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Effects of Motivational Interviewing for Incarcerated Adolescents on Driving Under the Influence after Release

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Abstract

Motivational Interviewing (MI) to reduce alcohol and marijuana-related driving events among incarcerated adolescents was evaluated. Adolescents were randomly assigned to receive MI or Relaxation Training. Follow-up assessment showed that, as compared to RT, adolescents who received MI had lower rates of drinking and driving, and being a passenger in a car with someone who had been drinking. Effects were moderated by levels of depression. At low levels of depression, MI evidenced lower rates of these behaviors; at high levels of depression, effects for MI and RT were equivalent. Similar patterns were found for marijuana-related risky driving, but effects were non-significant.

The risk for motor vehicle crashes (MVCs) is higher for 16–19 year olds than any other age group.¹ From 1992 to 2002 driver fatalities for 15–20 year-olds increased by 21%.² The estimated impact of police reported MVCs in 15–20 year-olds in 2002 was \$40.8 billion.²

One risk factor for dangerous driving is alcohol and other substance use.³ As compared to older drivers, any level of alcohol use increases sharply the risk of a fatal MVC for adolescents.⁴ In North America, nearly a third of adolescents have ridden with a driver who had been drinking.^{5,6} Although there has been less research on the effects of marijuana on adolescent driving, evidence indicates that this drug also greatly impairs driving performance for adolescents.⁷ Marijuana produces deficits in ability to track vehicles, speed adjustment, and breaking.^{8,9} According to the U.S. Department of Health and Human Services, an important public health objective is to reduce death and injury caused by alcohol and drug-related MVC, and the proportion of adolescents who ride with a driver who has been drinking alcohol.¹⁰

For adolescents, factors associated with driving while under the influence of marijuana or alcohol (DUI) include truancy, illicit drug use, number of evenings out per week, tolerance for deviance, poor school performance, and comparatively low involvement in prosocial activities.^{6,11–13} Emotional states (such as anger, depression) and thrill seeking also predict hazardous

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driving in young drivers,^{14,15} as do low parental monitoring and family connectedness.¹⁶ These factors describe many of the characteristics found in incarcerated adolescents, and it is therefore important to target interventions to this population in order to reduce DUI. Rates of alcohol and marijuana use disorder among detainees are approximately 26.1% and 43.3%, respectively, and similarly, these adolescents show relatively high rates of depression or dysthymia (29.6%).¹⁷

In contrast to adult treatment, relatively little work has been directed toward adolescent substance abuse and reducing associated risky behaviors. Similarly, much of the work that has found some success has focused on school-based prevention, and therefore does not include school dropouts. In one published treatment study on older adolescents in the Emergency Department (ED), investigators found that adolescents randomly assigned to Motivational Interviewing (MI) following an alcohol-related event had significantly lower incidence of drinking and driving, and traffic violations as compared to those randomly assigned to standard care (SC).¹⁸ In a subsequent study,¹⁹ these investigators found that younger adolescent (13–17 years old) problem-drinkers assigned to MI reduced alcohol use at follow-up. In another study of adolescents found in the ED, as compared to standard care, brief behavior change counseling increased both seatbelt and bicycle helmet use at follow-up, but no other differences between groups were found on other target behaviors (drinking and driving, riding with an impaired driver, binge drinking, carrying a weapon).²⁰ Tapert et al. studied effects of depressed mood and gender on treatment response in adolescents found in the ED.²¹ No main effects for treatment were presented; however, depressed mood predicted less drinking in younger adolescent girls and more drinking in younger adolescent boys at follow-up. Depressed mood did not moderate the relation between treatment and outcome.

MI decreases substance-related negative consequences, reduces substance use, and increases treatment engagement, with results particularly strong for those with heavier substance use patterns and/or less motivation to change.²² Masterman and Kelly²³ indicate that MI may be particularly well-suited to adolescents given their sensitivity and resistance to adult attempts to control or direct their behavior²⁴—features not uncommonly found among delinquent adolescents.

MI²⁵ is ideally suited for correctional settings in that it is brief, can be used as a prelude to other treatments,^{26,27} and has also been found effective as a stand-alone treatment for substance abuse (see^{18,28,29}). MI is well suited for settings with few resources and for persons who may be high in anger or hostility.^{30,31} As many as 40% of juveniles show significant anger when initially detained.³²

Newly incarcerated adolescents may be particularly receptive to intervention because of the recency of being incarcerated, and their emotional state. These factors may assist a therapist in eliciting ambivalence about risky behaviors associated with delinquency and incarceration, including DUI. Some adolescents may be particularly dysphoric and will respond overwhelmingly to a treatment focused on motivation. On the other hand, being very depressed may impede the ability to attend to intervention or mobilize resources. The purpose of this study was to explore the impact of depressed mood on treatment to reduce DUI and being a passenger with a driver under the influence (PUI) in substance using incarcerated adolescents.

METHOD

Participants

The sample was recruited at a state juvenile correctional facility in the Northeast. Immediately after adjudication adolescents were identified as potential candidates for the study if they were between the ages of 14–19 years (inclusive) and were sentenced to the facility for between 4–

12 months (inclusive). Consent was obtained from legal guardians and assent was obtained from adolescents (adolescents 18 years or older provided consent). Adolescents and guardians provided permission for adolescent participation in a larger treatment outcome study, of which the current study is a part. Guardians and adolescents were informed that all information was confidential, except for plans to escape, hurt self or others, or reports of child abuse.

Adolescents were included in the study if they met any of the following substance use screening criteria: 1) in the year prior to incarceration they 1a) used marijuana or drank regularly (at least monthly), or 1b) they binge-drank (≥ 5 standard drinks for boys; ≥ 4 for girls) at least once; 2) they used marijuana or drank in the 4 weeks before the offense for which they were incarcerated; or 3) they used marijuana or drank in the 4 weeks before they were incarcerated.

All procedures that were utilized received Institutional Review Board approval. Of 125 adolescents approached for the study, all met screening criteria and completed our consent procedure. Of those 125, two adolescents dropped out of the study prior to completing the initial assessment. Of the remaining 123, 105 were re-interviewed at 3-month follow-up; 15 could not be located for follow-up after release from the facility, and three adolescents withdrew from the study prior to completion of the 3-month follow-up.

The sample ($N = 105$) was comprised of the following racial=ethnic background: 27.6% Hispanic, 34.3% African American, 32.4% White, and 5.7% other. Most were boys (89.5%), and average age was 17.06 years (standard deviation = 1.08). In the last year, 61.0% and 84.8% qualified for alcohol and marijuana use disorders, respectively. Over 41% of the sample had been previously incarcerated. Eighty-nine and one-half percent (89.5%) of the sample enrolled in the usual substance use programming offered at the facility (see description below), following our initial treatment at baseline. No significant differences were found between the sample of 105 and the 18 adolescents lost at follow-up on basic demographics except for age. Average age of the group lost at follow-up was 17.62 years, whereas average age of the study sample was 17.06 years (this approximates only about a 6-month difference). Table 1 provides more information on sample characteristics by treatment condition.

PROCEDURES

Facility Program Description

This is the state's sole juvenile correctional facility and charges range from simple truancy to murder. It has been estimated that about 1,000 to 1,200 adolescents per year are detained at the facility, about 500 to 600 adolescents per year are adjudicated to the facility, and annual recidivism is about 35%. Adolescents receive group treatment as well as individualized attention (as indicated) on a variety of topics (sex-offending, drug dealing, reducing crime, developing empathy, preventing violence, anger management, etc.).

Adolescents routinely attend psycho-educational group treatment for substance use/abuse. This is the facility's standard care substance abuse treatment. Enrollment usually begins shortly after adjudication. This treatment, which is native to the facility and administered by facility staff, is designed to provide appropriate counseling and rehabilitative services for residents of the facility. Treatment goals include increased knowledge of negative effects of alcohol, tobacco, and other drugs, and accompanying change in attitude regarding the use of these substances. The program, which meets twice weekly for 8 weeks for 60 minutes per session, includes an education/prevention component that provides youths with information on the effects of alcohol, tobacco and other drugs. The curriculum includes overviews of the physical, psychological, and social consequences of drugs, including HIV risk; defense mechanisms such as denial, and an introduction to AA; over-view of coping skills; and treatment resources that are available after release. Each group has about 10–12 participants at any one time. Groups

are didactic as well as interactive. Video tapes are also used as part of the education process. As needed, groups may focus on conflict resolution, anger management, communication, gang participation, drug dealing, and independent living.

Medical, dental, psychiatric, and psychological care is available to adolescents, and the facility houses its own education department. More in-depth substance abuse services are available as indicated, and Alcoholics Anonymous (AA) is also available on a weekly basis. Community religious organizations also have a relationship with the facility. Limited vocational programming is available for adolescents as are transitional services that include substance use counseling, case management, mentoring and other services.

Assessment

The assessments consisted of 60–90 minute interviews conducted by a trained Bachelor's (BA/BS) or Master's (MA)-level research assistant. Research assistants had about 20 hours of training with two hours of group and one hour of individual supervision per week. In-vivo observations were conducted regularly by a licensed clinical psychologist. All assessment data were reviewed by a licensed clinical psychologist or MA-level project member. Record reviews were completed following completion of the assessments. Assessments occurred at baseline (shortly after adjudication), and at three months after release from the facility. Adolescents received a \$60 gift certificate with \$10 bonus if they completed the interview within one week of the scheduled date.

Study Interventions

Interventions were about 90 minutes at baseline and about 60 minutes at booster. Adolescents were randomly assigned to and received intervention (MI or RT) shortly after the baseline assessment, in order to prepare them for the facility standard care treatment. For both interventions (MI and RT) research counselors had about 56 hours of manualized training with two hours of group and one hour of individual supervision per week. All study intervention files were reviewed by a licensed clinical psychologist or a MA-level project member. Research counselors were 2 men and 2 women; all 4 were Caucasian; 1 had an MA degree and 3 had BA/BS degrees. Each research counselor conducted both intervention types. In vivo observations were conducted by a licensed clinical psychologist to maintain intervention fidelity.

Motivational Interviewing

The research counselors' therapeutic style and protocol were based on the principles of MI,²⁵ with focus on empathy, not arguing, developing discrepancy, self-efficacy, and personal choice. Sections of the MI include developing rapport, exploration of motivation (pros and cons), personalized assessment feedback, imagining the future with and without change, and establishing goals. Handouts are provided (e.g., goals chosen). A large portion of the personalized feedback is devoted specifically to their episodes of DUI and PUI related to alcohol and marijuana.

Relaxation Training

RT, administered by research counselors, is designed to control for the effects of attending individual intervention. Participants are instructed in relaxation and meditation. Adolescents receive feedback in use of the relaxation techniques and they receive hand outs on relaxation. Research counselors maintain rapport, and provide generalized advice to stop risky activities such as DUI and use of alcohol/marijuana.

MEASURES

Record Review

The record review was used to enhance truthfulness of self-reported alcohol/marijuana use and illegal activity. Adolescents were informed at the start of the study that records would be reviewed to verify self-reports. Records contained health and legal information regarding substance use history and charges. Record review was conducted at baseline only.

Background Questionnaire

Socio-demographic information was recorded including age, gender, race, number of years of school completed, and parent/guardian educational level. This questionnaire was administered at baseline.

Structured Clinical Interview for DSM-IV (SCID-I)

This diagnostic interview was developed by First, Gibbon, Spitzer and Williams³³ and is reliable and valid. Modules for alcohol and marijuana abuse and dependence were administered. It was completed at baseline.

Center for Epidemiological Studies-Depression Scale (CES-D)

The Center for Epidemiological Studies Depression Scale³⁴ was administered. Coefficient α s as on the CES-D for alcohol abusers have ranged from .85–.90. The CES-D is reliable and valid for use with adolescents.³⁴ Scores of 16 or greater indicate presence of significant depressive symptomatology.³⁵

Risky Behaviors Questionnaire (RCQ)

This questionnaire inquired regarding a number of risky activities in which the adolescent engaged during the last 12 months before incarceration (the last 3 months since release). Risky behaviors related to DUI and PUI were chosen for analyses: How many times have you driven within an hour after having 1 or more drinks? How many times have you driven within an hour after using marijuana? How many times have you ridden with a driver who had been drinking? How many times have you ridden with a driver who had been using marijuana? These items were based on the work of Monti et al.¹⁸ who utilized items from the Young Adult Drinking and Driving Questionnaire which ask how often respondents drove after various amounts of drinking.³⁶ The original measure is reliable and valid,³⁶ with internal consistency of $\alpha = .89$.¹⁸

MANIPULATION CHECK

O'Leary-Tevyaw and Monti²² detail this fidelity measure. Adolescents complete evaluation forms assessing whether certain core components of the interventions occur. This includes 3 items assessing the therapeutic relationship (perceived rapport, empathy, self-efficacy). Responses for each of the three relationship items are rated on a 1–4 scale (strongly disagree to strongly agree). An average relationship rating is obtained. The relationship items assess core elements of MI, and should be rated more highly in MI than in RT.

Specific elements of each protocol (MI or RT) are assessed, as is the perceived utility of each (0 = topic not introduced to 3 = topic very useful, across ten items). An average usefulness rating is obtained for elements pertaining to MI and for those pertaining to RT. On the MI fidelity form, adolescents in MI rated MI-specific elements as well as elements specific to RT. Therefore, adolescents in MI should rate MI-specific elements of the protocol more highly on the scale than RT-specific elements. On the RT fidelity form, adolescents in RT rated RT-

specific elements as well as elements specific to MI. Therefore, adolescents in RT should rate RT-specific elements of the protocol more highly than MI-specific elements. MI-specific elements include a discussion of likes and dislikes regarding substance use, whereas RT-specific elements include practicing tensing and relaxing muscle groups.

Previously published work³⁷ from this study showed that fidelity procedures indicated: [1] adolescents in MI rated elements of RT as less useful than elements of MI ($t(68) = 19.53, p < .001$); [2] adolescents in RT rated elements of MI as less useful than elements of RT ($t(60) = 23.25, p < .001$); and [3] adolescents rated the therapeutic relationship significantly better (warmth, ease of discussion, instilling hope) in MI than in RT ($t(111) = 2.03, p < .05$).

ANALYSES

DUI and PUI variables were log-transformed so that these data would conform to distributional assumptions. We sought to explore the impact of depressed mood on treatment to reduce DUI and being a passenger with a driver under the influence (PUI).

Repeated measures analyses were not selected as the analytic approach because measures did not cover identical time periods at baseline and follow-up assessments. As a result, analysis of covariance (ANCOVA) was chosen to determine the impact of depressed mood on treatment to reduce DUI and PUI. DVs at 3-month post-release assessment were number of times DUI with marijuana (then separately with alcohol), and number of times PUI with marijuana (then separately with alcohol). For each ANCOVA, the covariate was the corresponding baseline measure of the DV, and the independent variables (IVs) were intervention condition and depressive symptoms. Outcome analyses for main effects and interactions were powered at 0.71 for α set at .05 and effect size in the medium range.^{38,39} See Tables for actual effect sizes for main effects, interactions, and follow-up tests.

RESULTS

No significant differences were found between treatment groups on relevant baseline variables including gender, age, ethnicity=race, depressive symptoms, participation in facility substance use treatment, or mother's education level (a marker for socio-economic status).

Means and standard deviations for covariates at baseline are presented in Table 2. Main effects and the interactions are presented in Table 3. Main effects were found for treatment group for DUI with alcohol (DUI-A). Main effects were found for depressive symptoms for DUI-A and for being a passenger with a driver under the influence of alcohol (PUI-A). The interaction (treatment group by depressive symptoms) was significant for DUI-A, DUI with marijuana (DUI-Mj), and PUI-A.

Table 4 presents follow-up tests for the ANCOVAs. RT is associated with significantly less DUI-A, DUI-Mj, PUI-A, and PUI with marijuana (PUI-Mj) for adolescents high in depressive symptoms as compared to those low in depressive symptoms. On the other hand, for adolescents receiving MI, results in the high and low depressive symptom groups are non-significantly different on all four risky driving dependent variables. Also as can be seen in Table 4, at low levels of depressive symptoms, MI significantly reduces reports of DUI-A and PUI-A after release as compared to RT; however, at high levels of depressive symptoms, results for the two treatments are equivalent across all four risky driving dependent variables.

DISCUSSION

Alcohol and marijuana-involved adolescents who were recruited from a juvenile correctional facility were successfully assessed, received randomized brief intervention (MI or RT), and

were retained at follow-up. Findings clearly demonstrate the acceptability and feasibility of these interventions. There was a significant treatment by depressive symptom interaction found for driving under the influence of alcohol and marijuana (DUI-A, DUI-M), and for being a passenger with someone driving under the influence of alcohol (PUI-A). No such interaction was found for being a passenger with a driver under the influence of marijuana (PUI-Mj), and neither were there main effects for treatment or depressive symptoms on PUI-Mj. RT was associated with reduced risky driving at high depressive symptoms, as compared to low depressive symptoms. No differences were found between the high and low depressive symptom groups for adolescents receiving MI. At high depressive symptoms, no differences were found between treatment groups; however, at low depressive symptoms MI significantly reduced DUI-A and PUI-A. The clinical significance of these findings is of interest: For adolescents low in depressive symptoms early in incarceration, at 3 months after release the MI group showed an 89.1% reduction in DUI-A, and a 74.2% reduction in PUI-A as compared to the RT group. Although similar reductions in DUI-Mj and PUI-MJ were observed, they were non-significant at the .05 p-level.

These findings are similar to those of Monti et al.¹⁸ who found reduced alcohol-related risky behaviors after brief intervention for older adolescents. It may be that a more intensive intervention would also significantly reduce risky driving related to marijuana use. Our findings are encouraging for intervening with substance-using incarcerated adolescents, given the prevalence of alcohol use among incarcerated adolescents.⁴⁰ Given that 61% of the sample qualified for an alcohol use disorder, this suggests that for adolescents low in depressive symptoms early in incarceration, brief intervention followed by standard facility psycho-educational treatment is effective for a wide range of alcohol-involved adolescents.

These findings are different from those of Monti et al.¹⁸ in that we found moderation effects for treatment based on level of depressive symptoms as measured soon after adjudication. It appears that adolescents low in depressive symptoms may be responsive to interventions increasing motivation to alter harmful drinking. This suggests that clinicians working in these settings may wish to consider depressive symptoms during treatment planning. For those adolescents high in depressive symptoms, results are not overwhelming; however, they do suggest that RT may be more suitable for high-depressive adolescents as compared to low-depressive adolescents.

This study is limited by its reliance on self-report methods; however, self-report is one of the most sensitive indicators of substance use. Evidence generally supports accuracy of self-reports.⁴¹ Teens appear to report more misbehaviors than their parents report for them and to self-report more marijuana use than is detected in urinalysis.⁴² Although the study is limited in its relatively brief follow-up period, it is first important to establish an effect of treatment, and then to determine if it can be extended. Future investigations should include longer follow-up periods. In addition, clearly it is necessary to determine far more effective methods of intervening on marijuana-related risky driving in future studies. Consideration may be given to including a skills component to assist in reducing marijuana-related risky driving.

This study was also limited in that we did not have a no-treatment control group; however, we reasoned that it was ethical to provide some individualized attention to each adolescent enrolled in the study. In addition, our measure of depressive symptoms only asks about affect during the past week. High scores may reflect current stressors and long-standing dysphoria. Future studies should consider assessing for lifetime and current major depressive disorder and changes in depression over time that may be related to intervention efforts. This is of critical importance.

Given that this is one of the first randomized trials conducted in a juvenile correctional facility, it will be important to replicate these findings in other facilities. We selected a broad range of alcohol- and marijuana-involved adolescents, who also had diverse criminal histories. Results may vary depending on type of population encountered in other facilities (for example, mostly aggressive offenders with substance dependence). Similarly, replication with larger sample sizes is very important as some sub-group analyses included only about 15 participants.

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TABLE 1

Characteristics of sample by treatment condition

Characteristics	MI %	RT %	MI		RT	
			M	SD	M	SD
White	33.9	30.0	—	—	—	—
Non-White	66.1	69.4	—	—	—	—
Alcohol Use Disorder	59.3	63.0	—	—	—	—
Marijuana Use Disorder	84.7	84.8	—	—	—	—
Age, years	—	—	16.90	1.14	17.27	0.98
Length of stay, days	—	—	195.80	94.33	175.96	71.49
Time between study treatment and release, days	—	—	143.88	91.52	125.30	61.16

Note. % = Percent; MI = Motivational Interviewing condition; RT = Relaxation Training condition; M = Mean; SD = Standard Deviation.

TABLE 2
Means (M) and standard deviations (SD) for covariates at baseline

	MI Depressive Symptoms		RT Depressive Symptoms	
	High (N = 38)	Low (N = 21)	High (N = 30)	Low (N = 15)
DUI-A	M	8.29	1.29	15.87
	SD	33.47	2.78	28.01
DUI-Mj	M	50.97	40.14	51.07
	SD	137.20	102.00	76.84
PUI-A ^a	M	9.97	9.00	22.33
	SD	19.76	22.21	51.10
PUI-Mj	M	44.97	51.81	61.27
	SD	103.13	100.44	66.03

Note. Units are number of times in the last 12 months before incarceration. Data shown are not log transformed. MI = Motivational Interviewing; RT = Relaxation Training; N = number of participants; DUI = driving under the influence; PUI = passenger in a car with someone driving under the influence; A = alcohol; Mj = marijuana.

^aFor the High Depressive Symptom RT group, N = 31 because one adolescent answered this follow-up question and refused the other driving questions.

TABLE 3
Main effects and interaction effects for treatment condition and depressive symptoms on outcomes

	MI Depressive Symptoms		RT Depressive Symptoms		Tx Effects		Depressive Effects		Tx by Depressive Effects	
	High (N = 38)	Low (N = 21)	High (N = 30)	Low (N = 15)	F ^a	Eta ²	F ^a	Eta ²	F ^a	Eta ²
DUI-A										
M	0.37	0.48	0.23	4.40	4.31 ^{**}	.042 ^b	11.29 [‡]	.102 ^c	8.56 [‡]	.080 ^c
SD	1.03	1.57	0.82	7.53						
DUI-Mj										
M	9.21	3.29	2.90	19.27	0.15	.002 ^d	1.58	.016 ^d	4.46 ^{**}	.043 ^b
SD	23.80	7.75	8.13	34.67						
PUI-A ^e										
M	4.11	5.24	1.58	20.73	1.19	.012 ^d	17.85 [‡]	.151 ^f	5.65 ^{**}	.053 ^g
SD	9.86	12.90	2.26	25.44						
PUI-Mj										
M	20.47	17.67	12.87	34.67	0.00	.000	3.81	.037 ^b	2.01	.020 ^d
SD	34.18	26.99	25.65	36.22						

Note. Data shown are not log transformed. MI = Motivational Interviewing; RT = Relaxation Training; Tx = treatment; N = number of participants; M = mean; SD = standard deviation; DUI = driving under the influence; PUI = passenger in a car with someone driving under the influence; A = alcohol; Mj = marijuana.

^a F(1,99).

^b Small-medium effect size (ES; Cohen, 1988).

^c Large-medium ES.

^d Small ES.

^e For the High Depressive Symptom RT group, N = 31 because one adolescent answered this follow-up question and refused the other driving questions.

^f Large ES.

^g Medium ES.

^{**} p ≤ .05.

[‡] p ≤ .005.

[‡] p ≤ .001.

TABLE 4
Follow-up tests comparing treatments within depressive symptom levels, and depressive symptoms within treatments

	DUI-A		DUI-Mj		PUI-A		PUI-Mj	
	F ^a	Eta ²	F ^a	Eta ²	F ^b	Eta ²	F ^d	Eta ²
MI vs. RT at Low Depressive Symptoms	9.28 [†]	.086 ^c	2.35	.023 ^d	4.51 ^{**}	.043 ^e	0.70	.007 ^d
MI vs. RT at High Depressive Symptoms	0.49	.005 ^d	2.15	.021 ^d	1.16	.012 ^d	1.54	.015 ^d
Low vs. High Depressive Symptoms within MI	0.09	.001 ^d	0.43	.004 ^d	2.01	.020 ^d	0.17	.002 ^d
Low vs. High Depressive Symptoms within RT	17.04 [‡]	.147 ^f	4.93 ^{**}	.047 ^g	19.06 [‡]	.160 ^f	4.96 ^{**}	.048 ^g

Note. Data shown are not log transformed. DUI = driving under the influence; PUI = passenger in a car with someone driving under the influence; A = alcohol; Mj = marijuana; MI = Motivational Interviewing; RT = Relaxation Training.

^a $F(1,99)$.

^b $F(1,100)$ because one adolescent answered this follow-up question but refused to answer the others.

^c Large-medium effect size (ES; Cohen, 1988).

^d Small ES.

^e Small-medium ES.

^f Large ES.

^g Medium ES.

** $p < .05$.

[†] $p < .005$.

[‡] $p < .001$.