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Brief Multiple Behavior Health Interventions for Older Adolescents

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Abstract

Purpose—This study examined whether brief intervention strategies, founded on the Behavior-Image Model and addressing positive images of college and career success, could be potentially efficacious in impacting multiple health habits of high risk adolescents transitioning into adulthood.

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1. Manuscript format: Research

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2. Research purpose: Intervention testing/program evaluation

3. Study design: Randomized trial

4. Outcome measure: Behavioral and cognitive

Content focus

5. Setting: School

6. Health focus: Fitness/physical activity, nutrition, smoking control, social health, stress management

7. Strategy: Skill building/behavior change

8. Target population age: Youth

9. Target population circumstances: Education/income level

Design—Participants were stratified by grade level and drug use and individually randomized to one of the three Plan for Success interventions, with baseline and one month post-intervention data collections.

Setting—A large, relatively diverse suburban school in Northeast Florida.

Subjects—A total of 375 11th and 12th grade students participated during the spring semester 2006.

Intervention—Three interventions studied included: 1) Goal Survey, 2) Goal Survey plus Contract, or 3) Goal Survey plus Consult.

Measures—Outcome measures included multiple health risk, health promotion, and personal development behaviors, as well as image and belief measures.

Analysis—Repeated measures MANOVAs and ANOVAs were used to examine intervention effects.

Results—MANOVAs were significant for alcohol use, $F(4,328)=6.33$, $p=.001$, marijuana use, $F(4,317)=3.72$, $p=.01$, exercise, $F(3,299)=4.28$, $p=.01$, college preparation, $F(2,327)=6.26$, $p=.001$, and career preparation, $F(2,329)=6.17$, $p=.001$, with most behaviors improving over time, while group by time interaction effects were found for nutrition habits, $F(6,652)=2.60$, $p=.02$, and career preparation, $F(4,658)=3.26$, $p=.01$, favoring the consultation.

Conclusion—Brief interventions founded on the Behavior-Image Model may have potential to improve selected health and personal development habits among older adolescents.

Keywords

Brief Intervention; Multiple Health Behaviors; Emerging Adulthood; Positive Youth Development; Image; Behavior-Image Model

Purpose

Recent investigations suggest that brief interventions based upon the Behavior-Image Model (BIM)¹ can impact multiple health habits of adolescents.^{2,3} The BIM is a planning model supported by Prospect Theory and literature on message framing⁴, hypothesizing that health risk and health promoting behaviors can be coupled and simultaneously influenced through the portrayal of salient self-images. Earlier studies examining interventions based upon the Behavior-Image Model emphasized fitness-related behaviors and images.^{2,3} The current study examined the potential efficacy of new multiple behavior health interventions, based upon the BIM and addressing images of college and career success, for impacting multiple health habits of older adolescents.

Methods

Design

After obtaining written parental consent and youth assent to participate in the study, and collecting baseline data, participants were stratified by grade level (11th or 12th) and drug use status (yes/no on cigarette smoking and/or marijuana use) and individually randomized to one of the three interventions: 1) Goal Survey, 2) Goal Survey plus Contract, or 3) Goal Survey plus Consult. Baseline and one month post-intervention data were collected at the target school using identical procedures. The University's Institutional Review Board approved the research protocol prior to implementing the study.

Sample

A total of 387 11th and 12th grade students attending a large, relatively diverse suburban school in Northeast Florida participated in evaluating the Plan for Success health promotion program during the spring semester 2006. Priority was given to recruiting students in 12th grade classes, using formal presentations regarding study aims, procedures, benefits, and risks. Of those adolescents recruited into the study, 97% (n=375) participated in the baseline data collection, with nine students absent and three transferring to other schools during baseline data collection. Most participants were in the 12th grade (86%), with an average age of 17 years old (SD = 0.69). The majority was female (57%). Most students were Caucasian (49%), followed by African American (23%) and Hispanic youth (6%). Over four in ten participants (44%) drank alcohol in the past 30 days, while 18% used marijuana and 17% smoked cigarettes in the past 30 days. In addition, 28% participated in no strenuous or moderate exercise in the past 7 days, and 69% ate four or less servings of fruits in vegetables during the same period.

Intervention

The content for all three interventions was based on the Behavior-Image Model (BIM).¹ This content consisted primarily of printed text and scripted messages which attempted to elicit an image of successful young adults as those individuals engaged in personal development and health promoting habits (e.g., planning for college and exercising), while avoiding health risk habits (e.g., using alcohol and smoking cigarettes). In addition, messages attempted to show the benefits of being successful in terms of enhanced self-image (e.g., confident and happy). All interventions were administered during regular school hours in a space reserved for the study.

One group received the Plan for Success Goal Clarification Survey (Goal Survey), a self-administered instrument read by participants and asking them to identify behaviors that would improve their future chances of being successful, as well as those that would interfere, along with improvements in the way they would view themselves or others might see them resulting from becoming a more successful young adult. A second group received the Goal Survey plus a Path to Success Goal Plan (Contract). The Contract was designed to assist participants in selecting self-concordant goals they felt lead to a more successful and happy life, which have been found to facilitate behavioral change.^{5,6} A third group received the Goal Survey plus a Career Consultation (Consult) which was designed to provide image-based feedback tailored to targeted personal development and health behaviors. For example, for students planning to go to college after high school, they received the message: "Being a college-bound young adult is a sure way to enhance your potential to be successful. College graduates report being happier and less worried about the future, and college can lead to being smarter and more confident." Both the Contract and the Consult took approximately 20 minutes to implement, and were administered by trained Personal Success Coaches using standardized, scripted protocols.

Measures

The Personal Development and Health Survey⁷ was used to collect data on multiple behavior measures including risk behaviors such as alcohol, cigarette, and marijuana consumption (four items each), health promotion behaviors including eating habits (three items), exercise (three items), and stress management, personal development behaviors including college and career preparation (two items each), and health quality of life (two items). In addition, various belief and image-related measures associated with the Behavior-Image Model¹ were assessed, including self-image scales, behavior coupling beliefs (i.e., drinking alcohol interferes with other health behaviors, college/career improves other health behaviors), perceived peer prevalence, and frequency of future comparisons (i.e., comparing present accomplishments with future goals). All measures in this instrument were adopted from previous research and were pilot tested on a sample of high school adolescents to ensure a psychometrically sound

and highly readable instrument for participating adolescents. Alpha coefficients for scaled measures ranged from a high of .91 for perceived peer prevalence (college/career) to a low of .72 for the partier self-image.

Analysis

Repeated measures MANOVAs and ANOVAs were used to examine the primary research question of intervention effects over time on behavior measures, followed by a secondary analysis of intervention effects on image and belief outcomes. MANOVAs were selected when appropriate to more efficiently address the number of dependent measures targeted in the interventions, maximizing group differences and controlling for Type 1 error from performing multiple individual tests. Factorial repeated measures MANOVAs were used to examine interaction effects of baseline drug use (past 30-day cigarette or marijuana use) by treatment group on behavior measures.

Results

Baseline and Attrition Analyses

No significant differences were found at baseline on any demographic or health behavior measure across group. A total of 359 participants received one of the three interventions, of which 93% (n=335) were successfully followed up at post-intervention, with no significant differences in attrition across groups ($p>.05$).

Outcome Analysis

Table 1 shows overall repeated measures MANOVAs were significant for alcohol use, marijuana use, exercise, college preparation, and career preparation ($p's \leq .01$), with most behaviors improving over time. In addition, overall group by time interaction effects were found for nutrition habits, and career preparation, ($p's < .05$). No significant group by drug use by time interactions were found on any of the health behavior measures.

Univariate analyses on health behaviors showed decreases across time on intentions to drink alcohol in the next six months, and length of time one has been drinking alcohol, and parallel reductions on intentions to use marijuana in the next six months, and length of time one has been using marijuana, ($p's \leq .05$). Moderate exercise increased in the past 7 days, while the number of days in which mental health was not good decreased for all groups, ($p's < .05$). In addition, there were treatment by time interaction increases in the servings of fruits and vegetables eaten in the last 7 days, and number of times good carbohydrates such as whole grain foods were eaten in the last 7 days ($p's < .05$), for adolescents receiving the consultation. Likewise, treatment by time interaction increases in the number of times good fats such as nuts, olive oil, or fish was eaten in the last 7 days was seen for participants assigned to the consultation and the goal survey only groups, ($p < .05$).

Univariate analyses on personal development behaviors showed increases in the length of time one has been taking steps to go to college, for all groups, and treatment by time interaction increases in length of time one has been taking steps to get a good career/job for adolescents in the consultation and the goal survey groups, ($p's < .05$). At the same time, there was a decrease in intentions to have a good career/job someday soon, particularly for those receiving the consultation and the contract, ($p = .05$).

Table 2 shows three self-image scales were found to differ significantly by group or time. Self-image of being responsible and motivated increased for adolescents receiving the consultation, while one's image as trendy and cool increased for those adolescents receiving the consultation and the goal survey only, ($p's < .05$). In addition, self-image as a drug user increased for

adolescents receiving the contract and the goal survey, but remained constant for those receiving the consultation, ($p=.05$). There was an increase in the alcohol health behavior coupling belief that drinking too much alcohol interferes with other health habits for all groups, and an increase in the behavior coupling belief that going to college or getting a good job/career improves other health habits, particularly among those receiving the consultation, ($p's=.001$). Perceived peer prevalence of friends using drugs decreased for all groups, ($p=.001$). In addition, making temporal comparisons of ones' accomplishments increased across all groups, ($p<.05$).

Discussion

Summary

This study suggests that brief interventions founded on the Behavior-Image Model may have affected a number of behavior and image-related measures among participating adolescents. Of the interventions examined, the tailored consultation accounted for the majority of the differential outcomes, particularly those on healthy eating habits and modifying self-images and health behavior couplings underpinning the Behavior-Image Model.¹ The consultation therefore appears to have added value above and beyond the brief goal survey alone, and the goal survey plus contract strategy. While research is needed to compare various formats for providing brief intervention targeting multiple behaviors, early research suggests that in-person consultations may produce greater outcomes^{2,3} than print mediated approaches.⁸

This study provides partial support for the Behavior-Image Model (BIM)¹ which posits that salient goal images may be used to link seemingly divergent health and personal development habits. Specifically, results indicated that there was an increase in the coupling of excessive drinking (interfering) with other health habits across treatments, and an increase in the coupling belief that going to college or getting a good job/career improves other health habits for those receiving the consultation. Increased frequency of making temporal comparisons of one's present accomplishments with future goals suggests that the interventions generated prospective self-comparisons, whereas decreased perceived peer prevalence of friends' drug use likely reflects a social comparison process with peer prototypes.

Limitations

This investigation was restricted to a one-month post-intervention follow-up. Given this was a preliminary trial, further research is needed better understand the full range and sustainability of effects resulting from these brief multiple behavior health interventions. This study did not include a non-treatment control, which prevents drawing definitive conclusions regarding the efficacy of the interventions. Testing effects can not be ruled out in this study. In addition, length of time measures are difficult to interpret given the brief follow-up period. Finally, the study was limited to one suburban school in the southeast. While the sample was relatively diverse, caution should be used in generalizing these results to other high school student populations.

Significance

Given that a recent report cites that as many as two-thirds of America's youth are not equipped to succeed in adulthood,⁹ interventions linking personal success and health promotion have considerable implications for increasing positive youth development. Furthermore, the Behavior-Image Model provides a much needed framework with practical connotation for planning programs that could address the epidemiologic reality of multiple health risks among youth and adults.

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Table 1

Estimated marginal means of health and personal development behavior measures by group and time

Measures	Goal Survey (n = 113)						Goal survey + Contract (n = 113)						Goal survey + Consult (n = 109)					
	Pretest			Posttest			Pretest			Posttest			Pretest			Posttest		
	M	SE	M	SE	M	SE	M	SE	M	SE	M	SE	M	SE	M	SE	M	SE
Alcohol	$F = 6.33; df = 4, 328; p = .001$																	
Intention to use alcohol ^b	2.49	.10	2.28	.10	2.46	.10	2.27	.10	2.44	.11	2.24	.10						
Length of alcohol use ^c	2.67	.18	2.69	.17	2.77	.18	2.47	.17	2.72	.18	2.61	.18						
30-day alcohol frequency ^d	2.03	.12	1.91	.11	1.82	.12	1.74	.11	1.85	.12	1.81	.12						
30-day alcohol quantity ^e	3.30	.33	3.27	.34	3.20	.33	3.32	.34	3.39	.33	3.42	.34						
Cigarettes	$F = 2.09; df = 4, 323; p = .08$																	
Intention to smoke ^b	1.45	.01	1.44	.08	1.50	.09	1.51	.08	1.48	.09	1.37	.08						
Length of cigarettes use ^c	1.52	.12	1.42	.12	1.48	.12	1.60	.12	1.48	.12	1.44	.12						
30-day cigarettes frequency ^d	1.71	.17	1.58	.16	1.72	.17	1.76	.15	1.63	.17	1.50	.16						
30-day cigarettes quantity ^f	1.39	.08	1.32	.09	1.34	.08	1.44	.09	1.30	.08	1.32	.09						
Marijuana	$F = 3.72; df = 4, 317; p = .01$																	
Intention to use marijuana ^b	1.60	.09	1.51	.09	1.46	.09	1.45	.09	1.55	.09	1.45	.09						
Length of marijuana use ^c	1.88	.14	1.79	.13	1.50	.14	1.37	.13	1.93	.15	1.80	.14						
30-day marijuana frequency ^d	1.60	.13	1.67	.14	1.37	.13	1.43	.14	1.56	.13	1.64	.14						
30-day marijuana quantity ^g	1.63	.14	1.75	.15	1.38	.14	1.45	.15	1.68	.15	1.61	.15						
Nutrition ^h	$F = 2.60; df = 6, 652; p = .02^a$																	
Fruits/vegetables	4.76	.22	4.45	.22	4.73	.22	4.24	.22	4.36	.23	4.66	.22						
Good carbohydrates	5.54	.23	5.06	.23	5.85	.23	5.08	.23	4.95	.24	5.22	.23						
Good fats	4.15	.23	4.35	.23	4.84	.23	4.32	.23	4.39	.23	4.68	.23						
Exercise	$F = 4.38; df = 3, 299; p = .01$																	
7-day average of strenuous exercise [*]	2.51	.25	2.34	.26	2.48	.26	2.38	.26	2.88	.25	3.07	.26						
7-day average of moderate exercise [*]	3.02	.33	3.65	.29	2.86	.33	3.11	.29	2.96	.32	3.81	.28						

Note.

1 = Definitely not, 2 = Probably not, 3 = Probably will, 4 = Definitely will

1 = Do not use or take steps, 2 = 30 days or less, 3 = More than 30 days, but less than 6 months, 4 = More than 6 months, but less than 1 year, 5 = 1 year or more

1 = 0 days, 2 = 1–2 days, 3 = 3–5 days, 4 = 6–9 days, 5 = 10–19 days, 6 = 20–29 days, 7 = All 30 days

1 = Do not drink, 2 = 1 drink, 3 = 2 drinks, 4 = 3 drinks, 5 = 4 drinks, 6 = 5 drinks, 7 = 6 drinks, 8 = 7 drinks, 9 = 8 drinks, 10 = 9 drinks, 11 = 10 drinks, 12 = 11 or more drinks

1 = Do not smoke, 2 = Less than 1 cigarettes per day, 3 = 1-5 cigarettes per day, 4 = 6-10 cigarettes per day, 5 = 11-15 cigarettes per day, 6 = 16-24 cigarettes per day, 7 = more than 24 cigarettes per day

7 = 0 times, 2 = 1–2 times, 3 = 3–5 times, 4 = 6–9 times, 5 = 10–19 times, 6 = 20–29 times, 7 = 30–39 times, 8 = 40 or more times

1 = 0 servings, 2 = 1 serving, 3 = 2 servings, 4 = 3 servings, 5 = 4 servings, 6 = 5 servings, 7 = 6 servings, 8 = 7 servings, 9 = 8 servings, 10 = 9 or more servings

* Higher score = Lower risk

Table 2

Estimated marginal means of image and belief measures by group and time

Measures	Goal Survey (n = 113)						Goal survey + Contract (n = 113)						Goal survey + Consult (n = 109)					
	Pretest			Posttest			Pretest			Posttest			Pretest			Posttest		
	M	SE	M	SE	M	SE	M	SE	M	SE	M	SE	M	SE	M	SE	M	SE
Self image ^b																		
Responsible & Motivated	1.37	.03	1.38	.03	1.33	.03	1.33	.03	1.35	.03	1.39	.03	1.31	.03	1.35	.04 ^a		
Physically Fit & Healthy	1.79	.05	1.82	.06	1.75	.05	1.75	.05	1.76	.06	1.78	.05	1.72	.06		.70		
Trendy & Cool	1.86	.04	1.82	.05	1.81	.04	1.81	.04	1.86	.05	1.82	.04	1.75	.05		.36; .03 ^a		
Drug Using	2.80	.04	2.73	.05	2.80	.04	2.80	.04	2.74	.05	2.78	.04	2.78	.05		.05		
Partier	2.29	.06	2.30	.06	2.23	.06	2.23	.06	2.19	.06	2.33	.06	2.33	.06		.71		
Alcohol interferes with other behaviors ^c	1.79	.09	1.52	.08	1.80	.09	1.80	.09	1.73	.08	1.82	.09	1.53	.08		.001		
College or good career/job improves other behaviors ^c	1.82	.08	1.80	.09	1.84	.09	1.84	.09	2.12	.09	2.03	.09	1.84	.09		.68; .001 ^a		
Perceived peer prevalence (drug) ^d	2.43	.09	2.40	.08	2.56	.09	2.56	.09	2.35	.08	2.30	.09	2.16	.08		.001		
Perceived peer prevalence (college/career) ^d	3.76	.09	3.71	.09	3.65	.09	3.65	.09	3.61	.09	3.75	.09	3.77	.09		.69		
Accomplishment comparison with future ^e	2.61	.12	2.48	.12	2.61	.12	2.61	.12	2.27	.12	2.57	.12	2.51	.12		.02		

Note.

^a *p* value's = Time × Group Interaction

^b 1 = Yes, 2 = Somewhat, 3 = No

^c 1 = Yes, 2 = Maybe Yes, 3 = Maybe No, 4 = No

^d 1 = None, 2 = A few, 3 = Some, 4 = Most, 5 = All

^e 1 = Always, 2 = Most of the time, 3 = Often, 4 = Sometimes, 5 = Rarely, 6 = Never