ASSOCIATIONS BETWEEN RECREATIONAL MARIJUANA LEGALIZATION IN CALIFORNIA AND TEEN MARIJUANA ATTITUDES AND USE

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INTRODUCTION

- The landscape of marijuana use is changing, with more states legalizing recreational marijuana use.
- On November 9, 2016, California voters approved the Adult Use of Marijuana Act (Proposition 64) to legalize adult recreational marijuana use, with retail outlets permitted beginning January 1, 2018.
- Adult marijuana use has more than doubled in the past decade, which could affect teen attitudes. Use during adolescence is associated with cognitive, mental health and achievement difficulties.
- **Research Questions:**
  - How was the approval of recreational marijuana legalization in California associated with teen marijuana attitudes, teen marijuana use, and discussions with parents regarding marijuana?
  - How was the implementation of recreational marijuana legalization in California associated with teen marijuana attitudes and use, and parent-teen discussions about marijuana?

METHODS

- Teens (N=232) aged 13-18 (60.1% female) in the San Francisco area completed two annual online surveys assessing approval of marijuana use, marijuana outcome expectancies, perceived risk, marijuana use, and discussions of marijuana legalization with parents.
- These annual surveys were completed between 5/2/2016 and 4/18/2018. 28.0% (n=116) of annual surveys were completed prior to the November 2016 vote, and 72.0% (n=299) were completed after the election. 90.6% (n=376) annual surveys were completed prior to legalization of retail for recreational use (1/1/2018), and 9.4% (n=39) were completed after that date.

MEASURES:

- **Approval of marijuana use:** 5-point scale (Strongly disapprove to Strongly approve).
  - ***Own approval:*** 2 items - approval of occasional and regular marijuana use
  - ***Friends' perceived approval:*** 2 parallel items regarding perceptions of closest friends' use.
- **Marijuana outcome expectancies:** 6 items adapted from Ellickson et al. (2003); views on expected outcomes of marijuana use (e.g., marijuana relaxes you, marijuana lets you have more fun). 4-point scale (strongly disagree to strongly agree). Items averaged to create a scale of expectancies (Cronbach's α= 0.569).
- **Perceptions of marijuana:** 3 items adapted from Berg et al. (2015) assessed teens' perceptions of marijuana (e.g., How socially acceptable among your peers do you think marijuana is?) on a 7-point scale from not at all to extremely. Items were averaged to create a scale (Cronbach's α = 0.672) where higher scores indicated more positive perceptions of marijuana.
- **Perceived risk:** 3 items adapted from Johnston et al. (2013). Items asked how much they thought people risk harming themselves if they: a) try marijuana once or twice, b) smoke marijuana occasionally, and c) smoke marijuana regularly; 4-point scale. Items were averaged to create a scale (Cronbach's α = 0.780).
- **Marijuana use:** Number of days used marijuana in the past 30 days.
- **Discussions of marijuana legalization with parents.** Whether parents ever discussed the legalization of recreational marijuana with them (Y/N).

ANALYSES :

Hierarchical Tobit and Logit models were used to analyze scale and binary outcomes, respectively, while controlling for repeated waves within respondents. Models controlled for age, gender and race. Each California city was able to opt out of legal marijuana outlets. Among our sample cities, all opted out except for Richmond. Thus, models included a simple interaction term which was one if the wave's annual survey was after 12/31/2017 and the home city was Richmond, or zero if either of those conditions failed.

RESULTS

- **Descriptive Results (Table 1):**
  - Teens' own and perceived peer approval of marijuana appeared moderate. Teens perceived moderately low risk from marijuana use and had slightly positive perceptions of marijuana. On average, 20.4% of teens used marijuana in the past 30 days, using on average two out of the past 30 days. About half (57%) had discussions with parents regarding recreational marijuana legalization.
- **Relationships between Marijuana Legalization and Teen Attitudes, Use, and Parent-teen Communication (Table 2):**
  - ***November 2016 vote:*** Teens who responded after the November 2016 vote perceived significantly greater peer approval of occasional marijuana use and were more likely to have discussed marijuana use with their parents. The November 2016 vote was unrelated to teens' own approval of use, perceived risk of use, marijuana outcome expectancies, or teen marijuana use.
  - ***January 2018 legalization of retail outlets:*** After the legalization of retail outlets, teens reported greater approval of occasional and regular marijuana use, more positive marijuana outcome expectancies, and more positive perceptions of marijuana. Legalization was unrelated to perceptions of peer approval, perceived risk of use, teen marijuana use, and discussions of legalization with parents. The interaction term suggests greater approval of regular marijuana use among those survey responses that are both after retail legalization and from a respondent whose city had active recreational outlets.
- **Demographic Variables and Relation to Teen Use, Attitudes, and Communication (Table 2):**
  - Asians reported significantly lower levels of their own and their peers' approval of occasional and regular marijuana use, less positive outcome expectancies regarding marijuana, and greater perceived risk regarding marijuana use.
  - African-American teens were less likely to report their parents discussing marijuana legalization with them.

Table 1. Descriptive Statistics

Outcome measures	Mean	SD	Min	Max	N
Own approval of occasional MJ use	3.00	1.46	1	5	413
Own approval of regular MJ use	2.38	1.36	1	5	413
Peer approval of occasional MJ use	2.76	1.41	1	5	411
Peer approval of regular MJ use	2.27	1.34	1	5	411
Positive marijuana outcome expectancies	2.32	0.86	1	4	276
Marijuana perceived risk	2.32	0.89	1	4	303
Positive perceptions of marijuana	4.03	1.92	1	7	301
Days using marijuana in past 30 days	2.08	6.31	0	30	411
Parental discussion of recreational MJ legalization	0.57	0.50	0	1	409
Predictor variables					
Surveyed post November 2016 election	0.72	0.45	0	1	415
Surveyed post January 2018 retail legalization	0.09	0.29	0	1	415
MJ Retail in home city	0.01	0.10	0	1	415
Age	15.77	0.83	14	18	409
Gender (female)	0.59	0.49	0	1	408
Asian	0.07	0.25	0	1	405
African-American	0.11	0.31	0	1	405
Hispanic	0.19	0.39	0	1	412

Note. "MJ" = marijuana

Table 2. Multilevel Tobit and Logit models relating state marijuana policies to teen marijuana attitudes, use, and parental communication

	Own approval of occasional MJ use	Own approval of regular MJ use	Peer approval of occasional MJ use	Peer approval of regular MJ use	Positive marijuana outcome expectancies	Marijuana perceived risk	Positive perceptions of marijuana	Days using marijuana in past 30 days	Parental discussion of recreational marijuana legalization
Surveyed post November 2016 election	0.128 (1.377)	0.149 (0.808)	**0.532*** **(2.575)**	0.455 (1.917)	-0.249 (-0.713)	-0.459 (-1.166)	0.431 (0.556)	3.023 (0.943)	**0.966**** **(2.690)**
Surveyed post January 2018 retail legalization	**0.368*** **(2.279)**	**0.717*** **(2.150)**	0.303 (0.853)	0.630 (1.571)	**0.375*** **(2.571)**	-0.237 (-1.562)	**0.696*** **(2.439)**	6.915 (1.271)	-0.0347 (-0.0580)
MJ retail in home city*surveyed post January 2018 legalization	-0.410 (-0.754)	**-2.605*** **(-2.184)**	0.786 (0.649)	-1.335 (-1.011)	-0.164 (-0.365)	0.151 (0.300)	-0.716 (-0.711)	-4.406 (-0.264)	-2.011 (-0.931)
Age	0.0191 (0.170)	-0.0696 (-0.349)	0.245 (1.327)	0.0760 (0.385)	0.0431 (0.511)	-0.120 (-1.356)	0.0942 (0.485)	1.711 (0.722)	0.255 (1.007)
Gender (female)	0.185 (0.963)	0.118 (0.347)	-0.0574 (-0.181)	-0.0855 (-0.253)	-0.116 (-0.821)	-0.123 (-0.825)	0.161 (0.489)	-0.949 (-0.236)	0.323 (0.752)
Asian	**-0.919*** **(-2.468)**	**-1.647*** **(-2.386)**	**-1.885**** **(-2.889)**	**-1.967**** **(-2.798)**	**-0.696**** **(-2.596)**	**0.678*** **(2.471)**	-1.095 (-1.799)	-14.74 (-1.576)	-1.478 (-1.774)
African-American	-0.388 (-1.239)	0.347 (0.631)	-0.836 (-1.615)	-0.514 (-0.928)	0.331 (1.403)	-0.114 (-0.451)	0.411 (0.734)	-5.025 (-0.723)	**-1.971**** **(-2.633)**
Hispanic	-0.279 (-1.128)	-0.425 (-0.970)	-0.227 (-0.563)	0.0720 (0.167)	-0.176 (-0.930)	0.146 (0.757)	-0.656 (-1.523)	-1.871 (-0.361)	-0.998 (-1.793)
Constant	2.626 (1.480)	2.854 (0.910)	-1.420 (-0.487)	0.324 (0.104)	1.962 (1.447)	**4.647**** **(3.265)**	2.120 (0.680)	-47.59 (-1.264)	-3.832 (-0.963)
Number of wave observations	390	390	389	389	262	286	284	386	385
Number of respondents	214	214	214	214	186	202	200	213	212

Note. unstandardized parameter effects (b) shown; z-statistics in parentheses. Tobit models were used for all outcomes except parental discussion of legalization, which used a logit model.
** p<0.01, * p<0.05. MJ = marijuana

DISCUSSION

- Findings suggest that legalization of recreational marijuana in California may be related to increases in teens' positive attitudes towards marijuana.
- Results should be considered preliminary since the January 2018 legalization of retail outlets is still recent, and it may be too soon to determine the full effects of legalization. In addition, few outlets opened immediately after retail outlets were permitted.
- These data provide an understanding about teen perspectives/use prior to a heavy density of recreational marijuana outlets, and as the outlet density increases, an even greater levels of teens rating favorably and using marijuana may occur due to the wider availability.
- Findings suggest that prevention programs focusing on teen attitudes towards marijuana in states with legalized recreational marijuana use may be useful.
- As legalization was related to parents' discussion of marijuana with teens, this suggests that focusing on family-based prevention efforts may be a useful strategy.

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