Interpersonal communication outcomes of a media literacy alcohol prevention curriculum

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Abstract

Media literacy intervention efficacy literature has focused on media-relevant (e.g., knowledge and realism) and behavior-relevant outcomes (e.g., attitudes and behaviors), without much attention paid to interpersonal communication outcomes. This project examined interpersonal communication after participation in two versions (analysis plus analysis and analysis plus planning) of the *Youth Message Development (YMD)* intervention, a brief media literacy curriculum targeted at preventing high school student alcohol use. Participants attended a 75-mins media literacy *YMD* workshop and completed a delayed posttest questionnaire 3 to 4 months later. Overall, 68 % participants replied affirmatively to interpersonal communication about the *YMD* intervention. Communication about the workshop moderated the effects of the type of workshop (analysis plus analysis or analysis plus planning) on self-efficacy to counter-argue (but not critical thinking). Interpersonal communication moderated the effects of the *YMD* intervention on self-efficacy to counter-argue, thereby signaling the importance of including interpersonal communication behaviors in intervention evaluation.

Keywords

Alcohol prevention, Evaluation, Interpersonal communication, Media literacy

Alcohol use, particularly underage alcohol consumption (use by those under the minimum legal drinking age of 21), is a major public health problem [1]. Rates of youth alcohol use in the USA exceed rates of youth tobacco or drug use [2] and remain high despite the adverse physical, social, legal, and emotional consequences including approximately 4700 deaths [3], physical and sexual assaults, higher risk for suicide and homicide, increased risk for illicit drug abuse, and higher risk of involvement in alcohol-related car crashes [4, 5].

The 2011 Youth Risk Behavior Survey revealed that 39 % of high school students report alcohol consumption and 22 % report binge drinking in the last 30 days [6]. Recent reports from the 2012 Monitoring the Future study clearly document that although alcohol use among adolescents dropped significantly in the last 5 years, they still use at unacceptably high levels. For instance, 3.6 % of 8th graders, 14.5 % of 10th graders, and 28.1 % of 12th graders in 2012 reported getting drunk in the past month [7]. These statistics suggest a need for novel efforts to prevent underage drinking and encourage healthier decisions regarding alcohol use. Thus, it is imperative to develop and deliver interventions that prevent alcohol use.

Intervention approaches to prevent underage drinking utilize two primary avenues for change: efforts to change the adolescent and efforts to change the adolescent's environment [2]. Intervention approaches to change adolescent behaviors include provision of knowledge, skills, and/or motivation to change adolescent beliefs, attitudes, norms, and intentions. On the other hand, intervention approaches to change the adolescent's environment seek to reduce opportunities for underage drinking by enforcing legislation for minimum age requirements for drinking, raising the price of alcohol, and enacting zero-tolerance laws for drinking and driving. As well, some interventions highlight the role of family and school to both change behaviors and reduce community tolerance for underage drinking [8]. Prevention efforts for adolescents largely target the school setting, with community-based organizations mostly untapped for primary prevention or efforts to reinforce school-

Implications

Practice: Researchers planning, implementing, and evaluating health intervention/campaign effects should include measurement of the frequency of interpersonal communication by including different targets and content of communication.

Policy: Public health campaigns/interventions should encourage interpersonal communication about the campaigns/interventions to allow for social proliferation of the key messages.

Research: Researchers should not only include interpersonal communication outcomes in evaluating health intervention/campaign effects, but also investigate the mediating and moderating roles of interpersonal communication outcomes.

based activities. Intervention effects are bolstered when the community is engaged as a whole and social networks encourage safe health behaviors [9].

Many existing interventions utilize social influence models [10, 11], with critical thinking and media-based interventions needed to expand the repertoire of prevention strategies. Critical thinking skills aid in providing youth with an active lens that allows for processing of media images thereby limiting the relationship between media exposure and subsequent substance use behaviors [12, 13]. One such strategy endorsed by the White House Office of Drug Control Policy [14] and the American Academy of Pediatrics [15] is media literacy.

MEDIA LITERACY

Although many definitions and conceptualizations exist, the most commonly used definition characterizes media literacy as the learned ability to access, analyze, evaluate, and communicate messages in a variety of different forms [16]. Embracing this definition, Rogow [17] detailed, "At its best, media literacy education is nonpartisan and includes production (i.e., the ability to "write") as well as analysis (the ability to "read")" (p. 32).

Media literacy differs from many other prevention strategies because it advocates critical analysis of various kinds of mass media messages to develop critical thinking skills that allow students to examine messages and resist proalcohol messages and pressure [18–21]. Related intervention components include discussing persuasive media strategies, analyzing sample messages, and sometimes planning and/or producing messages to help adolescents become more aware of the nature of messages and teach them to be more adept at identifying motives and purposes [18, 22, 23]. These activities enhance critical thinking and decision making skills to empower youth in order to make them less vulnerable to persuasive messages. The effects are posited to extend beyond comprehension of media, generalizing to influence processes across situations, topics, and messages [24, 25].

Whereas a few media literacy curricula were developed and delivered in the 1980s and 1990s [26–28], the last decade has seen a proliferation of media literacy curricula focusing on different topics such as smoking prevention [29–34], adolescent drinking prevention [20, 35], alcohol and tobacco prevention combined [22], violence prevention [25, 36, 37], body image [38, 39], and advertising awareness [40].

EFFICACY OF MEDIA LITERACY CURRICULA/ INTERVENTIONS

Recent examinations of the efficacy of media literacy programs include two systematic reviews [41, 42] and a meta-analytic review [24]. The meta-analytic review concluded that media literacy interventions are generally effective (d=.37) for reducing potentially harmful effects of media messages. Although the meta-analysis demonstrates the promise of media literacy, the two systematic reviews describe mixed results, with some programs reporting significant desired effects while others demonstrate more mixed effects. For instance, Banerjee and Greene's [30, 31] tobacco prevention media literacy intervention was effective in reducing positive attitudes toward smoking and behavioral intention to smoke. However, a different anti-alcohol media literacy workshop (single session, 45-min duration) with middle school students showed mixed results with significant changes observed for social expectancies about the perceived benefits of drinking, but no significant changes for the perceived realism of general advertisements, realism of alcohol ads, or perceived desirability of alcohol advertising [43].

Published research on media literacy shows tremendous variability in intervention methods, methodological precision, and outcome measurement [42]. The Jeong et al. [24] meta-analysis categorized outcomes into two categories: media-relevant outcomes (e.g., knowledge and realism) and behavior-relevant outcomes (e.g., attitudes and behaviors). Interpersonal communication as one set of moderating factors was not discussed in these reviews and forms the focus of current research.

INTERPERSONAL COMMUNICATION OUTCOMES

In the context of media literacy interventions, interpersonal communication outcomes focus on communication (or talk) about the intervention between intervention participants and other individuals. These communications could include discussions about specific parts of the intervention, lessons learned from participation in the intervention, or on the salience of the issue topic (e.g., youth alcohol use and drug use). Southwell and Yzer [44] discuss the importance of interpersonal communication outcomes in the context of media campaigns and propose that

> Included are the possibilities that interpersonal interaction might spread inoculation…that campaign message form might prompt people to talk, that conversation might be a cruciallink between campaign efforts and key political outcomes. (p. 1).

Intervention developers may target interpersonal communication outcomes as indicators that the intervention stimulated deliberate conversations, influenced social norms via social networks [45–47], facilitated exposure to a key intervention or campaign message [48], and promoted diffusion of relevant information in peer groups by facilitating transfer of learning [49]. In fact, Rogers and Storey [50] proposed that successful campaigns induce interpersonal communication about the campaign topic, which further influences behavioral outcomes. In contrast to deliberate outcomes, interpersonal communication outcomes may also be unintended and may strengthen anticampaign attitudes within social networks and increase resistance to persuasion attempts, or induce talk that is contrary to the intended

message and increase biased processing of intervention or campaign materials [49, 51].

In addition to the potential of reflecting both positive and negative outcomes, interpersonal communication after participation in an intervention may serve two roles: as a mediator or moderator of intervention effects [49]. The mediator model suggests that interpersonal talk after intervention participation may be a direct effect of intervention participation and subsequently influence social norms and strengthen attitudes, further leading to behavior change. Talk with others about the intervention may lead to discovery of normative support for intervention-relevant behaviors [46, 48]. For instance, an intervention participant may discuss the harmful effects of cigarettes with others who did not participate and learn that peers also hold congruent attitudes about not smoking, thereby strengthening nonsmoking behavior.

The moderator model, on the other hand, suggests that post-intervention talk could facilitate or hamper intervention effects [52, 53]. Talking about an intervention after participation may strengthen or amplify one's memory for the content and reinforce health behavior maintenance or enhance the likelihood of behavior change. For instance, an intervention participant who engages in interpersonal talk about the harmful effects of cigarettes may remember the intervention message longer and better apply the skills taught in the intervention to refuse offers to smoke. In contrast, an intervention participant who does not engage in talk about the intervention may forget the intervention messages and revert back to initial unhealthy behaviors when encountering in a situation that promotes drinking. Here, we focus on the moderating effects of interpersonal communication.

Therefore, it becomes essential not only to measure media-relevant outcomes (e.g., knowledge and realism) and behavior-relevant outcomes (e.g., attitudes and behaviors) of a media literacy intervention, but also to include measures of interpersonal communication about the intervention in evaluations to assess social proliferation [54, 55]. This article presents interpersonal communication as a moderator of a media literacy curriculum [*Youth Message Development (YMD)*] targeted at preventing high school student alcohol use. Given the importance of the context in which the interpersonal communication occurs, our operationalization of interpersonal communication moves beyond measuring whether interpersonal communication occurred. Our measures of interpersonal communication characterize both the targets of conversation and the content of conversation. Therefore:

RQ1: Do participants talk about the *YMD* curriculum to nonparticipants?

RQ2: For participants who talked with others about *YMD*:

RQ2a: Who are the most frequent targets of communication about the *YMD* curriculum?

RQ2b: What different topics did they discuss?

YMD CURRICULUM

The *YMD* curriculum was developed to compare the efficacy of two strategies of media literacy training, analysis and planning, which have been utilized jointly in the creation of most media literacy curricula [26, 32, 34]. The theoretical foundations for the *YMD* curriculum suggest that these components (i.e., analysis and planing) should have differential effects. Whereas analysis strategy focuses on traditional prevention-based activities that include lectures and discussion of media messages, message planning strategy is a more novel and creative approach (through arousal and involvement) because students are encouraged to create their own messages [56]. Analysis strategy refers to critical examination of media messages through rigorous understanding of key concepts of media literacy, for example target audience, advertising claims, and motives for advertising. The analysis piece is essential for having adolescents acquire necessary critical thinking skills and tools they need to resist influence. However, this component does not provide motivation to do so. The planning piece, designed to address this deficiency, activates the necessary underlying concepts of media literacy through engaging students in planning anti risk health messages.

Prevention science has called repeatedly for examination of program components such as analysis and planning. However, only preliminary research by the research team [30, 31] has tested message analysis plus analysis versus analysis plus planning strategies for changing substance use expectancies, norms, intentions, and behaviors. In the initial preliminary study, Banerjee and Greene [30, 31] developed a brief, 2-lesson, inoculation-based media literacy smoking curriculum and assessed it in two middle schools with classrooms randomly assigned to condition (analysis plus analysis, analysis plus planning, or control). Compared to those in the analysis plus analysis workshop or control, participants in the analysis plus planning workshop reported negative anti-smoking attitudes and lower behavioral intentions to smoke. When compared to the control, participants in the analysis plus analysis workshop also reported less favorable smoking attitudes and intentions. This media literacy intervention formed the basis for the current study and *YMD* curriculum. Clearly, further testing is needed before these theoretical claims are accepted. Additional details describing theoretical foundations for the *YMD* curriculum [56] and formative research leading to the development of the *YMD* curriculum [57] are presented elsewhere.

The current study examines the varied efficacy of analysis plus analysis and analysis plus planning strategies and moderating role of interpersonal communication on key intervention outcomes including frequency of critical thinking about advertising and self-efficacy to counter-argue. Given that interpersonal talk may include telling others about group activities, ads seen, and lessons learned, we expect that more talk will reactivate memory about the workshop and facilitate intervention effect outcomes [52, 53]. Therefore, the following hypotheses are forwarded:

H1: Participants in the analysis plus planning group will report higher frequency of critical thinking and higher self-efficacy to counter-argue compared to participants in the analysis plus analysis group.

H2: Among participants who talked with others, participants in the analysis plus planning group will report higher frequency of critical thinking and higher self-efficacy to counter-argue compared to participants in the analysis plus analysis group.

METHODS

Procedure

Participants attended a 75-min media literacy *YMD* workshop in 2011. The *YMD* curriculum consists of two parts. First, leaders use an emphasis on alcohol advertising to introduce media-related terms, describe the reach of advertising, discuss the targeting of advertisements to different audiences, describe the identification of claims in advertising, explain message counterarguments, and cover persuasion techniques along with production components. The curriculum uses examples from recent print advertisements to make connections and emphasize key points. Students complete a small group activity in groups of 4–5, discussing and analyzing current print alcohol ads focusing on the ad's claims, target audience, and the persuasion techniques. Students engage in group discussions through analyzing the ads and exchanging perspectives, and the activity culminates with one person presenting the group ad analysis to the larger group.

The second part of the *YMD* curriculum has two variants: analysis plus analysis and analysis plus planning. In the analysis plus analysis condition, students continue to identify and analyze claims missing from alcohol advertisements (deconstruction skills) and utilize the skills in analyzing an anti-alcohol ad (counter-advertisement). In the analysis plus planning condition, students plan anti-alcohol posters for others their age. Students complete all activities in small groups which include discussions and group tasks. Finally, group leaders in both conditions present their group end-product (analysis of alcohol counter-advertisements or the anti-alcohol poster) to the rest of the group to initiate discussion in a larger group setting. These steps are undertaken during the *YMD* curriculum sessions to encourage interpersonal conversations.

Participants

After removing three participants due to missing data on the relevant items, the final sample included 171 male (*n*=59) and female (*n*=102; 10 students did not report gender) 10th grade high school students (ages 14–17; *M*=15.75, *SD*=.90) from 34 schools across Pennsylvania (representing rural, smaller town, smaller city, suburban, and urban school districts). About 70 % reported their race/ethnicity as White, while others indicated Hispanic/Latino (10 %), Asian American/Pacific Islander (10 %), American Indian/Alaskan Native (4 %), African American (3 %), or some other race/ethnicity (3 %).

Measures

Before participating in the *YMD* curriculum, participants completed a pretest questionnaire (T1). After taking part in the *YMD* curriculum, participants completed a short immediate posttest questionnaire measuring their evaluation of the intervention (T2) and a delayed posttest questionnaire 3 to 4 months later (T3). The analyses below utilize the responses on the delayed posttest (at T3). Measures included communication about the workshop (at T3), frequency of communication (for target and content, at T3), frequency of critical thinking about advertising at T3, and self-efficacy to counter-argue (at T1 and T3).

Communication about the workshop–Communication about the workshop was measured by one item asking "After the *YMD* Institute, did you talk with anyone else about the Media Messages workshop (even a little)?" with answer options as 1 (yes) or 0 (no). Of those eligible to complete the item (e.g., completed delayed posttest and not in control group, *n*=120), 68 % (*n*=81) participants replied affirmatively while 32 % (*n*=39) replied that they had not talked to anyone about the workshop. Participants who replied "yes" to this question further completed the next three communication questions that follow.

Frequency of communication–*targets*–Frequency of communication about the *YMD* workshop with others was measured by five Likert-type items developed by the authors with responses ranging from 1 (never) to 5 (very often). Sample targets of communication include friends, teachers, and other adults in the family. Items were averaged to form a scale with higher scores indicating greater frequency of communication with others. The scale demonstrated good reliability (Cronbach's α=.88, M=2.42, SD=.93).

Frequency of communication–*content*–Frequency of communication about the *YMD* workshop content was measured by five Likert-type items developed by the authors with responses ranging from 1 (never) to 5 (very often). The participants responded about the kinds of things they discussed with others regarding the workshop. Sample content items included the ads viewed during the workshop, what participants learned about persuasion techniques, and what participants learned about alcohol advertising during the workshop. Items were averaged to form a scale with higher scores indicating greater frequency of content communication. The scale demonstrated good reliability (Cronbach's α=.89, M=2.96, SD=.92).

Frequency of critical thinking about advertising–Frequency of engagement in critical activities about advertising was measured by four Likert-type items developed by the authors with responses ranging from 1 (never) to 5 (very often). One sample item consisted of "How often

Table 1 | Responses for frequency of interpersonal communication about the *YMD* workshop with different targets (*n*=81)

Targets	Never *n* (%)	Seldom *n* (%)	Sometimes *n* (%)	Often *n* (%)	Very often *n* (%)
My friends	6 (7.4 %)	27 (33.3 %)	33 (40.7 %)	8 (9.9 %)	7 (8.6 %)
My teachers	20 (24.7 %)	16 (19.8 %)	28 (34.6 %)	14 (17.3 %)	3 (3.7 %)
Other adults in my family (grandparents, uncle, aunt, etc.)	26 (32.1 %)	27 (33.3 %)	10 (12.3 %)	13 (16.0 %)	5 (6.2 %)
Other kids in my family (siblings, cousins, etc.)	23 (28.4 %)	20 (24.7 %)	25 (30.9 %)	8 (9.9 %)	5 (6.2 %)
Other people I know in my community	30 (37.0 %)	29 (35.8 %)	15 (18.5 %)	4 (4.9 %)	3 (3.7 %)

did you search for more information about advertising online?" Items were averaged to form a scale with higher scores indicating greater frequency of critical thinking. The scale demonstrated good reliability (Cronbach's α=.90, M=2.25, SD=.94).

Self-efficacy to counter-argue—Participants' perceived confidence to counter-argue with the claims underlying advertisements was measured by three Likert-type items developed by authors with responses ranging from 1 (not at all confident) to 5 (completely confident). Participants rated their confidence in the ability to counter-argue on three criteria, such as "Distinguish relevant from irrelevant claims in the ad." Items were averaged with higher scores indicating more self-efficacy to counter-argue. The scale demonstrated good reliability (T1: Cronbach's α=.78, *M*=3.50, *SD*=.80; T3: Cronbach's α=.90, *M*=3.68, *SD*=1.03).

Analyses
To ensure comparability between participants in analysis versus planing workshops, it was necessary to explore the data for differences at baseline (T1). Results of independent *t* test analyses indicated that at baseline, the workshop participants did not differ with regards to gender [*t* (172)=−.90, *p*=.37], age [*t* (169)=−1.38, *p*=.20], or prior alcohol use [operationalized as alcohol use in the past 30 days; *t* (162)=.26, *p*=.80].

Descriptive analyses (frequencies) provided information for RQ2a and RQ2b. In addition, for the subset of participants who talked to others about *YMD* after the workshop, independent sample *t* test assessed differences in targets and content of communication between participants in the analysis plus analysis and analysis plus planning conditions. Analyses for H1 and H2 consisted of two regression models, both with type of workshop, communication about the workshop, and the interaction between type of workshop and communication about the workshop as independent variables. One model included critical thinking about advertising at T3 as the dependent variable and the other included self-efficacy to counter-argue at T3. In addition, for each regression analysis, we included the corresponding variable at T1 as a control variable.

RESULTS

Descriptive analysis for frequency of communication—target and content
Tables 1 and 2 present participants' responses for frequency of communication targets and content, respectively. Overall, 68 % (*n*=81) of participants replied that they had talked to someone about the workshop. Among those who had talked, 59 % reported communicating about the *YMD* workshop with friends (cumulative sum of sometimes, often, and very often

Table 2 | Responses for frequency of interpersonal communication regarding different content of the *YMD* workshop (*n*=81)

Content	Never *n* (%)	Seldom *n* (%)	Sometimes *n* (%)	Often *n* (%)	Very often *n* (%)
...the ads you saw during the workshop?	9 (11.1 %)	19 (23.5 %)	35 (43.2 %)	13 (16.0 %)	5 (6.2 %)
...what you learned about persuasion techniques?	7 (8.6 %)	14 (17.3 %)	33 (40.7 %)	22 (27.2 %)	5 (6.2 %)
...what you learned about production components?	12 (14.8 %)	14 (17.3 %)	32 (39.5 %)	17 (21.0 %)	6 (7.4 %)
...what you learned about alcohol advertising?	9 (11.1 %)	17 (21.0 %)	32 (39.5 %)	17 (21.0 %)	6 (7.4 %)
...how much you liked the workshop?	12 (14.8 %)	9 (11.1 %)	25 (30.9 %)	27 (33.3 %)	8 (s9.9 %)

responses), 56 % with teachers, 35 % with other adults in family (grandparents, uncles, aunts), 47 % with other kids in family (cousins, siblings), and 27 % with other people in the community. With regards to the content of the communication, 65 % of participants who talked with someone about *YMD* reported communicating about the ads they saw during the *YMD* workshop (cumulative sum of sometimes, often, and very often responses), 74 % about the persuasion techniques learned during the workshop, 68 % about production components learned during the workshop, 68 % about alcohol advertising they learned during the workshop, and 74 % about how much they liked the workshop.

Additionally, for those who had talked, we ran independent sample t tests to assess differences between participants in analysis plus analysis and analysis plus planning conditions in the frequency of speaking with the target or about the topic. Results indicated no significant differences between participants in analysis plus analysis versus analysis plus planning conditions with regards to targets of communication, $t(78)=1.13$, $p=.26$ or content of communication, $t(78)=1.43$, $p=.16$.

Hypotheses 1 and 2

For critical thinking, the regression model was not significant [Adj. $R^2=.03$, F $(3, 115)=2.37$, $p=.07$]. Type of workshop ($\beta=.05$, $p=.85$), communication about the workshop ($\beta=-.20$, $p=.11$), or interaction between type of workshop and communication about the workshop ($\beta=-.11$, $p=.70$), did not significantly predict differences in critical thinking.

For self-efficacy to counter-argue, the regression model was significant [Adj. $R^2=.09$, F $(4, 107)=3.88$, $p<.01$]. Communication about the workshop was not a significant predictor of self-efficacy to counter-argue ($\beta=.13$, $p=.27$). However, baseline self-efficacy to counter-argue (at T1; $\beta=.28$, $p<.01$), type of workshop, ($\beta=.69$, $p<.01$), and the interaction between type of workshop and communication about the workshop ($\beta=-.75$, $p<.01$) were significant predictors of self-efficacy to counter-argue (at T3). Participants in the analysis plus planning workshop reported overall higher self-efficacy to counter-argue as compared to participants in the analysis plus analysis workshop. For participants who had talked about the workshop, participation in the analysis plus planning workshop (M=4.08, SD=.78) resulted in greater self-efficacy to counter-argue than participation in the analysis plus analysis workshop (M=3.70, SD=.96). For participants who had not talked about the workshop, participation in the analysis plus analysis workshop (M=4.03, SD=.86) resulted in greater self-efficacy to counter-argue than did participation in the analysis plus planning workshop (M=3.49, SD=1.20).

Therefore, H1 and H2 were each partially supported. Participants in the analysis plus planning group reported greater self-efficacy to counter-argue (but not critical thinking) than did participants in the analysis plus analysis workshop. Communication about the workshop moderated the effects of the type of workshop on self-efficacy to counter-argue (but not critical thinking). Communicating about the workshop appears to be related to better self-efficacy outcomes for participants of the analysis plus planning workshop and worse outcomes for participants of the analysis plus analysis workshop.

DISCUSSION

This paper is among the first to examine the frequency and effects of interpersonal communication following participation in a media literacy intervention, specifically the *YMD* workshop targeted at preventing high school student alcohol use. Our findings demonstrate that the curriculum stimulated a great deal of interpersonal discussion with others in the participants' social network and about various aspects of the intervention. This suggests the importance of examining this type of intended/unintended effect of any intervention. While we argue that communication should be expected after a successful intervention, whether hypothesized or not, it seems clear that such communication occurs and has the potential to moderate the effects of any intervention much the way conversations and networks filter other messages.

Southwell and Torres [58] suggest that interventions have the potential for improving people's self-efficacy to engage in conversations about a given topic. Increasing people's self-efficacy for conversations about given topics may encourage people to learn more, empower them with information to be used in discussions with others, and help in reducing people's normative constraints for engaging in conversations [44]. Therefore, intervention participation should move beyond the workshop setting, and participants should be encouraged to discuss workshop elements and share their learning with others.

Interpersonal communication about an intervention is important to examine because it has the potential to lead to diffusion of information, influence social norms, and activate and strengthen one's own memory for behavior maintenance or motivate behavior change [44, 45, 49]. Our findings demonstrate that people who engaged in interpersonal communication about the *YMD* workshop reported higher frequency of critical thinking about advertising as compared with participants who did not. Therefore, the moderating role of interpersonal communication in affecting relevant attitudinal and behavioral outcomes is important to examine in future research. Some prior research in this area suggests that stimulating conversations about important topics, such as about organ donation with family members [59] or about drugs between parents and children [60], may be a planned outcome of campaigns and interventions. Therefore, analyzing how participants' communication changes when they are encouraged to discuss the workshop with others and how that affects relevant distal outcomes needs further examination.

Finally, our study demonstrated that among students who talked about the curriculum with others, students in the analysis plus planning condition demonstrated more consistent significant positive effects over the analysis plus analysis students on self-efficacy to counter-argue. In other words, interpersonal communication bolstered the effects of analysis plus planning condition as compared to analysis plus analysis condition on relevant outcomes. One explanation is that interpersonal communication primed the participants in the analysis plus planning condition more than those in the analysis plus analysis condition to reflect more about lessons learned and issues discussed in the workshops (e.g., to think more critically about alcohol advertising and the effects such advertising has on youth), because participants in the analysis plus planning condition were more motivated to process information. The analysis plus planning workshop may have not only provided increased involvement through more active engagement [61], but may have also reinforced perspective taking and counter-arguing beyond what was learned in the analysis plus analysis workshop. This needs to be explored further.

Limitations

This research is not without limitations. The project tested the *YMD* intervention with predominantly White Pennsylvania high school students attending a Leadership Institute; so, results may not generalize to other adolescent populations. Our measurement and operationalization of interpersonal communication with others included targets and content, but we did not measure other aspects such as the channel of communication (face-to-face, e-mail, or text) and/or social networks that may be assessed in future research. Recent research indicates that assessment of interpersonal communication is quite useful in not only explaining group interaction online, but in also exploring referral network structure and behavior [62, 63]. With advances in online communication research [64, 65] including the use of Twitter and Facebook, it will be interesting to examine how information is discussed and eventually diffused via online channels. Additionally, one limitation of the study was that the measure of interpersonal communication was completed at delayed posttest, but not immediately after. In future studies, capturing interpersonal communication immediately a few days after the workshop followed by 3 or 4 months after will provide a stronger set of analyses regarding the influence of interpersonal communication on relevant outcomes. Finally, an improved design would track the adolescents longitudinally to ascertain if the interpersonal communication about the workshop acted as a moderator in predicting outcomes based on skills, cognitions, and behavior.

CONCLUSIONS

In concluding, we examined interpersonal communication effects of the media literacy-based *YMD* prevention intervention targeted at high school student alcohol use. Future research should examine the role of interpersonal communication in multiple ways such as a mediator or moderator of intervention effects. Our findings suggest the potential positive impact of including intervention components that encourage and facilitate further communication outside of the intervention setting, such as incorporating discussion activities, scheduling the workshop across youth group meetings, and adding boosters. However, whether integrated into the logic model of the curriculum design or not, our findings suggest that it is imperative to examine the effects of interpersonal communication [social proliferation] when evaluating health messages. Media literacy-based interventions that encourage participants' learning about media, increase motivation to process media messages critically, and stimulate conversations outside of the intervention setting provide a promising, innovative approach to addressing adolescent alcohol use.

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