STASH, Vol. 6(10) – Abuse by association: The relationship between implicit associations and at-risk adolescents' marijuana use

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A growing body of research suggests that simple computer tests can reliably measure some of the cognitive and motivational factors that contribute to substance misuse. For example, a measure of the strength of the association between the concepts "alcohol" and "arousal" predicts college students' heavy drinking behavior (Wiers, van de Luitgaarden, van de Wildenberg, & Smulders, 2005). The [Implicit Association Test](#) (IAT: Greenwald & Banaji, 1998) can measure associations such as these. This test is an implicit measure because it does not require introspective access and reduces the role of mental control in responding (Nosek, Greenwald, & Banaji, 2006). In this week's STASH, we review a study assessing the association between implicit measures and self-reported marijuana use among a sample of at-risk adolescents (Ames, Grenard, Thush, Sussman, Wiers, & Stacy, 2007).

Methods

- Participants (n= 121, M age=16.7 years, 64 % male, 72 % Latino, 28 % White and other ethnicities) were recruited from "continuation" high schools in the Los Angeles area. The researchers contacted a random sample of these schools from an available list, and the schools then invited all students in selected classrooms to participate. Students are sent to "continuation" high schools for a variety of reasons, including behavior problems and substance abuse, but are not currently receiving any drug abuse prevention programming. Sixty-one percent of the students who volunteered to participate in the study reported using marijuana within the past 12 months, and 34% reported using marijuana more than 11-20 times in the past month.

- Participants completed several implicit and explicit (i.e. self-report) measures of cognitive and motivational factors that might relate to adolescents' marijuana use.

The measures included the following:

- **Relaxed beliefs:** For this explicit measure, participants were asked "How likely is it that these things happen to you when you smoke marijuana?" Participants responded to six statements (e.g., "When I smoke marijuana, I feel mellow") on a scale from no chance to certain to happen. The six items satisfied criteria for one-dimensional scaling and the researchers calculated a summary score.

- **Negative beliefs:** Similarly, participants were asked to respond to statements such as "When I smoke marijuana, I feel awful." Response options were the same as Relaxed Beliefs above. Again, responses showed internal consistency and researchers calculated a summary score.

- **Implicit marijuana-excited associations:** The general IAT format is described [here](). The version used in the current study measured the strength of the implicit association between the concepts "marijuana" and "excited" by recording participants' reaction time to visual stimuli. Higher scores indicate stronger associations between the concepts "marijuana" and "excited."

- **Marijuana word association index:** The researchers administered a number of word association tasks found to predict substance abuse among at-risk populations and combined them into one all-inclusive index. On each of these tasks, participants indicated the first word or association that came to their minds when they saw ambiguous words (e.g., bowl, pot) and phrases (e.g., having fun, feeling good). Independent judges coded each response as being marijuana related (1) or not marijuana related (0) and summed all scores for each participant. Higher scores therefore indicated greater activation of drug-related associations.

- **Self-reported marijuana use:** Experimenters collected participants' self-reports of their past 30-day and lifetime marijuana use.

- The researchers compared the convergence among the implicit measures as well as their correspondence with adolescents' self-reported marijuana use. They used multivariate regression analyses to evaluate the contributions of implicit measures of marijuana use above and beyond known explicit covariates of drug use. In this STASH, we present the trimmed regression model that excluded non-significant predictors of marijuana use frequency.

Results:

- The trimmed regression model for marijuana use was statistically significant, F (4, 116) = 46.64, $p<.0001$), and this model explained 62 % of the variance associated with these adolescents' marijuana use. Table 1 provides details about the trimmed regression model.
- In the trimmed regression model, relaxed and negative beliefs contributed to the estimation of the frequency of marijuana use (cumulative R^2 = .37). The two implicit measures described here, marijuana-excited IAT scores and the marijuana word association index, added significantly to the prediction of the frequency of marijuana use (additional combined R^2 = .25).

Predictor Variable	Cumulative R^2	Simultaneous Model	
		F	p
Relaxed beliefs	.30	16.86	.0001
Negative beliefs	.37	4.10	.05
Marijuana-excited IAT scores	.40	7.67	.01
Marijuana word association index scores	.62	66.78	.0001

Figure. Trimmed regression model for marijuana use (adapted from Ames et al., 2007). R^2 are from hierarchical models in which preceding effects were entered first; Fs are from a simultaneous model; Model, F(4, 116) = 46.64, p = .0001. IAT = Implicit Association Test. Click image to enlarge.

Limitations

- All participants completed the assessments in the same order, so it is possible that an order effect limited the integrity of the data, that is, certain measures might have contaminated other measures.
- Because the study was correlational, it is unclear whether these implicit cognitions contribute to future risky behavior or simply reflect the mindset of individuals who already engage in these behaviors. Future longitudinal research would be in a better position to address this question.

Discussion

Implicit measures added to the prediction of self-reported marijuana use among this at-risk adolescent sample after controlling for known self-reported correlates of drug use. If future work indicates that these implicit measures are significant contributors to future drug use behavior after controlling for other known predictors, clinicians might wish to supplement their screening and assessment tools by incorporating these measures.

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What do you think? Please use the comment link below to provide feedback on this article.

References

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