none"> effect of friend MJ use Covariate effects <ul style="list-style-type: none"> gender grade parent education Shape effects <ul style="list-style-type: none"> linear quadratic

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Results: Lifetime Marijuana Use

Lifetime marijuana use predicted friendship choices

- Users nominated fewer friends
- Users attracted fewer friends (S1)
- Selected friends with same lifetime use

Initiation of marijuana use:

- Not predicted by friend MJ use
- Not predicted by covariates

Parameter	School 1 P.E. (SE)	School 2 P.E. (SE)
Friendship network dynamics		
Rate parameter	7.34 (0.31)	16.29 1.05
Effect of Lifetime MJ use		
MJ lifetime use ego	-0.17 (0.07)*	-0.28 (0.08)**
MJ lifetime use alter	-0.16 (0.06)**	0.13 (0.08)
Same MJ lifetime use	0.29 (0.07)**	0.37 (0.07)**
Marijuana initiation dynamics		
Rate	0.35 0.08	0.48 (0.14)
Effects of friends' behaviors		
Friends' lifetime MJ use	n.s.	n.s.
Friends' past month MJ use	16.61 12.68	5.60 (4.55)
Effects of individual covariates		
Male	n.s.	n.s.
Race/ethnicity	n.s.	n.s.
Grade	n.s.	n.s.
Parent education	n.s.	n.s.

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Results: Frequency of Marijuana Use

Frequency of past month MJ use predicted friendship choices

- MJ use not associated with making or receiving friend nominations
- Selected friends with similar frequency of MJ use

Change in frequency of MJ use:

- Predicted by friend MJ use in School 1, but not School 2
- Predicted by parent education in School 1

Parameter	School 1 P.E. (SE)	School 2 P.E. (SE)
Friendship network dynamics		
Rate parameter	7.02 (0.31)	15.70 1.46
Effect of MJ use (monthly freq.)		
MJ use ego	-0.07 (0.11)	0.01 (0.07)
MJ use alter	-0.49 (0.38)	-0.38 (0.42)
MJ use squared alter	0.24 (0.13)	0.22 (0.15)
Similar MJ use	1.62 (0.35)**	0.74 (0.31)*
Marijuana frequency dynamics		
Rate	4.31 0.64	3.95 (1.23)
Linear shape		
	-1.59 (0.12)**	-1.24 (0.22)**
Quadratic shape		
	0.37 (0.03)**	0.37 (0.06)**
Friends' past month MJ use	0.78 (0.37)*	0.74 (0.56)
Effects of individual covariates		
Male	n.s.	n.s.
Race/ethnicity	n.s.	n.s.
Grade	n.s.	0.33 (0.20)
Parent education	-0.14 (0.05)**	n.s.

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Post Hoc Test: Drivers of Friendship Selection

- Marijuana-based friendship selection**
 - Is lifetime MJ use, or frequency of MJ use, more important?
- Additional SAB model**
 - Co-evolution of friendship network, lifetime MJ use, *and* frequency of past month MJ use
 - Does frequency of MJ use predict friendship choices *over and above* lifetime MJ use?
 - Estimate effects of lifetime use, score test effects of MJ freq.
- Result: Role of marijuana in friend choices differed by school**
 - School 1: friendship choices predicted by similarities in lifetime MJ use *and* similarities in frequency of MJ use
 - School 2: friendship choices explained by similarities in lifetime MJ use

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Moderators of Friend Selection and Influence for Marijuana Use

- Re-estimate the SAB model for the co-evolution of the friendship network and frequency of marijuana use**
- Addition of moderating effects of personal, family, and school factors on:**
 - Selection of friends with similar MJ use
 - Effect of friend MJ use on adolescent use (multiplicative risk?)

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Results: Moderators of Friend Selection and Influence for MJ Use

• Moderators of friend selection based on similar MJ use

- School 1:
 - Delinquency (-)
 - Popularity (-)
- School 2:
 - Family support (-)

• Friend influence on adolescent MJ use

- School 1:
 - School trouble (+)

Respondent attribute	School 1		School 2	
	Similar MJ selection	Friend MJ influence	Similar MJ selection	Friend MJ influence
Personal factors				
Depression	n.s.	n.s.	n.s.	n.s.
Self-esteem	n.s.	n.s.	n.s.	n.s.
Delinquency	-0.67(,23)**	n.s.	n.s.	n.s.
Male	n.s.	n.s.	n.s.	n.s.
Grade	n.s.	n.s.	n.s.	n.s.
White	n.s.	n.s.	-	-
Risk	n.s.	n.s.	-	-
Hispanic	n.s.	n.s.	-	-
Asian	n.s.	n.s.	-	-
School factors				
GPA	n.s.	n.s.	n.s.	n.s.
School attachment	n.s.	n.s.	n.s.	n.s.
School trouble	n.s.	1.39(,65)*	n.s.	n.s.
Popularity	-0.32(,07)**	n.s.	n.s.	n.s.
Family factors				
Drugs in the home	n.s.	n.s.	n.s.	n.s.
Family support	n.s.	n.s.	-0.53(,26)*	n.s.

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Summary of Results

• Evidence of friend influence on adolescent marijuana use was only evident in School 1

- Adolescents' frequency of MJ use was predicted by friends' frequency of use over the year-long study
- Ego alter tables indicate that in School 1:
 - Youth whose friends abstain from MJ use, were likely to remain (or become) non-users
 - Youth whose friends used marijuana more frequently, were at most risk of becoming (or remaining) frequent users

• Initiation of marijuana use was not influenced by school friends in either school

- Nor was it predicted by covariates

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Summary of Results

• School (setting) level differences in the social role of marijuana use

- Rates of marijuana use slightly lower in School 1
- School 1: marijuana use particularly salient
 - Friend selection based on frequency of MJ use *and* lifetime use
 - Friends' use influenced adolescent frequency of MJ use
- School 2: marijuana use *less salient*
 - Friend selection based on the same lifetime MJ use (no additional effect for frequency of MJ use)
 - No evidence of friend influence on MJ use

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Summary of Results: Moderators

• Few significant moderators of friend selection or friend influence for marijuana use

- Most personal, school, family risk factors did not heighten risk of friend influence on marijuana use
 - School trouble (School 1): youth who got in trouble at school were more likely to be influenced by their friends' MJ use
- Significant moderating effects of MJ-based friend selection differed by school
 - Risk factors seems to attenuate tendency to select friends based on MJ-use similarities
 - Delinquency, popularity (School 1)

• Overall, MJ based friend selection and influence effects were pervasive

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Final Conclusions and Implications

• Context matters

- Friend influence on MJ use, and the role of MJ use in friendship choices, differed between the two school contexts

• When friend influence on marijuana use was observed, the effect was pervasive

- Little evidence of moderating factors at the individual level

• Future work: sampling multiple friendship networks

- What factors at the school (setting) level make marijuana use (and other drugs) salient to friendships?
- Interventions may need to target different individual, peer, or setting-level processes, depending on the context

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Thank you

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