

Pilot Study for Youth Participatory Video Production Program for Smoking Prevention

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Abstract

Background: Youth smoking is a serious public health concern, but early successes in its prevention have been difficult to sustain. There is growing evidence that digital media shows promise for attracting young people as well as effectiveness for youth health promotion programs.

Purpose: The purpose of this pilot study was to develop a youth smoking prevention program using the participatory video making strategies, under the youth empowerment framework. The specific aims of this pilot study were twofold: (1) to evaluate the feasibility of the youth participatory video making program for smoking prevention by assessing participants' attendance rate, total time and resources needed, and reasons for participation, and program satisfaction and (2) to examine how youth participatory video making enhances participants' psychological empowerment for tobacco control, and changes participants' individual smoking behaviors, including intention to smoke and behavior for non-smoking.

Methods: A mixed method study design, following a concurrent embedded experimental model was used. Twenty-three youths (10 to 14 years old) participated in the video production program in eight sessions over four weeks at a local youth community center in a low-income neighborhood. The attendance rate, time, and resources for the program, reasons for participation, and program satisfaction were explored using multiple data sources, including checklist, interviews, and survey. Changes in psychological empowerment and smoking intention were assessed with pre- and post-intervention surveys (YGMS; Holden et al., 2004 and modified YBRSS; CDC, 2004). Quantitative test and descriptive qualitative analysis were conducted.

Results: Participants produced four videos about anti-smoking messages; 69.6% of participants rated this program as excellent, and 75% reported that it met their expectation. The attendance rate was 73.4%. The program enhanced the level of psychological empowerment and intention not to smoke ($p < 0.05$). Participants' discussion of experiences in the program revealed three themes: (1) active engagement, (2) personal growth and healthy development, and (3) agentic participation for a healthy community.

Discussion: This study described the feasibility of interactive use of technology for youth tobacco control. The findings provided promise for engaging young people as nonsmokers and empowering them to become anti-tobacco advocates in their communities.

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CHAPTER 1: Introduction

Adolescent smoking prevention is a critical public health agenda. In spite of the fact that smoking is a cause of premature deaths and illnesses, the youth smoking rates have not decreased. Given the fact that 88% of smoking initiation occurs during adolescence and the cost of intensive efforts for smoking cessation once people get addicted to tobacco products is extremely high, there need for efforts to prevent smoking initiation is great (United States [U.S.] Department of Health and Human Services [DHHS], 2012; Centers for Disease Control and Prevention [CDC], 2012).

Adolescent smoking has been the subject of research for many years; however, more studies have focused on smoking cessation rather than prevention efforts (USDHHS, 2012). For smoking prevention, although a number of approaches have been tried, such as a family-based approach (Guilamo-Ramos et al., 2010), media-based approach (Davis, Farrelly, Messeri, & Duke, 2009), and tobacco control policy-based approach (Ribisl, 2012; Slater, 2007), in various settings, including school and community (Campbell et al., 2008; Valente, Hoffman, Ritt-Olson, Lichtman, & Johnson, 2003), smoking prevention efforts have been challenging (Chen, Ren, Lin, MacDonell, & Jiang, 2012). In spite of some positive effects of smoking prevention efforts and positive outcomes of programs with multiple components, smoking prevention programs have had mixed results (Flay, 2009; Krowchuk, 2005; Murnaghan, Leatherdale, Sihvonen, & Kekki, 2008).

To achieve a better outcome in the youth smoking prevention studies, the youth empowerment approach and use of interactive technology, such as digital media, has been recently suggested (CDC, 2010). A youth empowerment approach has been suggested and applied in youth smoking prevention, which aims to provide a positive

approach for youth to become critical advocates for creating smoke-free environments. This approach aims to bring better long-term results, as well as encourage youth health promotion by impacting the community and society level by providing agency to youth (CDC, 2010). In addition, to enhancing youth engagement and motivation, technology and new media that incorporate smoking prevention strategies (Richardson, Green, Xiao, Sokol, & Vallone, 2010; Zucker et al., 2000), have been shown to be effective (Backinger, Fagan, Matthews, & Grana, 2003; Skara & Sussman, 2003). Recent smoking prevention programs have used different types of technology, such as computers, video games, mobile phones, and multi-media applications (Hutton et al., 2011; Skinner, Maley, & Norman, 2006), as youth are exposed and raised with new types of technology. There is growing evidence of the positive effect of engaging youth in smoking prevention programs that use different types of technology to enhance youth participation as a successful approach to the smoking prevention programs.

The purpose of this pilot study was to develop an effective youth smoking prevention program, by exploring ways to apply a youth-oriented approach and digital media. This dissertation is divided into chapters that include the dissertation proposal and three manuscripts. The first manuscript is a systematic review of Internet-based youth smoking prevention programs, to provide an in-depth understanding of the trends and effects of applying the Internet in youth smoking prevention and to examine the methodological challenges of studies on Internet use for youth smoking prevention. The second manuscript explores the concept of the agency, which can potentially be used as a key concept to enhance youth empowerment in youth smoking prevention and health promotion. The third manuscript describes interactive digital media, which is a

participatory video making strategy, and its application to youth smoking prevention in a community-based setting. In this manuscript, the feasibility of the video making program is explored by examining youth smoking prevention and psychological empowerment.

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CHAPTER 2. PHS 398 Form

SPECIFIC AIMS

Adolescent smoking is a serious public health concern (United States [U.S.] Department of Health and Human Services [DHHS], 2010, 2012; Centers for Disease Control and Prevention [CDC], 2012). In 2009, 23.9% of U.S. high school students used tobacco products (CDC, 2010a). Every day, approximately 3,800 youths initiate smoking and about a thousand became daily smokers (CDC, 2012). Young people are particularly vulnerable to tobacco products; 88% of current adult smokers, an estimated 45.3 million Americans, took up the habit during their adolescent years (CDC, 2012). Half of all smokers eventually die of smoking-related causes, as the harmful effects last through adulthood. Adolescent smoking prevention is important because it requires more effort to quit than to never start, and there is thus an urgent need to develop more effective youth smoking prevention approaches (DHHS, 2012).

The CDC is seeking new ways to empower youth for non-smoking behaviors and to encourage young people to become active advocates for a smoke-free society (CDC, 2010b). Youth engagement and empowerment are important concepts in achieving these goals, and there is evidence to suggest that producing and sharing messages using digital media such as mobile devices or cameras could be an effective health education method to support desired behavioral changes by facilitating enjoyable and accessible interactions (Bennett, 2008; Pepler, & Kafai, 2007; Stewart et al., 2008). To date, however, the use of digital media production as a way to effectively engage youth, not only as consumers and producers of a smoking prevention message, has not yet been explored in depth (Flicker et al., 2008).

Youth participatory video production enhances adolescents' in-depth understanding of complex issues by identifying multi-faceted determinants and consequences through the critical reflection process as a self-directed action-based learning (Holden, Messeri, Evans, Crankshaw, & Ben-Davies, 2004b). It also empowers participants by encouraging them to develop their own voice and enabling them to present a final product to a public audience (Ager, Parquet & Kreutzinger, 2008). Producing videos with messages promoting a smoke-free community allows adolescents to relate to health issues personally in terms of their extended social network and their community (Flicker et al., 2008). Ultimately, motivating the participants to improve their own positive health behaviors and become advocates for community health as healthy individuals and active health agents (CDC, 2010; Holder et al., 2004b)

The major objectives of this pilot study were to test the feasibility and effect of a youth participatory video production program for adolescent smoking prevention aimed at enhancing adolescents' psychological empowerment for non-smoking smoking behavior in support of a smoking-free community.

The specific aims of this pilot study were:

1. To evaluate the feasibility of the youth participatory video making program for smoking prevention by assessing participants' (a) attendance rate, (b) total time and resources needed, (c) reasons for participation, and (d) program satisfaction.
2. To examine how youth participatory video making (4th -8th grade youths) enhances participants' (a) psychological empowerment for tobacco control, and changes participants' individual smoking behavior related outcomes, including (b) intention not to smoke and (d) behavior for non-smoking (among smokers).

RESEARCH STRATEGY

a. Significance

Adolescent Health Risk Behaviors and Health Education

Adolescents show a high prevalence of engagement in risky behaviors such as tobacco use, alcohol and drug use, unhealthy sexual behaviors, injury and violence, sedentary behavior, and unhealthy dietary behaviors (CDC, 2011). These high rates of risky behaviors are serious public health concerns, which adversely affect both the adolescents and society. Adolescents' engagement in a number of risky health behaviors could cause serious chronic disease and premature death. According to recent statistics, 18.1% of high school students had smoked in the previous 30 days, 38.7% had drunk alcohol, 23.1% had used marijuana, and 32.8% had been involved in physical fights; 33.7% had had sexual intercourse in the previous 3 months (CDC, 2012). The data also shows that 32.8% texted or emailed while driving, 31.1% spent more than 3 hours playing games each day and 4.8% had not eaten fruit or drunk fruit juice in the previous week (CDC, 2012). The costs of these risky behaviors are high, as they all pose a serious risk of significant harmful effects on health outcomes throughout the rest of their lives.

Adolescence is a critical period for health education (Weissberg, Kumpfer, & Seligman, 2003). This is the age when people acquire many behaviors that will provide the basis for their lifelong healthy habits (Currie & Alemán-Díaz, 2015; Fergus & Zimmerman, 2005; Veselska et al., 2009). It is therefore vital to provide effective and sufficient health education as primary prevention for risky behaviors. With proper health education programs, adolescents can take charge of their own health and become advocates for better public health for all.

Adolescent smoking represents one of the most important health threats facing the nation today. In the United States, 443,000 people die prematurely each year and 8.6 million suffer from serious diseases due to smoking, corresponding to approximately one in five deaths and 90% of serious lung diseases (CDC, 2010). Although the overall smoking rate has declined, this trend has been less marked in young people (CDC, 2011); since 2003, the youth smoking rate has dropped only slightly and smokeless tobacco use rate remains stalled (CDC, 2012). Tobacco companies are introducing innovative products such as flavored smokeless tobacco and direct marketing strategies geared toward youth in the hope that they will become future smokers (Agaku, Vardavas, Ayo-Yusuf, Alpert, & Connolly, 2013; Cummings, Morley, Horan, Steger, & Leavell, 2002). There is a need for innovative interventions that use strategies that are developmentally- and culturally-tailored for this target population (Brindis et al., 2007; CDC, 2010b; Flay et al., 2009).

Multi-level Determinants of Adolescent Smoking

Individual level

A number of individual and environmental factors contribute to smoking initiation. Individual factors that are important for youth in deciding whether to smoke or not include knowledge, beliefs, and attitudes about smoking and the health related consequences of using tobacco, and many studies have assessed the success of outcome measures that look at attitudes toward smoking (Farrelly et al., 2002; Morrell, Song, & Halpern-Felsher, 2010). Perceptions of the health consequences of smoking have been linked to adolescent smoking onset (Ayo-Yusuf, Van Den Borne, Reddy, Van Wyk, & Severson, 2009), with youths who think it is okay to smoke for one or two years being

more likely to smoke (Rudatsikira, Muula, & Siziya, 2009). Youth self-efficacy is also a predictor in smoking initiation (Hiemstra, Otten, De Leeuw, Van Schayck, & Engels, 2011).

Community level

At the community level, multi-level factors are also related to adolescent smoking behavior. These factors include both physical and social environments, which are, in part, comprised of the micro-, exo-, and macro-systems based on ecological models (Bronfenbrenner & Ceci, 1994; Ennett et al., 2010). At the micro level, parents and the home, peers, and the school environment are all determinants of adolescent smoking. Parents and the home environment represent an important influential factor, and numerous studies have shown that if family members smoke, the risk of those adolescents smoking markedly increases (Gilman et al., 2009; Leatherdale, McDonald, Cameron, & Brown, 2005). The longer children are exposed to parental smoking, the more likely it is that those children will take up smoking, particularly for adolescents younger than 13 years of age (Gilman et al., 2009). If both parents smoke, the risk of their children smoking is doubled (Gilman et al., 2009). Improving the home environment by banning smoking at home strongly influences attitudes toward smoking (Emory, Saquib, Gilpin, & Pierce, 2010; Muilenburg Legge, 2009), and parents' high parental self-efficacy has also been associated with low rates of youth smoking behavior (Mahabee-Gittens, 2011). Peer pressure strongly affects smoking behavior (Change et al., 2006) since adolescence is a period that is strongly governed by social norms and peers. If social norms are friendly to tobacco and smoking is considered "cool," teenagers will be more susceptible to smoking; the more close friends that adolescents have who smoke, the greater are their

chances of initiating smoking (Leatherdale et al., 2005). The school environment is also a significant factor associated with smoking onset (O'Loughlin, Karp, Koulis, Paradis, & DiFranza, 2009). Attending a school where many of the older students smoke has been shown to increase the possibility that younger students will initiate smoking (Leatherdale et al., 2005). School policies such as clear rules related to smoking can therefore also be important in preventing the initiation of youth smoking (Murnaghan, Leatherdale, Sihvonen, & Kekki, 2008).

In the exo-system, the community environment is very important. The adoption of suitable policies related to smoking has been shown to be one of the most effective factors in reducing smoking rates, although according to some studies this effect is less significant for smoking initiation (Wilson et al., 2012). Most smoking-related policies have been designed specifically to reduce the initiation of youth smoking and have had a tremendous effect on decreasing overall smoking rates. For example, policies such as Indoor Clean Air, youth prevention programs, mandatory education at school, and enforcing the age at sale regulations have all been effective in decreasing smoking rates (CDC, 2010; Slater, Chaloupka, Wakefield, Johnston, & O'Malley, 2007). In those states where the tobacco tax is low, such as Virginia, there is a noticeably higher rate of youth smoking, demonstrating the deterrent effect of high tax rates (Carpenter & Cook, 2008).

In the macro-system, social culture and value systems are associated with youth smoking (Frohlich et al., 2012), with media being an important factor in influencing a culture of smoking (Farrelly, 2002). Greater exposure to movies that contain smoking scenes has been shown to create positive attitudes toward smoking and to increase the likelihood of smoking initiation (Heatheron, & Sargent, 2009; Wills, Sargent,

Stoolmiller, Gibbons, & Gerrard, 2008). Several studies have explored ways of using media campaigns and found that this can be very effective in primary prevention (Davis et al., 2009; Richardson et al., 2010; Willis et al., 2008). A general awareness of such national media campaigns has been linked to anti-smoking attitudes among young people (Richardson et al., 2010; Wills et al., 2008).

Youth Smoking Prevention Programs

Overall, smoking prevention programs, along with appropriate educational strategies, have been shown to reduce smoking rates and prevent smoking. However, the success of youth smoking prevention programs has varied wildly, with some failing to decrease smoking in the target audience at all (CDC, 2012; Flay et al., 2009; Johnson et al., 2007). A recent meta-analysis of randomized controlled studies found that school-based programs have shown mixed results in preventing smoking initiation (Thomas, McLellan, & Perera, 2013) and a curriculum that combines social competence and social influences approaches is more effective than programs that are information delivery-focused or are targeted specifically at nonsmokers to prevent smoking initiation. However, most programs have shown little in the way of effective results (Backinger, Fagan, Matthews, & Grana, 2003; Krowchuk, 2005; Thomas et al., 2013). Flay et al. (2009) suggested that school-based programs can produce long-term effects using a minimum of 15 sessions, interactive delivery methods, the use of a social influence model, components on norms, peer leaders, and training in the use of refusal skills. In general, multi-component approaches that combine media and smoking policy approaches have been more effective in both community-based and school-based settings (Backinger et al., 2003; Krowchuk, 2005).

Interactive educational methods

Age-appropriate teaching methods should be used to deliver content to adolescents for smoking prevention (Flay & others, 2009; Mitschke, Loebel, Tatafu, Matsunaga, & Cassel, 2010; Weissberg, Kumpfer, & Seligman, 2003), with virtual or computer-generated delivery modes being known to enhance youth engagement among today's media-savvy YouTube generation. Multimedia, Internet, and computer-based delivery systems with interesting visual and sound effects attract attention and communicate messages effectively for this population (Cremers, Mercken, Oenema & Vries, 2012; Crutzen et al., 2012; Skinner, Maley, & Norman, 2006; Hutton et al., 2011), while interactive pedagogical strategies facilitate group communication among peers as users, enabling them to practice decision-making skills and social skills with their peers in a fun way. For example, Mitschke et al. (2010) reported that the use of drama, an interactive educational method, was effective in changing attitudes, knowledge, and behavior around smoking in a positive way.

Youth empowerment approach

The youth empowerment approach is a new method of smoking prevention that treats adolescents as rational decision-makers and problem solvers (Dunn & Pine, 2005; Holden et al., 2004b). Supporting youth autonomy for changing adolescent health behavior (Spear & Kulbok, 2004; Williams, 1998) provides opportunities for critical thinking and problem solving (Unger et al., 1999; Wilson et al., 2007), and the educational content of smoking intervention including critical thinking about the media, government policies, and the tobacco industry is effective in changing adolescents attitudes toward smoking (Arheart, Sly, Trapido, Rodriguez, & Ellestad, 2004; Berg,

Coman, & Schensul, 1998; Kupersmidt, Scull & Austin, 2010; Ribisl et al., 2004; Ross, 2011; Suleiman, Soleimanpour, & London, 2006; Winkleby et al., 2004). Addressing the ecological context, including policy and culture related to smoking, helps young people develop an awareness of risky behaviors and a deeper understanding of the consequences (Jennings, Parra-Medina, Hilfinger-Messias, & McLoughlin, 2006; Unger et al., 1999; Zucker et al., 2000). Tobacco control policy advocacy and self-efficacy is associated with youth smoking free behaviors (Ramirez, Velez, Chalela, Grussendorf, & McAlister, 2006), and participating in anti-tobacco related activities, such as anti-smoking campaign influences on participants' attitudes and belief about anti-smoking (Arheart et al., 2004, and perceived influence on tobacco control (Dunn & Pine, 2005; Marr-Lyon, Young, & Quintero, 2008). Autonomous, self-directed approaches thus have the potential to change adolescent behaviors (Williams et al., 1999). However, although this youth empowerment approach has shown great promise for positive youth development, there is still much to learn about the details of this process, such as how much power can be devolved to youth.

Culturally sensitive approach

Researchers have pointed out that a culturally sensitive approach is important for youth smoking prevention programs (Weissberg, Kumpfer, & Seligman, 2003). Since peers and perceived social norms have a major environmental influence on adolescent behavior, peer-led smoking prevention programs have shown promising results (Campbell et al., 2008; Lotrean, Dijk, Mesters, Ionut, & De Vries, 2010). This is particularly important given the difficulty associated with changing participants' thoughts and behaviors within groups and social environments. Peer-synergy and social norm changes are thus important in youth health behaviors, so including group activities or

peer-led education could increase group members' acceptance of smoking education (Valente, Hoffman, Ritt-Olson, Lichtman & Johnson, 2003). In the collective group working approach, health education can reinforce positive social norms that do not support smoking, especially if delivered in conjunction with culturally tailored programs designed to help change individual behavior intentions in positive directions (Campbell et al., 2008; Holden et al., 2004b).

Connecting to community

Adolescents' connection to their communities at various levels, including their homes and families, neighborhoods, and society as a whole, is thought to be important for developing positive youth health behaviors (Iseke, & Moore, 2011; Weissberg et al., 2003). All communities create such positive psychosocial outcomes and behavioral changes (Lerner et al., 2005; Maton, 2008), so given that risky behaviors are not solely individual issues, strengthening adolescents' community connections should enhance their social engagement and their participation in critical public health issues, with correspondingly positive health-related outcomes (Connell, Gambone, & Smith, 2001; Hawkins et al., 2012). This approach may be important not only for the young people themselves but also for their parents and communities (Hawkins et al., 2012). Moreover, since programs that incorporate family involvement have reported some success in reducing smoking initiation, youth advocacy should help build family and community support for the program (Campbell et al., 2008).

Knowledge gaps

Smoking prevention programs have tended to target adolescents, though the results have generally been disappointing (Backinger et al., 2003; Flay, 2009; Krowchuk,

2005; Thomas, McLellan, & Perera, 2013). Although different types of prevention and intervention strategies have tried to deal with the complex issue of youth smoking, there remains an urgent need for effective prevention and intervention strategies to decrease smoking behaviors among youthful populations (Flay, 2009; Inman, van Bakergem, LaRosa, & Garr, 2011; Jennings, et al., 2006). Although we know much about the determinants of youth smoking and the effective and important principles for youth smoking prevention, some elements remain unclear, and achieving better outcomes remains a challenge. For example, addressing the intertwined, multilevel risks and protective factors for youth smoking behaviors in smoking prevention programs is difficult, especially given the contextual variability (Backinger et al., 2003; Glanz & Bishop, 2010). Developing a developmentally and ecologically appropriate program is thus a key factor in designing an effective smoking prevention strategy and further exploration is needed to shed light on how each of these components can be used most effectively. Approaches that empower participants, thus supporting youth engagement and empowerment for changing and regulating behaviors, have shown some promise for youth health promotion (Holden et al., 2004b; 2005), although few programs have yet applied this approach and further study is clearly indicated.

Digital Media and Implication for Youth Health Promotion

Digital media, also often referred to as new media, is an evolving concept that has been defined as the “communication media basis of channel characteristics that parallel human sensory perception, such as motion versus still visual, sound versus silent, text versus picture, or one-way versus two way transmission” (Schramm, 1977, p. 17). This definition is based on the underlying assumption that digital media allows participants to

create messages by utilizing the Internet or digital electronic devices and then share them through digital channels. Therefore, two-way communication ability and participatory use is the key characteristic, contrasting markedly with the one-way flow experienced with traditional media (Lievrouw & Livingstone, 2006; Rice, 1984). Digital media use many different kinds of digital devices and channels, including videos and Internet resources such as YouTube, blogs and Facebook pages.

The use of digital media for health promotion and positive youth development has been studied by several groups (Kennedy & Bradway, 2012; Peppler & Kafai, 2007; Wexler, Gubrium, Griffin, & DiFulvio, 2012), with different forms of technology, such as computers and mobile devices, and different forms of visual images being utilized to encourage self-expression in adolescents (Baker, Staiano, & Calvert, 2011; Kral, 2010; Wexler et al., 2012). Digital media have supported participants' active engagement in a wide range of learning and social behaviors by enhancing their creativity and critical thinking (Peppler & Kafai, 2007). The pedagogical benefits of digital media include enhancing media literacy by attracting teenagers' attention (Soep, 2006) and motivating them to participate as active learners (Bennett, 2008; Peppler & Kafai, 2007). Digital media production has been shown to enhance youthful participants' sense of confidence and self-esteem (Wexler et al., 2012) and their psychological empowerment (Leung, 2009), and to decrease their anxiety (Robb & Ebbert, 2003), although the findings of most of these studies are not generalizable. The pedagogical benefits of digital media especially is effective as an educational method by attracting youths' attention and motivating them to participate and become active learners, as well as by enhancing media literacy (Bennett, 2008; Flanagin & Metzger, 2008; Peppler & Kafai, 2007).

These findings have, however, encouraged researchers to incorporate digital media into youth health promotion efforts, aiming particularly at enhancing specific domains of individuals' health behaviors (Ager, Parquet & Kreutzinger, 2008; Guse et al., 2012; Holleran, Reeves, Dustman, & Marsiglia, 2002; Lachter, Komro, Velblen-Mostenson, Perry, & Williams, 1999; Sharma, Reimer-Kirkham, & Meyerhoff, 2011). In adolescent sexual behavior interventions digital media have produced positive psychosocial outcomes, including condom self-efficacy, abstinence attitudes, and enhanced knowledge of HIV and sexually transmitted infections (Guse et al., 2012), although Guse et al. did not consider the impact of different types of digital media on the creation of messages or participants.

Among the different digital media applications, video making is possibly best suited to youth health promotion as it enables adolescents to create messages about health behavior issues and to share these messages with the public (Ager, Parquet & Kreutzinger, 2008; Guse et al., 2012; Holleran et al., 2002; Sharma et al., 2011). Few studies have used video production for substance use prevention or smoking prevention (Ager et al., 2008; Holleran et al., 2002). A case study of youth participatory video making for substance use was found to enhance the creation of culturally sensitive messages and enhance youth power in the process (Holleran et al., 2002). Youth video projects for substance abuse programs have also shown positive results in healthy attitudes and behaviors, and knowledge of drug use. One study found that when provided with a camcorder, participants were able to identify key important components, including family involvement and community engagement, and successfully adapt the program to fit the needs of their own community (Ager et al., 2008). However, this study suffered from

methodological limitations, notably the small sample size (N=7), which was insufficient to show statistical significance. Mitschke et al. (2010) also reported positive outcomes for adolescent health as a result of digital media production, but once again there are some limitations related to the generalizability of findings, as most studies in this area used qualitative methodological approaches.

Digital media production provides opportunities for young people to generate and share messages on health promotion, allowing us to hear their authentic voices (Ager et al., 2008; De Lange & Geldenhuys, 2012; Flicker et al., 2008; Holleran et al., 2002). This process can help create authentic messages (Buchanan & Murray, 2012; MacDonald et al., 2011; Mitchell et al., 2010; Morton & Montgomery, 2012; Sharma et al., 2011) and has the potential for further development as a peer-education method or in culturally tailored prevention programs for adolescents (Ager et al., 2008; Holleran et al., 2002; Okamoto et al., 2014; Sharma et al., 2011). Sharma et al.'s (2011) study is a good example of this process, where participants created a video for diabetes prevention for their peers using participatory action research; Okamoto et al. (2014) also utilized video production to make a culturally tailored youth drug prevention program within a local community. Given the major influence of peer-pressure on youth health issues, their family, and community, the potential of video creation interventions as a useful peer-education or health promotion with community engagement has been amply demonstrated (Chávez et al., 2004; Iseke & Moore, 2011; Norman & Skinner, 2007; Okamoto et al., 2014). However, these studies have some limitations in showing the causal inference in changing participants' health outcomes after the process of producing the video is complete.

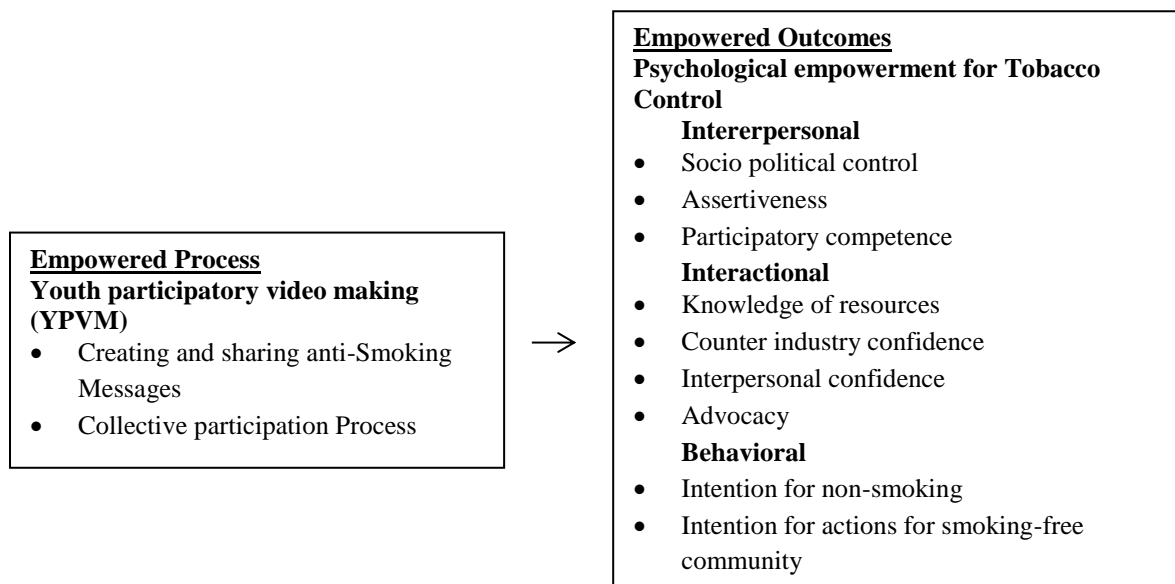
Digital Media Production for Adolescent Participation in Community Health

Digital media involves the participatory process of creating a specific message, which can take the form of art, videos, photographs, written material, or podcasts, and then distributing these messages or products. It has therefore received growing attention for enhancing the civic engagement of adolescents seeking policy changes or social action for their community health as engaged members of their society (Flicker et al., 2008; Iseke & Moore, 2011; Levinson, 2013; Lombardo, Zakus, & Skinner, 2002; Sharma et al., 2011). Digital media production enhances adolescents' self-confidence by empowering them and by acknowledging their social capital and assets (Thackeray & Hunter, 2010), as well as by reinforcing their sense of community (Charmaraman, 2013; Leung, 2009). Flicker et al. (2008) provide examples of the use of digital media for civic engagement in participatory action research, and Lombardo et al. (2002) explored the roles and barriers of different kinds of technology in connecting youths to social action by interviewing youth participants in NGO programs. Photovoice studies have shown the roles of photographs in providing examples of youth participants telling their story and highlighting their voices in community actions with high levels of engagement (Flicker et al., 2008; Wilson et al., 2007). However, as yet there is some evidences to support improved health outcomes for participants as a result of youth civic engagement with digital media. The impact of the knowledge gained regarding the detailed process involved in digital media production, such as video making, and potential positive outcome for engaging youth in community health issues is still need more support in the literature.

Theoretical Framework and Psychological Empowerment

The conceptual model for the proposed study (Figure 1) is based on the Youth Empowerment Conceptual Framework (Holden et al., 2004) and the Nomological Network for Psychological Empowerment Model (Zimmerman, 1995). Psychological empowerment is rooted in social action theory (Zimmerman, 1995). Psychological empowerment is defined as an “empowerment at individual level that integrates perceptions of personal control, a proactive approach to life, and a critical understanding of the sociopolitical environment” (Zimmerman, 1995, p.581). Psychological empowerment also involves “self-perceptions of competence, active engagement in one’s community, and understanding of one’s sociopolitical environment by learning about controlling agents and acting to influence those agents” (Zimmerman, 1995, p.582) and includes “beliefs that goals can be achieved, awareness about resources and factors that hinder or enhance one’s efforts to achieve those goals, and efforts to fulfill the goals” (Zimmerman, 1995, p.582). The three main attributes of psychological empowerment are originally defined with the interpersonal, interactional, and behavioral domains (Figure 1; Table 1). These domains are specified in more detail in the youth tobacco-control context (Holden et al., 2005, Table 1). The intrapersonal domain has three attributes, including domain-specific efficacy, perceived sociopolitical control, and participatory competence, and the interactional domain is composed of the attributes knowledge of resources, assertiveness, and advocacy (Holden et al., 2005).

Figure 1. Conceptual Framework Modified Youth Empowerment Model for Tobacco Control



In the traditional approach to youth tobacco control, young people are viewed as passive subjects who are susceptible to smoking due to the interaction between individuals and their surrounding multi-level environments. This includes: access to tobacco products, media exposure, and social norms. However, according to the Youth Empowerment Conceptual Framework (Holden et al., 2005), adolescents should be viewed as active producers who are capable of changing their individual health behaviors and changing their environments, which support anti-smoking (Holden et al., 2004b). According to the empowerment theory (Zimmerman, 1995), psychological empowerment should be enhanced through this empowering process as a result of the opportunities it provides to gain control, mobilize resources, and critically understand socio-political issues. In this context, digital media provides a way of connecting individual youths to

society as active producers of messages promoting health and enhancing psychological empowerment (Oladipo, 2009).

Table 1. Operationalization of Constructs of Psychological Empowerment

Domain	Description	General attributes in general	Attributes in tobacco control context	Definition (Holden et al., 2005)
Interpersonal	Perceptions about themselves and includes domain-specific perceived control, referring to beliefs about one's ability to exert influence in different life spheres such as family, work, or sociopolitical context (Zimmerman, 1995, p. 588)	Domain specific perceived control, self-efficacy, motivation to control, perceived competence.	Domain-specific efficacy	Beliefs in one's capabilities in organize and execute the courses of action required to produce specific changes related to tobacco control
			Perceived sociopolitical control	Beliefs about one's capabilities and efficacy in social and political systems
			Participatory competence	Perceived ability to participate in and contribute to the operations of the group or organization, through talking at meetings, working as a team member, etc.
Interactional	Understanding people have about their community and related sociopolitical issues. Awareness of behavioral options or choices to act	Critical awareness, understanding causal agents, skill development, skill transfer across life domains, and resource mobilization.	Knowledge of resources	Awareness of whether resources exist to support the group and how to acquire them
			Assertiveness	Ability to express your feelings, opinions, beliefs, and needs directly, openly, and honestly while not violating the personal rights of others

	(Zimmerman, 1995, p. 589)		Advocacy	Pursuit of influencing outcomes, including public policy and resource allocation decisions within political, economic, and social systems and institutions that directly affect people's lives
Behavior	Actions taken directly influence outcomes, such as engaging in actions to change community	Community involvement, organization participation, coping behaviors	Non-smoking	Behavioral Intentions for non-smoking
			Advocate actions for smoke-free community	Behavioral Intentions for community actions for smoke-free community

In this study, the focus is on smoking prevention. The process of producing a video that presents anti-smoking messages to the public, in this case their family and friends, is theorized as an individual action to enhance health promotion among members of society. Thus, this enhances individual psychological empowerment over individuals' health behavior, while simultaneously contributing to a smoke-free society. Therefore, the video production of an anti-tobacco message for the public serve as a means to enable youth participants to interact and communicate within their communities, as an empowering process, allowing the young people to take action and improve the health of their communities. Youth participation in creating videos is a form of action for community health; participants can better understand the smoking issue and its determinants, particularly the environmental factors, and youth participants can enhance their psychological empowerment as an outcome of participation. Therefore, participants can enhance psychological empowerment for positive health behaviors and community-

level participation for community health (Holden et al., 2005). As an ultimate outcome, these positive health behaviors may lead to health promotion on both an individual level and a community level. The individual can experience positive changes, as a result of participating in video production and the act of sharing videos, and contribute to community health promotion by improving community factors (Holden et al., 2004).

(b) Innovation

Participatory Use of Digital Media for Adolescent Health Promotion

This pilot study will advance youth health promotion interventions by applying the latest, most up-to-date scientific knowledge on participatory technology use for adolescent health behavior. Although digital media is particularly beneficial for reaching adolescents and engaging them, it has not yet been widely used with a participatory approach for youth health behaviors. Particularly, the question of whether participatory use of digital media can indeed serve as an effective mode for changing individuals' health behaviors, as well as those of their communities, has not been addressed. This new direction for digital media may have important implications in future applications and in the development of ways to use digital media in useful and effective ways to guide new and innovative approaches to changing health behaviors for health promotion. In addition, the findings of this pilot study may have an implication for health communication and public health for the younger generation, who are "digital natives" due to the high level of accessibility they are accustomed to through their use of mobile phones, web-cameras, and/or home videos, as well as their easy access to computers. Considering the characteristics of digital media, which are relatively simple to produce and then readily accessed by a wide audience, the implications of utilizing digital media

in this fashion to guide the possible development of youth health promotion programs extends all the way out to the macro-level of society.

Proactive Adolescent Smoking Prevention with Youth Empowerment Approach

This pilot study is expected to contribute to a paradigm shift on adolescent smoking prevention and health promotion, with more youth-oriented approaches that incorporate the concept of psychological empowerment and utilize digital media. Use of the concept of psychological empowerment may allow researchers to identify appropriate ways to promote people's health behaviors and sustainable community building in the future for adolescent health promotion studies as a more positive and pro-active approach (Chinman & Linney, 1998; Holden, Crankshaw, Nimsch, Hinnant, & Hund, 2004). In addition, this youth empowerment approach may help create more effective models for vulnerable populations to promote health equity by addressing social structures (Wilson et al., 2006; Winkleby, Feighery, Altman, & Kole, 2001). The act of enhancing youth voices may effectively empower a marginalized population and the findings of this pilot study could point the way to a whole new approach to enhancing youth psychological empowerment for health promotion.

(c) Approach

Design Overview

This pilot study was designed to test the feasibility of using participatory video production and its effect on participants' psychological empowerment for tobacco control and changes participants' individual smoking behavior related outcomes. A mixed method design, following a concurrent embedded experimental model (Andrew & Halcomb, 2009; Creswell & Plano-Clark, 2007; Sandelowski, 1996) was used in the

proposed study to answer the research question 1 (Table 2). This proposed research design used the concurrent mixed method approach, indicating that qualitative methods are embedded within a quantitative design in which one dataset provided a supportive, secondary role in a study based primarily on the other data set (Creswell & Plano-Clark, 2007). The primary aims of this pilot study were to test the feasibility of the participatory video production and its effect in enhancing psychological empowerment and changing participants' non-smoking behaviors and actions for a smoke-free society (Aims 1, 2). Quantitative data were collected at baseline and post-intervention using a self-report survey. The secondary dataset, derived using qualitative methods including interviews before and after participation, were used to examine the feasibility of the intervention and the experiences of participants with the intervention regarding their empowerment (Aim1) (Sandelowski, 1996). As a concurrent, embedded mixed-method design, both quantitative and qualitative data were concurrently collected in a single phase of the study (Andrew & Halcomb, 2009; Creswell & Plano-Clark, 2007; Polit & Beck, 2012). Institutional Review Board approval was received from the University of Virginia. Local permissions were also obtained from the site used in this study.

Setting

To test the feasibility and effect of engaging in the video production process for anti-smoking health education, 25 young people (10-14 years old) were target number to recruit in this study. A youth community center, Baldwin Center in Pontiac, Michigan, took part in this study by assisting in the recruitment process and by providing a location familiar to the participants in which to conduct the study. Baldwin Center is a non-profit

organization located in a low-income neighborhood and provided various educational activities for youth.

Table 2. Methods and Analysis by Study Aims

Aims	Constructs	Method	Data Sources	Analysis
1. To evaluate the feasibility of the youth participatory video making program for smoking prevention by assessing participants' (a) attendance rate, (b) total time and resources needed, (c), reasons for participation, and (d) program satisfaction	Attendance rate, total time and resources needed to produce videos,	Mixed method approach	Progress note during the intervention	Descriptive
	Reasons for participation		Semi-structured interviews at pre-intervention	Qualitative analysis (Content analysis)
	Program satisfaction		Semi-structured interviews at post-intervention Program Evaluation Survey	Descriptive statistics + Qualitative analysis Coding Themes may include– Group structure, adult involvement, group climate, collective participation (levels, intensity, roles) (Based on Holden et al., 2004)
2. To examine how youth participatory making (4-8th grades) enhances participants' (a) psychological empowerment for tobacco control, and changes	Psychological empowerment for tobacco control	Quantitative method	Youth Group Member Survey (YGMS) (Holden et al., 2005, validity+ reliability+ for adolescents) 15 items	Paired t-test and McNemar's test Wilcoxon Test
	Non smoking behavior		Behavior: Modified YRBSS 6 items	

participants' individual smoking behavior related outcomes, including (b) intention not to smoke and (c) behavior for non-smoking (among smokers).	Intention for non smoking		Youth Group Member Survey (YGMS) (validity (+) reliability y(+) for adolescents) 3 items	
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In the case of unexpected issues with the settings provided by Baldwin Center for the pilot study, local youth community organizations and schools were considered as potential study sites. The participants were recruited from those seeking to enroll in the summer programs provided by the Baldwin Center, and if needed local schools, libraries, and other youth organizations, using the IRB approved flyers, face-to-face strategies, letters, emails, and Facebook advertisements. The video production sessions were held twice a week for four weeks and each session took 50 minutes.

Sample/ Sampling Plan

The inclusion criteria were (1) 10-14 years of age, including smokers and non-smokers and (2) interested in participating in the video production program. Exclusion criteria were participants who cannot speak English, which would prevent them from participating fully in the study. A convenience sampling strategy was applied, given the practical issues inherent in the community-based setting. The attrition and refusal rate were expected to be in the range 20%-40% based on previous studies (Wiehe, Garrison, Christakis, Ebel, & Rivara, 2005; Thomas & Perera, 2006); however, this was part of the

data used to test the feasibility. A sample size of 25 was targeted to participate in the intervention and to complete questionnaires for the quantitative data collection, considering the anticipated attrition and refusal rate, based on the power analysis (see the Power Analysis section). For qualitative data collection, the investigator targeted 5 to 15 participating youths for individual interviews using a non-probabilistic, purposive sampling approach with attempts to ensure data variability (Guest, Bunce, & Johnson, 2006). The investigator invited at least one or two people in each video production group to participate in the interview.

Recruitment communication utilized face-to-face strategies and/or letters, emails, and Facebook as needed. The investigator recruited participants from those seeking to enroll in the summer programs provided by the Baldwin Center, and if needed at local schools, libraries, and other youth organizations, using the IRB approved flyers and Facebook advertisement. Upon the agreement of the Baldwin Center to become involved in the study, the IRB flyers were distributed to adolescents at the center; the participants were recruited from among those participating in the summer program. Additionally, recruitment occurred through distributing the IRB approved flyers in local libraries, schools, and youth organizations. Institutional Review Board approved consent forms included both minor assent and parental consent. Gift cards for \$10 were given to the participants of the intervention and interviewees as incentives; however, the opportunity to learn video skills was also expected to serve as an incentive for the participants.

Power Analysis

The software nQuery Advisor was used to conduct the power analysis. The first aim of the study was a test of the feasibility of the intervention, which did not require a

specific minimum sample size (Cohen, 1992). For the second aim of the study, the results of power analysis showed that 20 participants were sufficient to detect a medium-large effect size of 0.66 with 80% power using a two tailed pre- and post- t test with alpha of 0.05. Medium-large effect size is typical effect size in pilot study aiming to prevent smoking behaviors (Backinger, Fagan, Matthews, & Grana, 2003; Park, 2006). Therefore, the investigator planned to use twenty participants (approximately four groups of five participants). Based on a 20% attrition rate, 25 participants (3-5 youth in each of the five groups) were aimed for the study.

Procedures

After IRB approval was obtained, the program investigator contacted the potential site for the intervention. As a first step in the planning stage, one to two program leaders, who had a main role in leading each session, were going to be recruited among undergraduate students at a local university prior to the study and volunteers at the Baldwin Center. A program guide containing the session goals and instruction guides with resources were provided to the program leaders.

Following study procedures, recruitment and enrollment of all youth participants involved receiving informed consent from the parents and minor assent from the youths. When youth participants enrolled in the program, they were asked to participate in pre-intervention interviews and surveys.

Prior to the start of the program, there were a meeting of the investigator and the staff at the Baldwin Center, who were going to assist with the program, to share the programs goals. The investigator taught video camera skills for the intervention and assist with the group process as needed. Sub-groups of youth participants had time to work by

themselves during the program with the assistance of staff and the investigator. After each session, the program leaders made progress notes, including what was taught, participants' achievements, attention rates, and the resources used, and then validate these with the program investigator. At the end of the program, the investigator asked participants to participate in individual interviews and to complete post-intervention surveys.

Description of the Intervention

In each session, the investigator and staff supervised the group programs, and the investigator taught video camera skills for the intervention. Two to three staff from the organization assisted with the group work. All groups of youth participants met and discussed the goals of each session in a large room at the beginning of the sessions. At the beginning of each session, investigator provided program plans with goals and instruction resources to youth participants for about ten minutes and provided instruction on camera techniques for about ten minutes. After the initial instruction, 3 to 6 participants were grouped together to produce one video during the program. Each group made a unique video. After each group completed the video, all groups got together and share what they did. The investigator, staff, and other groups of youth participants shared their thoughts about the process. After each session, investigator and staff noted progress notes, including what was taught, participants' activities, achievements, attention rates, and the resources used (See Data Collection section for program progress note form.)

The participatory video production was implemented in eight sessions over four weeks to ensure the fidelity of the program during summer (Table 3). The process consisted of three phases, including pre-production, production, and sharing, modified

from the seven steps of engaging, identifying, planning, acting, research, reflecting, and sustaining suggested by Norman and Skinner (2007). In the first week, during the pre-production phase, participants took part in ice-breaking sessions and share the goals of the program. As an icebreaker activity, participants created questions for interviews to assess other people's thoughts regarding smoking. In addition, youth participants selected interviewees among other teenagers or adults at the Baldwin Center and conducted interviews based on the created questions. For goal sharing, youth participants decided on the target audiences of their videos. This was a self-learning process about different factors related to smoking, focusing particularly on media, policy, and tobacco companies. In addition, setting rules and ethical training occurred.

Table 3. Program Components (Based on Norman and Skinner model (2007))

Categories	Stage	Program activities
Pre-production	1. Engaging	Sharing thoughts and experiences, setting goals
	2. Identifying	Interviewing other people
	3. Planning	Making a plot
Production	4. Acting	Filming and editing
	5. Research	Assessing the community and policy
Post-production	6. Reflecting	Evaluation and writing; receive a certificate
	7. Sustaining	Community forum and distribution

In the second week, participants identified the determinants and the consequences of smoking and research the issues. Each group of youth participants chose the message for their video. In the third week, the youth group participants planned the scenes and plots, wrote the scripts, and shot the videos. In the fourth week, youth participants edited the videos produced. At the final session, the videos produced were disseminated other teenagers at the Baldwin Center, to a formal forum. During the whole program, youth

participants learned about the camera's functions from the video production instructor and different aspects about smoking from the program leaders.

Data Collection

The qualitative and quantitative data were collected before and after the program by the program investigator using the guiding interview questions and measures below (Appendix A). Demographic data were collected at baseline to assess participants' characteristics (Appendix B). The program leaders and investigator assessed program evaluation during the session using the program progress note (Appendix C); they conducted the survey and interviews before and after the program (Appendix D). Psychological empowerment and behavioral outcomes, including non-smoking, were assessed at baseline and immediately post-intervention (Appendix E, F). For qualitative data, interviews were collected before the intervention starts and after the intervention finishes (Table 4). Individual interviews lasted up to 30 minutes, and the interview was audio-recorded for transcription. Written notes were taken during the interview.

Although the instruments did not require special instructions to administer them to the target participants, to minimize errors in the evaluation process, participants were allowed to ask questions if they were unsure about the meaning. The total time of the evaluation phase, to complete the survey and interview, did not exceed 30 minutes each time, considering the concentration level of the participants. The collected data then were analyzed using the proposed analysis plan. During the data collection process, efforts were made to assure the participants' confidentiality. The audio materials and questionnaires were secured in a locked file, and all questionnaires were coded of each

participant. For example, questionnaire data did not contain identifiable information about participants and pseudonyms (fake names) were used during the interviews.

Measures

Aim 1: Feasibility. For the first aim of the study, the attendance rates, total time, and resources utilized during the sessions were collected, using the program progress notes (Appendix 3), and included in the analysis. The demographic survey was conducted at the beginning of the session to assess participants' demographic characteristics (Appendix 2). Participants' program satisfaction was measured using the program evaluation survey (developed by PI, Appendix D). In addition, individual interviews based on guiding interview questions (Appendix A) were conducted to assess participant's reasons for participating in the program and their expectations about the program, and to examine the feasibility of the intervention by exploring participants' experiences with the intervention after the program.

Aim 2: Psychological Empowerment. Two domains of psychological empowerment, composed of interpersonal and interactional components, were measured using the Youth Group Member Survey (YGMS) (Holden et al., 2004a; 2005). The psychometric properties were reported for adolescents (10 to 21 years old) in multiple states. Construct and content validity were supported by an expert review process and confirmatory factor analysis (Holden et al., 2004). The domain of interpersonal includes three attributes. *i.e.*, industry and interpersonal confidence (Cronbach's alpha=0.65), perceived socio-political control (Cronbach's alpha=0.64), and participatory competence. The interactional domain included three attributes, *i.e.*, knowledge of resources, assertiveness (Cronbach's alpha=0.67), and advocacy. These factors were confirmed with

confirmatory factor analysis (Holden et al., 2004) and structural equation modeling revealed a good fit of the model with a single latent factor of psychological empowerment (CFI>0.96) (Holden et al., 2005). The responses were 5–point Likert-type scale.

Behavioral Outcomes. For the second aim of the study, behavioral outcomes related to smoking, including non-smoking behavior, were measured using a self-reported method at the baseline and at the end of the session. The modified Youth Risk Behavior Survey (YRBS) and the Youth Group Member Survey (YGMS) were used (Appendix E, F; Holden et al., 2004). YRBS was a standard measure to assess youth smoking behaviors, since developed by the CDC in 1988 and was widely used with several revisions to assess smoking behavior (CDC, 2004). Reliability was supported by two test-retest reliability studies for 7th–12th grade students, showing high reliability (kappa=61-100%) (Brenner et al., 1994; CDC, 2004). In the second reliability test, the items showed questionable reliability, and the instrument was revised based on the results. Content validity was supported by expert panels reviewing the literature (CDC, 2004). Since the instrument measures behavior with self-report, it can be a potential threat to the validity. The YRBS questionnaire was developed for middle school and high school students with appropriate readability. The time to administer the tobacco-related questions would take about five minutes. Original YRBS questions on smoking behavior consist of eight items, measuring current smoking patterns and age of initiation were excluded from this study; only the four questions asking about smoking behavior were used. Participants who answer “no” to questions one and four were categorized as non-smokers. The answers to questions two, five, and six were averaged to assess the number of days that tobacco

products are used. Question three was used to assess the number of tobacco products used. Among the participants who answer “yes”, the respondents’ answers were categorized to reflect the number of tobacco products used. The rest of the questions asked how many days they used tobacco. These questions allowed for evaluation of the changes in smoking behavior patterns over time by administering them at different time points.

The intention to smoke was measured with the YGMS; the psychometric properties of reliability and validity for the youth population (10 to 21 years old) were well supported (Cronbach’s $\alpha=0.86$) with high factor loadings from confirmatory factor analysis. This questionnaire contained four items, and the first three questions, based on the susceptibility scale measures (Pierce, Choi, Gilpin, Farkas, & Merritt, 1996), was a standard measure to assess youth participants’ intention to smoke: “Will you smoke during the next year?” “Would you smoke if best friend offered?”, “Will you be smoking 5 years from now?” and, “Number of friend that smoke.” The questionnaire was scored from 0 to 5. Predictive validity is supported for this instrument (Pierce et al., 1996). Since the “never” smokers also have different levels of intention and susceptibility, this instrument was useful for this study, which mostly focuses on non-smokers. Depending on the level of susceptibility, future smoking behavior can be estimated. Susceptible “never” smokers became experimenting or established smokers more often than non-susceptible smokers in a longitudinal study (Pierce et al., 1996). Strong associations were found between non-susceptibility from each item with later smoking experimentation and established smoking behaviors.

Data Analysis

Aim 1 followed the mixed method approach with the concurrent data analysis, and Aim 2 used quantitative analysis. For quantitative data, descriptive statistics, McNemar's test (Westfall, Troendle, & Pennello, 2010), a paired *t*-test, and Wilcoxon Signed Rank test were used (Table 2). For the qualitative interview data, an inductive approach to thematic analysis was used (Hsieh & Shannon, 2005).

The audio-taped interview data were transcribed verbatim by a transcriptionist, and the interview transcription were checked for accuracy by reviewing the audio recording and the transcripts. The data were managed with the N-vivo, a web-based program, which is specialized for the mixed method studies.

Aim 1: For the first aim of the pilot study, to assess feasibility, descriptive statistics for attendance rates and program satisfaction, as well as the total time needed to produce videos were displayed in tables and graphs. Qualitative data from the semi-structured interviews were analyzed based on coding using a structured theme with various strategies to ensure trustworthiness of the data (Appendix A). For the first aim of the study, the concurrent data analysis approach was going to be used, as it is appropriate for the embedded study design (Creswell & Plano-Clark, 2007). Following the procedure of the analysis of mixed methods guided by Creswell & Plano-Clark (2007), both quantitative and qualitative data were analyzed separately in the first stage of analysis. In the second stage of analysis, triangulation of the data were going to be conducted by comparing complete results of quantitative and qualitative data analysis and focusing on how the analyzed results support each other. Similarities and differences were going to be highlighted during the interpretation.

The transcribed interview data were analyzed by the inductive descriptive qualitative analysis (Hsieh & Shannon, 2005; Murnane & Willett, 2010). The preliminary coding scheme was identified based on theoretical framework, however an open-coding technique was used to provide a broader understanding. While reading the transcripts thoroughly, several categories were identified. The categories were arranged to form themes. Sub-themes were identified by clustering related themes in the analysis. The coding themes were compared with the theoretical framework using a structured scheme.

Aim 2: For the second aim of the pilot study, the scores for the psychological empowerment level in each domain were compared between pre- and post-tests. Two-tailed *t*-tests were going to be used to examine and compare the changes in psychological empowerment pre- and post-test. Behavioral outcomes for smoking behaviors (smoking Yes/No) measured through the YRBS questionnaire at baseline and post-program were recorded in terms of two categories: smoker and non-smoker. The total score of the number of tobacco products among smokers was computed at baseline and post-intervention. McNemar's test and a two-tailed *t*-test were used to compare the dichotomous and continuous variables, respectively, at baseline and completion of the study. If there was a violation of assumptions, Wilcoxon Signed Rank test was used instead of a Student's *t*-test. Total scores for the level of intention to smoke were computed at baseline and at the end of the program. The 0.05 level of significance was used for all tests.

Timeline

The study was expected to take about 12 months. In the first stage (two months), the IRB protocol for this study was submitted for approval, and preparation for the

intervention setting with specific plans was confirmed. In the second phase (two months), staff and volunteers were recruited and trained. In addition, the participants were recruited and the consenting process completed (two months). In the third phase (one month), the program was implemented, and data were collected. In the fourth phase (two months) the collected data were analyzed. In the fifth phase (three months), the results were written up and the findings distributed.

Potential Limitations and Strategies to Overcome

There were some potential limitations of this pilot study. First, a one group pre- and post-comparison study design without a control group was used for practical reasons related to the community setting, limited resources, and time; this potentially posed a threat to the validity of the results and limit generalizability because of sample biases (Cook & Campbell, 2010). The reliance on quantitative data that were self-reported can be another potential limitation. However, this study included multiple data sources, so using qualitative data confirmed the findings related to the study's main aims and can enhance the overall validity of the study.

Second, convenience sampling procedures and only a relatively small number of participants were used due to the natural setting of the study and the limited time available. The small number of participants can be a threat that reduces the power of the study and/or the statistical validity of the study (Murnane, & Willett, 2010). The convenience sampling was a threat to the generalizability of the findings and systematic errors. To overcome this limitation, the investigator collaborated with community organizations to reach the targeted population. Recruiting the participants from a summer program of the community-based youth organization was a potential enhancement,

allowing for the recruitment of more participants. To overcome this issue, the baseline characteristics of the participants were assessed in the statistical analysis. Furthermore, once the research questions of this study were answered, a more advanced sampling method can be utilized to expand the findings in future research. The lack of further follow up after the immediate post intervention was another limitation of the study. Considering the fact that this was a feasibility study for a novel approach using video making in youth tobacco control, the limitations mentioned above may not be a serious issue.

Fourth, there may be potential bias regarding the qualitative data in this study. For qualitative data analysis, potential sampling errors in the semi-structured interview, researchers' bias, and lack of participants' disclosures can be potential sources of biases. Different strategies to ensure the trustworthiness of the qualitative data by minimizing these biases were described (Table 4) within four domains, including credibility, transferability, dependability, and conformability (Creswell, 2006; Lincoln, & Guba, 1985).

Table 4. Techniques Used For Trustworthiness of the Qualitative Data

Aspect	Strategies	Description
Credibility	Prolonged field engagement	Researcher builds trust and learn the participants' culture.
How confident are the findings of this study in the truth?	Peer review	Researcher has a process of external check with other researchers.
Transferability	Thick description	Setting and the description of participants are described in detail.
How applicable are the findings of this study in other contexts?		

Dependability	External auditing	The process and products for accuracy are checked with an external reviewer.
How consistent and reproducible are the findings of this study?	Process notes	The each process with decision making is noted.
Confirmability	Triangulation	Triangulate the interview data source with the field notes.
How neutral and objective are the findings of the study?	Bracketing	The researcher recognizes and clarify researcher's position and biases.
	Member check	Researcher confirms the findings and interpretation with the participants.

PROTECTION OF HUMAN SUBJECTS

A. Risk to Subjects

1. Human subjects' involvement and characteristics, and design

In this mixed method study to test the feasibility and effectiveness of utilizing video production for anti-smoking health education, 25 adolescents were going to be recruited as participants. Among the rising 4^h to 8th graders recruited, those who were unable to communicate in English were thus not able to participate fully in this process were excluded. The local Baldwin Center worked closely with the researcher, including the recruitment of participants and the provision of a place to conduct the study. The participants were recruited from those applying to participate in the summer program provided by the Baldwin Center. They participated in the study during eight sessions, over a period of 4 weeks Baldwin Center in Pontiac, MI, over the summer if they choose to participate. The program was a part of the summer programs offered at the center, and the parents of the participants were notified about the program and asked if they want their children to participate in this program; parental informed consent and youth assent

were obtained. The data were obtained before, during, and after the program by conducting surveys and interviews with the participants. In the data, the participants' private information or identifiable data were not obtained.

2. Sources of Materials

The participants in the study learned basic camera skills regarding how to create video products. The participants of the intervention also learned about the risks of smoking behaviors and potential influences from media and tobacco companies. The participants worked in groups of 3 to 6 youths to create a video clips promoting non-smoking behaviors for their extended social network and community members. After completing all sessions, children participating in the video making program were asked to complete a short survey (See Appendix B-F) at the end of the program, which took about 20 minutes. The survey asked them how much they learned from the video making program, some basic demographic questions, and their self-reported smoking behaviors and intention about non-smoking behaviors. In addition 5 to 15 youth were going be asked asked for interview, and all interviews were audio recorded. All materials collected, including the audio materials and questionnaires for the purposes of this study were stored in the locked in a drawer. The investigator was the only one with access to the key to that drawer. Because of the limited inherent risks associated with this study, the investigator did not have any plans for subsequent destruction of the data once the active research phase was completed.

3. Potential Risk

There were no foreseeable risks to participants in this study, given appropriate consent/assent and confidentiality procedures, described below:

The potential risk in the phase of the implementation of the program was possible boredom and/or discomfort hearing about the risks of tobacco use. In order to minimize the risk, participants were able to choose not to participate in the program and evaluation process and they were able to decide to stop participating at any point. Participants were well informed about their choice as to whether or not to participate.

There could be minimal risks of confidentiality regarding the questionnaire and interview. During the data collection process, efforts were made to assure the participants' confidentiality. Questionnaire data did not contain identifiable information about participants and pseudonyms (fake names) were used during the interviews.

The confidentiality was potential risk because of the distribution of the videos produced. The youth participants and parents were clearly informed and consented that there were no use of the videos for private purpose or business except at the community forum (at the end of the session) and for educational purposes, only if they agree.

There were minimal risks of safety issues due to the video camera devices during filming phase, considering the active nature of the activities engaged in during the program. The safety instructions were repeated every session, and the federal guidelines to ensure youth-safety when participating in youth-organizations were followed. Adult study nurses or staff accompanied the participants during filming.

Parent notification forms outlined any potential harm and potential benefits, as well as the clear procedures of the study. It also was explained that participation was voluntary.

B. Adequacy of Protection Against Risk

1. Informed consent

Informed consent was obtained from a parent or guardian for each participant after a clear informational process. Parents were informed about the purpose, procedure, and potential risks associated with the program when they enrolled their children in summer program in person or received a parent notification letter signed by the investigator. The potential risks and how to minimize the risks were explained. Prior to implementation of the program, investigator obtained assent from youth participants after explaining about the program. At each session, youths were told that they do not have to participate; or, if they participate, they were able to stop at any time and do arts and crafts activities. Program leaders used a script to ensure the consistency of the message.

Script for Minor Assent:

The video making program teaches video creation skills and youths will create video clips about anti-smoking campaign. You will learn ways to avoid risky behaviors after participating in this program. Each lesson and/or activity will last 50 minutes. Participating in the video making program is your choice. If you do not want to participate, please tell the program leaders and you can do another arts and crafts activity. It is OK to decide you do not want to participate. If you participate in the video making program you can stop at any time. If you want to stop just tell the instructors and you will be given another arts and crafts activity. If you participate in the video making program, you will be asked to complete a short survey at the end of the program. The survey takes about 20 minutes. The survey asks you how much you liked the video making program and how well you think the program went. For example, one question asks, “The program was interesting” and you can choose an answer from “strongly agree”

to “strongly disagree”. The survey will also ask you questions about your age and grade level. You will not be asked to give your name.

2. Protection against Risk

For program evaluation, the names of participants were not solicited. Completion of the end of program survey, which was administered on the final day of the intervention, also was voluntary. The researcher provided the cell phone number and email address for the parents/guardians to use to contact if they had any questions or wish to withdraw their child from the study. All materials collected for the purposes contained identifiable information about participants and were kept locked in a drawer. The investigator was the only one with access to the key to that drawer.

C. Potential Benefit to subjects and others

There were no direct benefits to those participating in this research study. However, potential benefits of the program were that participants would feel that they learned new skills, including media production skills and media literacy, and strengthened their competencies, to help them avoid risky behaviors in the future. The eventual intention of the study was to provide support for health care providers and/or health teachers striving to create a more effective health education program for their students.

D. Importance of Knowledge to be Gained

This study provided a blueprint for developing a video production process that was able to be replicated across various settings. The findings provided a better understanding of how to use existing, but under-utilized technology in health promotion.

The findings from this program had important implications for those seeking to develop youth health education programs that achieve more favorable and sustainable results.

E. Inclusion of Women

Both female and male students were included in this study. The target population followed the sex/ gender representation of the population of the city where this study was conducted. The ratio of male and female students is 49.8% vs. 50.2%.

F. Inclusion of Minorities

The study aimed to recruit its participant population following these proportions of the racial and ethnic subpopulations of the city as closely as possible in order to represent the appropriate health issues affecting racial and ethnic minorities. Pontiac Schools' Student Body Demographics for 2012-1013, K through 12, were: 43% black, 42% white, 5% Hispanic, 5% Asian/Pacific Islander/Hawaii, and 5% others.

G. Inclusion of Children

The target population of this study was entirely composed of children under 21 years of age (specifically, rising 10-14 years old). This age group represented a critical period for acquiring smoking behaviors, and appropriate health education on smoking issues was therefore timely. The children in this study population participated in this study only after permission was granted by their parents or guardians. During the program planned for this study, children were guided by the adults present, who were staff or investigator. Children also were reminded that they were able to opt out of the study at every session.

H. Targeted/Planned Enrollment Table

Targeted / Planned Enrollment: Number of Subjects			
Ethnic Category	Females	Males	Total
Hispanic or Latino	2	2	4
Not Hispanic or Latino	10	11	21
Ethnic Category: Total of All subjects	12	13	25
Racial Categories			
American Indian/ Alaska Native	1	1	2
Asian	1	1	2
Native Hawaiian or Other Islander	1	1	2
Black or African American	5	5	10
White	4	5	9
More than one race	-	-	-
Racial Categories: Total of All Subjects	12	13	25

I. Resource Sharing

The resources for camera skill education and the risks and consequences of smoking were shared with the participants during the program.

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Appendix A. Interview Guide for Qualitative Data Collection

Aims	Interview questions
Aim 1	<p><At pre-intervention></p> <p>What do you expect to learn from this program? What made you to want to become involved in (this project)? What motivated you to become continue to participate in?</p> <p><At post-intervention></p> <p>What are your thoughts about this program? Do you think this program worked well or not? Why or why not? In what way? How do you think this program was different from other programs? What components/activities of the program do you like? Why? What components do you like? What components do you not like? What makes it difficult for you to participate in the program? How do you think this program can be improved? Let's say that you are a program director—what do you want to organize better? What was the most interesting or least interesting aspect of the program? Did you enjoy the program? What makes you think this project was enjoyable? What aspect of the program did you enjoy? What was your role in the project? What do you think about your role in this project? Do you think your voice was reflected well enough in this project? In what way do you think this program was meaningful? Would you want to participate in the program again if you had the opportunity? If so, why? If not, why not? What did you learn from your experience in this project? In what ways did your involvement in the project influence you? In what way did this program make you feel better? Did any aspect of your experience in this project change your thoughts or any plans for your future?</p>

Appendix B. Demographic Survey

Demographic Survey**ID # _____ Date: _____**

1. How old are you? _____
2. What is your gender? (0) Male _____ (1) Female _____
3. What is the highest grade or year of school you have completed? _____
4. Are you currently enrolled in school or plan to attend school in the fall?
 - (0) Yes
 - (1) No
 - (2) Don't know
5. How well would you say you have done in school?
 - (0) Much better than average
 - (1) Better than average
 - (2) Average
 - (3) Below average
 - (4) Much worse than average
 - (5) Don't know
6. Do you plan to go to college?
 - (1) Yes
 - (2) No
 - (3) Don't know or undecided
7. How do you describe your race or ethnicity? You can choose one than one of the following categories?

- (0) White/Caucasian
- (1) Black/African American
- (2) Latino/ Hispanic
- (3) Asian American
- (4) American Indian or Alaska Native
- (5) Native Hawaiian or Other Pacific Islander
- (5) Other

Appendix C. Program Progression Note

<u>Session:</u> <u>Date:</u>				
Attendance rate				
Activity (Time and resources)	<u>Activity</u>	<u>Time</u>	<u>Resources</u>	<u>Produced materials (Progress)</u>
Observation note Aim1. Aim2. Aim3				
Other Comments				

Appendix D. Program Evaluation Survey

1. Program met my expectations.

Poor Fair Satisfactory Good Excellent

2. Content and usefulness of handouts.

Poor Fair Satisfactory Good Excellent

3. Overall, how would you rate this program?

Poor Fair Satisfactory Good Excellent

4. How much did you like this program?

Poor Fair Satisfactory Good Excellent

5. How much did you learn from this program?

Poor Fair Satisfactory Good Excellent

Appendix E. Youth Group Member Survey (YGMS) (Holden et al., 2004)

1. How sure are you that you can convince family members not to smoke?
2. How sure are you that you can convince your friends not to smoke?
3. How confident are you that you can work effectively against the tobacco industry?
4. So many other youth are active in local teen issues that it doesn't matter whether I participate or not?
5. I like to wait and see if someone else is going to solve a problem so that I don't have to be bothered.
6. I enjoy participation because I want to have as much say in my community or school as possible.
7. I find it very hard to talk in front of a group.
8. I can work with people in this group to get things done.
9. I can influence the decisions my group makes.
10. I can talk with adults about issues I believe in.
11. I can invite others to work on tobacco issues.
12. I can start discussions with others about tobacco issues.
13. In the past year, how many times have you tried to convince other students, your family, or friends to be more concerned about tobacco use?
14. In the past year, how many times have you tried to convince school officials, local businesses, community agencies, or government officials to be more concerned about tobacco use?
15. What resources are available to your group in your community or school to help you work on tobacco issues?
16. Do you think you will smoke a cigarette at any time during the next year?
17. Do you think you will be smoking cigarettes 5 years from now?
18. If one of your best friends offered you a cigarette, would you smoke it?
19. How many of your four closest friends smoke cigarettes?

- Questions 1-3 are 5-point, Likert type scale from I definitely cannot do it to I definitely can do it.
- Questions 4-13 are 5-point, Likert type scale from strongly disagree to strongly agree.
- Question 14 is frequency scale of never, once, 2 or 3 times, 4 or 5 times, 6 or more times.
- Question 15 is an open ended question.
- Questions 16-18 are 5-point, Likert type scale, and the response options are definitely yes, probably yes, neutral or no opinion, probably not, defiantly not.
- Question 19 is 5-point, Likert scale, and the response options are none, one, two, three, four, and not sure.

Appendix F. Smoking Behavior Questionnaire (Adapted from YRBS; CDC, 2004)

The next 4 questions ask about tobacco use.

1. Have you ever tried cigarette smoking, even one or two puffs?
 - A. Yes
 - B. No

2. During the past 30 days, on how many days did you smoke cigarettes?
 - A. 0 days
 - B. 1 or 2 days
 - C. 3 to 5 days
 - D. 6 to 9 days
 - E. 10 to 19 days
 - F. 20 to 29 days
 - G. All 30 days

3. During the past 30 days, on the days you smoked, how many cigarettes did you smoke per day?
 - A. I did not smoke cigarettes during the past 30 days
 - B. Less than 1 cigarette per day
 - C. 1 cigarette per day
 - D. 2 to 5 cigarettes per day
 - E. 6 to 10 cigarettes per day
 - F. 11 to 20 cigarettes per day
 - G. More than 20 cigarettes per day

4. Have you ever smoked cigarettes daily, that is, at least one cigarette every day for 30 days?
 - A. Yes
 - B. No

Appendix G. Parent/ Guardian Consent Form

Parent/Guardian Consent Form

Please read this consent agreement carefully before you give permission for your child to participate in the study. Your child will also receive an assent form; please review the assent form with your child.

Purpose of the research study: We want to study how well a program works to keep kids from smoking. We will help your child to make an anti-smoking video. If you decide that your child to be part of this study, he/she will learn how to use a video camera. Your child will also learn more about why people smoke and what smoking does to people.

What your child will do in the study: Your child will learn to use video cameras and computers. Your child will learn about the effects of smoking. We will talk about keeping people from smoking in your community. Your child will work with a small group. Your child's group will make a video about not smoking. We will show the video to your child's friends and other people at the Baldwin Center. We will also show the video at the local schools and on websites to educate. If you are ok with it, we might show the video to other scientist at conferences. If you do not want your child to be in the study, he/she can join other activities.

At the beginning and end of the program, we will interview your child to learn his/her ideas about the program. We will ask your child to complete a survey to learn about his/her grade, age, sex, and any changes in his/her thinking and behaviors related to smoking after joining in the program. Your child's answers will **not** be shared with you or the summer school staff. During the surveys and interviews, your child can skip any question that makes him/her uncomfortable and can stop the interview/survey at any time.

Time required: The program will take place over eight 1-hour sessions for 4 weeks. The study will take about 20 minutes to complete the surveys and 20 minutes for the interviews.

Risks: Your child may feel uncomfortable when he/she hear about the risks of tobacco. To avoid this, your child will be able to stop joining in the program at any time. Your child's name is not written in the surveys, interviews, or videos, but others may know that your child joined in this study by watching the video.

Benefits: There are no direct benefits to you or your child for joining in this study. However, your child may learn how to use video cameras and computers and helping other child not to smoke in the future. This study may help healthcare providers and/or health teachers working for children's health.

Confidentiality: The information your child provides in the surveys and the interview will not be shared with anyone. You will not be able to see your child's survey answers.

To help us protect your privacy, we have obtained a Certificate of Confidentiality from the National Institutes of Health. The researchers can use this Certificate to legally refuse to disclose information that may identify you in any federal, state, or local civil, criminal, administrative, legislative, or other proceedings. The researchers will use the Certificate to resist any demands for information that would identify you, except as explained below.

The Certificate cannot be used to resist a demand for information from personnel of the United States Government that is used for auditing or evaluation of Federally funded projects or for information that must be disclosed in order to meet the requirements of the federal Food and Drug Administration (FDA).

You should understand that a Certificate of Confidentiality does not prevent your child from voluntarily releasing information about involvement of your child in this research. If an insurer, employer, or other person obtains your written consent to receive research information, then the researchers may not use the Certificate to withhold that information.

Voluntary participation: Your child's participation in this program is completely voluntary.

Right to withdraw from the study: You have the right to stop your child from the study at any time without penalty.

How to withdraw from the study: If you want your child to stop from the study, contact the researcher or staff. There is no penalty for withdrawing.

Payment: Your child will receive a \$10 gift card for joining in the study. Your child will keep the gift card even if he/she withdraw from the study.

If you have questions about the study, contact:

Eunhee Park, RN, APHN-BC
University of Virginia
School of Nursing PhD Candidate

Appendix H. Parent Notification Letter

Parent Notification Letter

Dear Parent/Guardian,

We want to study how well a program works to keep kids from smoking. We will help your child to make an anti-smoking video. If you decide that your child to be part of this study, he/she will learn how to use a video camera. Your child will also learn more about why people smoke and what smoking does to people.

Your child will learn to use video cameras and computers. Your child will learn about the effects of smoking. We will talk about keeping people from smoking in your community. Your child will work with a small group. Your child's group will make a video about not smoking. We will show the video to your child's friends and other people at the Baldwin Center. We will also show the video at the local schools and on websites to educate. If you are ok with it, we might show the video to other scientist at conferences. If you do not want your child to be in the study, he/she can join other activities.

The program will take place over eight 1-hour sessions for 4 weeks. The study will take about 20 minutes to complete the surveys and 20 minutes for the interviews.

At the beginning and end of the program, we will interview your child's ideas about the program. We will also ask your child to answer to a survey about his/her grade, age, and gender, and any changes in ideas and behaviors about smoking. Your child's answers will not be shared with anyone including you or the staff at the Baldwin Center. He/she can skip any question that makes him/her feel uncomfortable and stop it at any time. Your child's name is not written in the surveys, interviews, or videos, but others may know that your child joined in this study by watching the video.

Your child will receive a \$10 gift card for joining in this program. Your child will keep the gift card even if he/she withdraw from the study.

If you have questions about this program, please contact Eunhee Park. If you and your children are interested in participating in this program, please contact the program director or Eunhee Park.

Sincerely,

Eunhee Park, RN, APHN-BC
University of Virginia
School of Nursing PhD Candidate

Appendix I. Minor Assent Form

The Minor Assent Form

Purpose of the research study: We want to study how well a program works to keep kids from smoking. We will help kids make an anti-smoking video. If you decide to be part of this study, you will learn how to use a video camera. You will also learn more about why people smoke and what smoking does to people.

What you will do in the study: You will learn to use video cameras and computers. You will learn about the effects of smoking. We will talk about keeping people from smoking in your community. You will work with a small group. Your group will make a video about not smoking. We will show the video to your friends and other people at the Baldwin Center. We will also show the video at the local schools and on websites. If you are ok with it, we might show the video to other scientist at conferences. If you do not want to be in the study, you can join other activities.

At the beginning and end of the program, we will interview you to learn your ideas about the program. We will ask you to complete a survey to learn about your grade, age, sex, and any changes in your thinking and behaviors related to smoking after you join in the program. Your answers will **not** be shared with your parents or guardians, and the summer school staff. During the surveys and interviews, you can skip any question that makes you uncomfortable and you can stop the interview/survey at any time.

Time required: The program will take place over eight 1-hour sessions for 4 weeks. The study will take about 20 minutes to complete the surveys and 20 minutes for the interviews.

Risks: You may feel uncomfortable when you hear about the risks of tobacco. To avoid this, you will be able to stop joining in the program or the evaluation. Your names are not written in the surveys, interviews, or videos, but others may know that you took part in this study by watching the video.

Benefits: There are no direct benefits to you for taking part in this study. However, you may learn new skills including video-making and helping other students not to smoke in the future. This study may help healthcare providers and/or health teachers working for children's health.

Confidentiality: The information you provide in the surveys and the interview will not be shared with anyone. Your parents, guardians and/or the staff at the Baldwin Center will not see your answers to the surveys.

Voluntary participation: Your participation in the study is completely voluntary.

Right to withdraw from the study: You have the right to stop from this study at any time without penalty.

How to withdraw from the study: If you want to stop taking part in the study, tell the researcher or the staff at the Baldwin Center. If you would like to withdraw after your materials have been submitted, please contact Eunhee Park.

Payment: You will receive \$10 gift care for taking part in the study. You will keep the gift card even if you withdraw from the study.

If you have questions about the study, contact:

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CHAPTER 3: Manuscript 1 – Systematic Review: Internet-Based Program for Youth
Smoking Prevention and Cessation

Target journal for submission: Journal of Nursing Scholarship (published)

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Abstract

Purpose: To review the characteristics and effects Internet-based youth smoking prevention and cessation programs.

Design: Systematic review of published articles in peer-reviewed journals in the last 10 years, focused on Internet-based youth smoking prevention and cessation programs.

Methods: Twelve articles are selected based on the following criteria: studies reporting the outcomes of Internet-based smoking cessation or prevention intervention programs for adolescents who are younger than 24 years old.

Findings: The components of youth Internet-based smoking intervention programs are analyzed based on study features (i.e., sample, design, theoretical basis, analysis, outcome measures) and program characteristics (i.e., focus, setting, frequency, duration, intensity, and different components) that make the programs effective. The most common components of effective Internet-based programs are identified as the following: the use of multimedia, tailored approaches, personalized feedback, and interactive features.

Conclusions: The characteristics and effects of the programs vary, but most programs show positive results in youth smoking prevention and cessation in spite of the studies' limitations.

Clinical Relevance: The evidence from this review provides useful information of recent efforts related to Internet-based youth smoking prevention and cessation programs, which can have significant clinical implications in developing future innovative youth smoking prevention and intervention programs.

Key words: Internet-based program, youth smoking prevention, youth smoking cessation, systematic review

Systematic Review: Internet-Based Program for Youth Smoking Prevention and Cessation

Youth smoking has become a serious concern in recent years (Centers for Disease Control and Prevention [CDC], 2012; US Department of Health and Human Services [DHHS], 2012). For the past few decades, although the overall smoking rate has decreased substantially, it has decreased far more slowly for young people (CDC, 2011). Notably, since 2003 the youth smoking rate has declined only very slowly and the smokeless tobacco use rate remains stalled (CDC, 2012). Every day approximately 3,800 youths and 1,800 adults initiate smoking, with about 1,000 youths becoming daily smokers (CDC, 2012). Overall, 23.9% of high school students and 8.2% of middle school students used tobacco products in 2009 (CDC, 2010). This is a critical issue since young people are more vulnerable to starting use and becoming addicted to tobacco; 88% of current adult smokers, an estimated 45.3 million people, took up the habit during their adolescent years (CDC, 2011; 2012).

Ever since the harm caused by smoking first came to public attention, health care researchers have implemented different interventions targeting youths. Although different types of prevention and intervention strategies have been attempted to deal with this complex youth smoking issue, the effectiveness of youth tobacco interventions is still unclear and presents a challenge (Brindis et al., 2007). In the current environment, where tobacco companies are introducing innovative tobacco products such as attractive flavored smokeless tobacco products, and continue to strategically direct their marketing strategies for these tobacco products at a youthful population, the need for effective, age-appropriate interventions is more urgent than ever.

The Internet can have an impact on smoking and other health behaviors, particularly for youth populations, as adolescents spend a significant proportion of their time using the Internet (Madden, Lenhart, Duggan, Cortesi, & Gasser, 2013). According to the Pew Internet survey, 95% of all teens are online and 74% of teens are mobile Internet users (Madden et al., 2013). The developmental characteristics of adolescence by nature including constructing self-identities, fostering intimate social relationships, seeking stimuli, and avoiding boredom make the Internet extremely attractive with its interactive features, fast overloads of information and fun activity sources. Therefore, as researchers have noted the increasing influence of the Internet on adolescents' daily lives, they have initiated efforts to investigate the Internet as a source for health behaviors, including smoking behaviors (Crutzen et al., 2011).

In spite of this increasing attention from researchers and the growing number of Internet-based programs on smoking prevention and cessation for youth, no studies have examined Internet-based smoking prevention programs focusing on youth systematically. Only a limited number of studies have reviewed Internet-based interventions for smokers (Civljak, Sheikh, Stead, & Car, 2013; Hutton et al., 2011). The purpose of this systematic review is to investigate how the Internet is used for youth smoking prevention programs and how effective the Internet can be as a tool for youth smoking intervention programs. Thus, this review aims to provide (a) trends and gaps of current studies in youth Internet-based programs (b) characteristics of youth Internet-based smoking interventions, and (3) methodological issue of identified studies Therefore, this review is expected to inform the future direction of youth smoking prevention and cessation studies.

Methods

This review followed the protocol of Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) for systematic reviews (Moher et al., 2009). Based on the purpose of the study, inclusion and exclusion criteria are in place and the literature search process is described in the Figure 1.

Inclusion Criteria

Studies were included if: they were published in a peer-reviewed journal in the past 10 years; they were published in English; the population studied was younger than 24 years old; they included Internet-based interventions as a smoking cessation or prevention tool. Studies were excluded if: participants' were over 24 years old; the Internet was used simply as a modality for the research survey tool or as a recruitment tool; they did not include smoking behavior information; they did not provide data-based results including protocol- and feasibility- focused paper without the findings of effects in smoking status. The search was limited to peer- reviewed articles written in English and published in the last 10 years.

Search Strategy

Comprehensive search was conducted, using five search engines, PubMed, Ovid MEDLINE, the Cumulative Index of Nursing and Allied Health Literature (CINAHL), PsycINFO, and Google Scholar (Conn et al., 2003). In addition to these search engines, a manual search was conducted. The following search terms were combined in each category smoking: (smoking, tobacco, health behavior, health promotion); adolescents (children/child, youth/youths, adolescents, teenager/teenagers, young people, young adult young adults); and Internet (health related Internet use, Internet use, Internet, web-based, e-health).

Data Extraction and Synthesis

All study titles and abstracts were initially evaluated by one reviewer based on the eligibility criteria. After the initial screening, full articles were reviewed for eligibility by two authors and the agreed-upon articles were included. After confirming eligibility, one reviewer entered components of the articles in the evidence tables and the second reviewer confirmed the accuracy of the coding. The coding scheme was developed based on the purpose of the studies and the guidelines of the systematic reviews (Moher et al., 2009; West et al., 2002). In the case of any disagreement among reviewers, external review was considered.

Results

Study Selection

The initial search identified 652 articles (Figure 1). The titles and abstracts of these articles were reviewed to determine whether they met the inclusion criteria, which resulted in a list of 46 articles that were potentially relevant. These 46 articles were then fully reviewed to confirm they met the inclusion criteria listed below, and reviewed to identify the purpose, sample, theoretical framework, method, and findings of each. When subjected to closer scrutiny, 33 articles were excluded since their focuses did not match the study criteria. Ultimately, 12 articles were included (Tables 1, 2, 3, 4, and 5).

Features of Studies

Aims. The purpose of 12 studies utilized Internet-based programs for youth smoking prevention or cessation programs is described in Table 1. The majority of these programs (64%) focus on smoking reduction or cessation and only one focused on

smoking prevention (Shegog et al., 2005). Three programs aim for both purposes (Bowen et al., 2012; Buller et al., 2008; Norman et al., 2008).

Settings. The settings of the programs varied (Table 1). Most programs were delivered using only the Internet (Abroms et al., 2004; An et al., 2008; Norman et al., 2008; Patten et al., 2006). However, several Internet-based programs were delivered from school-based settings (Buller et al., 2008; Chen & Yeh, 2006; Evers et al., 2012; Mermelstein & Turner, 2006; Norman et al., 2008; Shegog et al., 2005; Woodruff et al., 2007) and community-based settings, such as summer camp (Bowen et al., 2012). Group-based setting (Abroms et al., 2008) were also used to deliver basic components.

Population. Most studies were conducted in the US with only three studies were conducted outside of the US (Table 1). In total, 10,016 participants are included in the 12 studies. Ages vary from 11 to 23 years old, but the majority of studies focused on either middle school (Buller et al., 2008; Evers et al., 2012; Shegog et al., 2005), high school students (Abroms et al., 2004; Chen & Yeh, 2006; Norman et al., 2008; Mermelstein & Turner, 2006), or both (Bowen, Henderson, Harvill, & Buchwald, 2012; Patten et al., 2006; Woodruff, Conway, Edwards, Elliott, & Crittenden, 2007). Only two studies were conducted for young adults (Abroms, Windsor, & Simons-Morton, 2008; An et al., 2008). As most programs focused on smoking cessation, four studies (33.3%) included non-smokers (Bowen et al., 2012; Buller et al., 2008; Norman et al., 2008; Shegog et al., 2005); the remaining studies (66.7%) included only smokers. One study includes girls only (Abroms et al., 2004) and one study focused on the American Indian population (Bowen et al., 2012).

Study design. Among these, most studies (75%) used a two-armed randomized control trial, while quasi-experimental study designs were used in three studies (Table 2). Quasi-experimental studies include a two-group comparison without randomization (Abroms et al., 2004; Chen & Yeh, 2006) and single group with a pre and post comparison (Shegog et al., 2005). Among two-group comparison studies, although all studies used the Internet as the mode of delivering the program in the intervention group, there were differences in the control groups (Table 3). In four studies, control groups provided no treatment (Bowen et al., 2012; Chen & Yeh, 2006; Evers et al., 2012; Woodruff et al., 2007) and in two studies, control groups provided traditional health education programs, which do not include smoking specific programs (Buller et al., 2008; Norman et al., 2008). Only in four studies, did control groups provide non-Internet-based-smoking cessation or prevention programs (Abroms et al., 2004; Abroms et al., 2008; Mermelstein & Turner, 2006; Patten et al., 2006), and in one study, control group provided brief information about other smoking cessation websites (An et al., 2008).

Outcome measures and follow up. Although outcome measures vary by the purpose of the studies, most studies assessed smoking behavior (point 30day abstinence, point seven day abstinence) as a primary outcome and four studies confirmed self-report with bio-chemical measures in smoking cessation studies. Smoking uptake, intention, attitudes, self-efficacy, and knowledge are common constructs used to evaluate the effect of smoking prevention. Follow-up assessments were conducted anywhere from immediate post intervention to six months later with various outcome measures, depending on the purpose of the studies (Tables 2 and 3). The follow up period of the interventions ranges from one month to 14 months from the pre-test (Evers et al., 2012),

and 41.7% of studies evaluated the effectiveness or efficacy of the program only once at post intervention (Abroms et al., 2004; Buller et al., 2008; Shegog et al., 2005) or one week (Chen & Yeh, 2006) and one month (Bowen et al., 2012) after the intervention without further follow up. Most (58.3%) of the studies evaluated the program at multiple points (Table 2).

Characteristics of Youth Internet-Based Programs

Theoretical models. Most programs used theoretical frameworks when developing or using interventions (Table 3). Several health behavior theories have been applied for developing the content of the programs, of which Bandura's (1986) Social Cognitive theory was most frequently used (Abroms et al., 2008; An et al., 2008; Buller et al., 2008; Chen & Yeh, 2006; Patten et al., 2006; Woodruff et al., 2007). The Likelihood of Action Index (LAI) theory was also used (Bowen et al., 2012; Norman et al., 2008), as well as the Health Belief Model, Theory of Planned Behavior, and Prochaska's Transtheoretical model (TTM) stages of change (Evers et al., 2012). Quite a few incorporated motivational interviewing techniques (Buller, et al., 2008; Norman et al., 2008; Patten, et al, 2006; Woodruff, et al, 2007). However, some studies did not specifically indicate which theory or framework was used.

Intensity, frequencies, and duration. Although all the studies used Internet-based, youth smoking prevention or cessation programs, the intensity, frequencies, and duration of the delivery of the programs varied considerably (Table 3). The frequency of the programs was generally on a weekly to monthly basis, while the duration of the programs ranged from only once (Buller et al., 2008; Shegog et al., 2005) to seven

months. Most program sessions lasted from 30 minutes to two hours when the Internet was used as a mode of delivering the programs.

Unique characteristics of Internet related components. Internet-based interventions consist of different components, such as mode of delivery and follow up source (Tables 3 and 4). Most programs used it mainly as a source of information delivery using the web-site (Bowen et al., 2012; Buller et al., 2008; Chen & Yeh, 2006; Evers et al., 2012; Norman et al., 2008; Patten et al., 2006; Shegog, 2005) or e-magazines (Abroms et al., 2004; An et al., 2008) and/or as a follow-up source, using emails (Abroms et al., 2008; An et al., 2008; Norman et al., 2008) or booster sessions (Mermelstein & Turner, 2006).

Most programs provided multimedia based components, such as video content and stories (Bowen et al., 2012; Buller et al., 2008; Evers et al., 2012; Patten et al., 2006; Shegog et al., 2005), which can attract adolescents effectively. In addition, Internet-based components were used to enhance interaction and engagement by providing tailored feedback to the participants and interactive activities in most programs based on the participants' smoking status (Table 3). Tailored contents of the target population were also provided to the target population (Bowen et al., 2010) and personalized feedback by assessing the current or former smokers' smoking status and changing status (Abroms et al., 2008; Buller et al., 2008; Evers et al., 2012; Norman et al., 2008; Shegog et al., 2005) were unique components that the Internet could provide. In addition, Internet-based components, interactive activities such as discussion boards (Bowen et al., 2012; Chen & Yeh, 2006), Q & As (An et al., 2008; Patten et al., 2006) and self-journaling (Patten et al., 2006), were also commonly used components to facilitate teenagers' engagement,

allowing them to provide effective feedback. There was one study that utilized virtual reality program using avatar, which allows adolescents to explore the decision-making process through online role playing and discussion regarding smoking (Woodruff et al., 2007).

Incorporation of non-Internet components. Although the programs used Internet components in the program delivery, the program has educational non-technology based components with personal involvement (Table 4). The personal involvement varies by the study. Only two studies minimized non-Internet based components, as they wanted to test the whole (An et al., 2008; Patten et al., 2006). A few programs require minimal assistance only for setting up the program in the beginning (Bowen et al., 2012; Buller et al., 2008; Shegog et al., 2005). Several programs included personal components, such as tailored counseling emails by a counselor or online discussion lead by a program moderator or peer supporters (Abroms et al., 2008; An et al., 2008; Norman et al., 2008; Patten et al., 2006). Most programs included personal contacts combined with use of the Internet, such as general group sessions (Abroms et al., 2004; Mermelstein & Turner, 2006), counseling (Abroms et al., 2008), in-person group discussion or motivational interviews (Norman et al., 2008; Mermelstein & Turner, 2006; Woodruff et al., 2007), role playing (Chen & Yeh, 2006; Mermelstein & Turner, 2006), additional materials (Abroms et al., 2008; Evers et al., 2012), and phone calls (Mermelstein & Turner, 2006).

Effects of Youth Internet-Based Interventions

Cessation. Most studies show positive outcomes in the short term with higher rates of quitting smoking from the intervention group compared to the control group with

statistical significance (Buller et al., 2008; Evers et al., 2012; Mermelstein & Turner, 2006; Woodruff et al., 2007), including immediate post-intervention and at three months (Evers et al., 2012; Mermelstein & Turner, 2006). Interestingly, there is a study that reported the opposite results. In this study, the treatment group tended to report lower quit rates compared to the control group, which included an in-person component although it was not a statistically significant result (Patten et al., 2006). Among the 12 relevant studies, most showed positive results regarding the efficacy of the program being evaluated (Table 3). Quit rates range from 4.9% (Buller et al., 2008), 12.2% (Mermelstein & Turner, 2006), and 16.2% (Abroms et al., 2004) at post-intervention; 1% (Patten et al., 2006) and 42.8% at 2 months (An et al., 2008); 3% (Patten et al., 2006), 20.4% (Mermelstein & Turner, 2006), 31.3 (Abroms et al., 2008) to 33.0% at three months (Evers et al., 2012), 6% (Patten et al., 2006) and 20.0% at 6 months (Abroms et al., 2008); 40.5% at 30 week (An et al., 2008); and 6% at nine months (Patten et al., 2006), and 28.7% at 14 months (Evers et al., 2012).

However, in most studies, significant positive results were not reported with long-term follow-up (Abroms et al., 2004; An et al., 2008; Evers et al., 2012; Woodruff et al., 2007). Higher quit rates in treatment than control group did not show statistical significance at three months (Abroms et al., 2008), six months (Abroms et al., 2008), 12 months (Woodruff et al., 2007), and 14 months (Evers et al., 2012). This is consistent with other outcomes, such as a positive increase in action/maintenance stage at three months but no significant difference at 14 months reported (Evers et al., 2012). Rarely were there studies that showed long-term positive results to 30 weeks (An et al., 2008),

although other outcome measures such as the number of days smoked at six months showed positive results in long-term follow-up in one study (Abroms et al., 2008).

Prevention. For smoking prevention programs, generally youth in the treatment group showed positive results in decreasing their intention to smoke with statistical significance (Bowen et al., 2012; Buller et al., 2008; Shegog et al., 2005), compared to the control group. In addition, resistance was increased in the treatment group compared to the control group in spite of the statistically insignificant difference in intention to smoke (Norman et al., 2008). Smoking uptake did not show statistical difference although a higher proportion of nonsmokers in the treatment group compared to the control group (Bowen et al., 2012) and nonsmokers were less likely to smoke in the treatment group compared to the control group (Buller et al., 2008). Positive directional changes regarding attitudes toward smoking and self-efficacy were also reported with statistical difference in some studies (Chen & Yeh, 2006; Shegog et al., 2005), but appear inconsistent in another study (Buller et al., 2008).

Sub-population. Results based on sub-population were also reported in a few studies. There are inconsistent results regarding how the effectiveness of these programs changes depending on the age of the target population. In only a few reports that looked at subpopulations by age when examining the effectiveness of a program, the program was found to be more effective for those in grade 8 or above than those in grades 6 or 7 in middle school (Evers et al., 2012). Another study also showed that older students were more likely to change their smoking behaviors than younger students in the middle school population (Shegog et al., 2005). The results were more inconsistent for high school students, where students in grade 10 were reported to be the most responsive

among students in grades 9 to 11 (Norman et al., 2008), while another study found that the younger population were more likely to quit among students in grades 9 to 12 (Mermelstein & Turner, 2006).

Methodological Issues

Internal validity. Based on the guides of the Agency for Healthcare Research and Quality (2009), quality of studies and strength of evidence of the selected studies are reviewed (Table 5). Although most studies did not have issues regarding study question, population, comparability of subjects, interventions, results, and domains, there are some methodological issues that can introduce a risk of potential bias, regarding randomization, outcomes, and statistical analysis (Table 5). Although most studies utilized RCT study design, there are still some critical issues which can introduce threats to internal validity. Due to the nature of the study characteristics conducted in community or school settings, blinding was not applied in most studies; only one study used blinding for participants (Bowen et al., 2012). In addition, studies that used individual randomization may have caused a diffusion effect when the intervention was conducted in a group setting (Bowen et al., 2012; Norman et al., 2008). The studies used the clustered randomization contamination of the intervention effect, but there are issues regarding lack of description of the concealment process in randomization. Although the majority of studies did not have an issue regarding the analysis, a few did not use intent to treat analysis or failed to report if there are issues related to loss of follow up (Abroms et al., 2004; Bowen et al., 2012; Chen et al., 2006; Norman et al., 2008). Studies that did not use randomized control have some potential biases to internal validity (Abroms et al., 2004; Chen et al., 2006; Shegog et al., 2005), including limited comparability of subjects

(Abroms et al., 2004). There are some remaining concerns regarding the outcome measure, as most studies used self-report to evaluate the study outcomes. Only four studies utilized a way of objective measure, by using the bio-chemical method (Abroms et al., 2008; An et al., 2008; Mermelstein, 2006; Patten et al., 2006). In addition, some studies require a more detailed report of psychometric properties of the instruments (An et al., 2008; Bowen et al., 2012; Shegog et al., 2005; Woodruff et al., 2007), although self-reported instruments are existing instruments previously used in the field of youth smoking studies.

External validity. Only a few studies attempted to assure external validity for generalization with the effort of having diverse sample representation. A few studies used multiple sites, from multiple schools (Ever et al., 2012; Mermelstein, 2006; Norman et al., 2008; Shegog et al., 2005; Woodruff et al., 2007) and multiple states (Patten et al., 2006) (Table 2). Only a few studies described the attempts to having diverse groups (Evers et al., 2012; Mermelstein et al., 2006; Norman et al., 2008; Woodruff et al., 2007). However, it is not sufficient to conclude generalizability of evidences in given studies.

Discussion

This review of Internet-based programs for adolescent smoking prevention and cessation is timely and provides understanding of the benefits of the Internet as a promising tool. A number of Internet-based interventions were developed based on various theoretical frameworks and were tested for diverse population with different intervention frequency, duration, intensity, and study design. Due to these variations, individual study results are difficult to compare and too dissimilar or heterogeneous to combine.

However, in spite of the varying levels of effectiveness (quit rates ranging from 1% to 40%) and opposite directional results in one study, Internet-based programs represent an emerging field and appear to be feasible to implement. There are clinically promising results from the reported studies in youth smoking cessation and prevention, with quit rates as high as 40.5% at 30 weeks and positive trends in smoking prevention. These programs have strengths which include the ability to provide a personalized approach, interactive components, and engaging features, such as multimedia components. In addition, considering the low demands of the program delivery, once the program is developed, Internet-based programs show promise based on the ability to deliver the intervention in various settings, such as community, home, and school-based settings.

In addition, there are limitations related to the effectiveness and efficacy of Internet-based programs from these published studies related to methodological issues. Although the randomized control trial method was the most frequent study design used, which is the gold-standard for evaluating efficacy or effectiveness, it is still difficult to conclude the effect of Internet-based programs, considering the non-comparability of control groups. In addition, considering the variations in program features, it is difficult to conclude which components contributed to the effect of the outcome. In many cases, the Internet was as an additional component used along with personal contacts, and, in most studies, various components were used as a whole.

Youth ages 11–23 can demonstrate great variation between gender, developmental level, and culture. Considering the strength of the Internet-based interventions, such as the possibility of culturally tailored intervention for minority

groups or sub-populations, interventions could be more targeted for certain sub populations in future studies. A limited number of studies was conducted that focused on a specific sub group, such as an American Indian population (Bowen et al., 2012) and girls only (Abroms, 2004). In addition, most studies did not report outcomes depending on ethnicity and only one study showed Hispanic and white students as having a more positive change in intentions to not smoke than their African American counterparts (Shegog et al., 2005).

Although Internet-based programs show great potential for youth smoking prevention and cessation, clearly more research is needed. Effective programs can be developed to target specific populations with a more tailored approach. In addition, further studies for smoking prevention could report the effectiveness of specific components used in the selected studies. Considering the results demonstrating the importance of personal contacts in these programs, how to incorporate an in-person approach along with innovative components using available technology on the Internet, should be also thoroughly considered for future studies.

Clinical Resources

American Cancer Society:

<http://www.cancer.org/acs/groups/cid/documents/webcontent/002963-pdf.pdf>

American Legacy Foundation Legacy for Health:

<http://www.legacyforhealth.org/content/download/2554/33803/version/4/file/LEG-YA+Toolkit+Web-Single+Pages-3.27.13.pdf>

Campaign for Tobacco-Free Kids: <http://www.tobaccofreekids.org/>

Center for Disease Control and Prevention. Multimedia and Tools. Shareable Media:

<http://www.cdc.gov/tobacco/multimedia/shareable/index.htm>

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Supporting Information

Figure 1. Flow chart of the literature search process

Table 1. Summary of internet-based programs based on aims, settings, and population

Table 2. Summary of study design and methods

Table 3. Characteristics of youth Internet-based programs

Table 4. Effect of youth Internet-based programs based on the program characteristics

Table 5. Evaluation of study quality

Figure 1. Flow chart of the literature search process

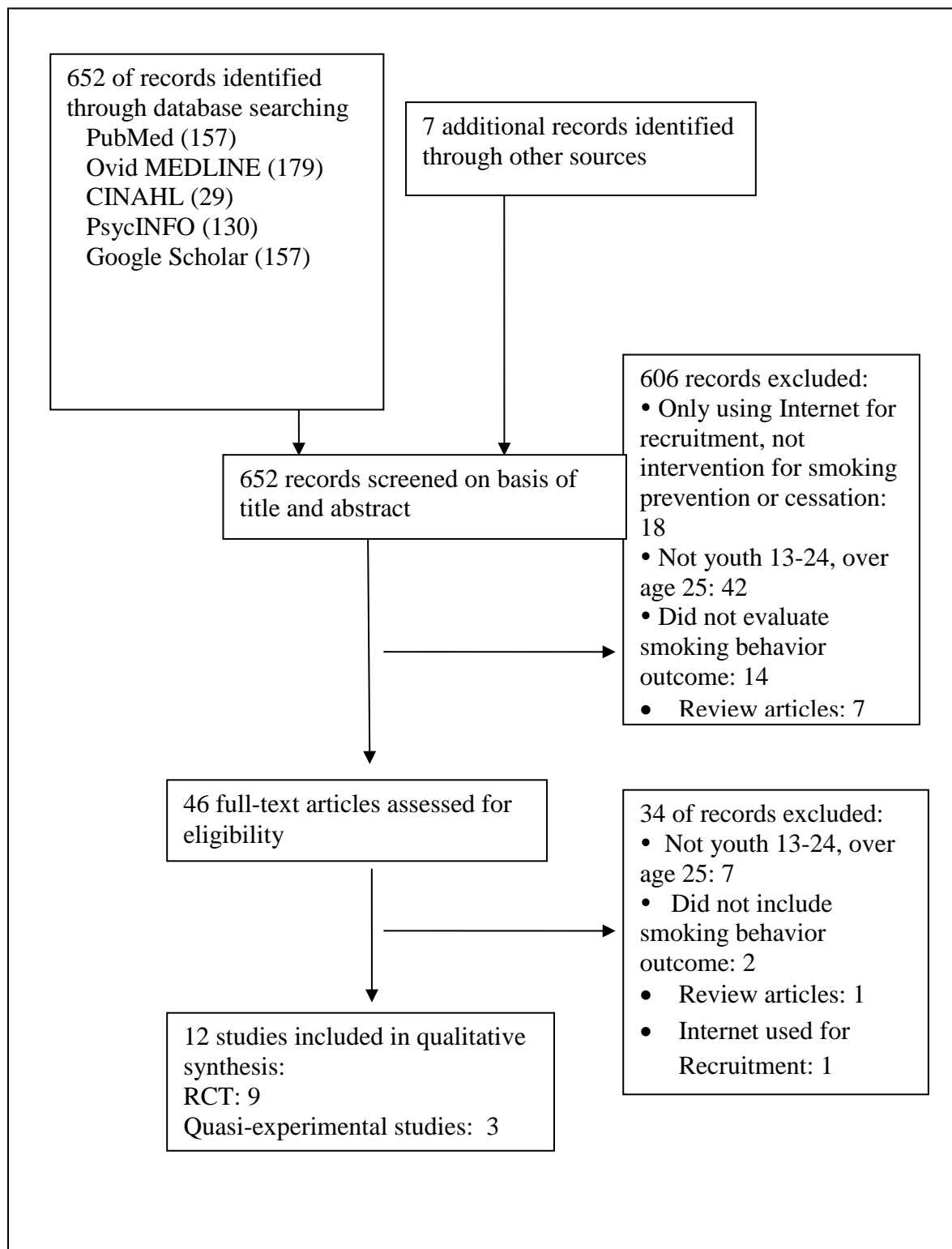


Table 1. Summary of Internet-based programs based on aims, settings, and population

Aims	Setting	First author, year	Age, country	N	Status
Cessation (n=8)	School	Evers, 2012	10-14 years old, US	1590	Current and past smokers or drug users
		Woodruff, 2007	14-19 years old, US	136	Smokers
		Mermelstein, 2006	14-19 years old, US	351	Smokers
	Home	Chen, 2006	Senior high school students, Taiwan	77	Smokers
	Mall (email f/u)	Patten, 2006	11-18 years old, US	139	Smokers
	College	Abroms, 2004	15-17 years old, US	70	Smokers and nonsmokers (girls)
		Abroms, 2008	18-23 years old, US	83	Smokers interested in quitting in next 6 months
		An, 2008	18-24 years old, US	517	Smokers
Combination of Prevention & cessation (n=3)	School	Buller, 2008	10-15 years old, US; 10-16 years old, Australia	1,234 +2,077	Smokers and nonsmokers
		Norman, 2008	9 th -11 th grade, Canada	1,402	Smokers and nonsmokers
	Summer camp	Bowen, 2012	12-18 years old, US	113	Smokers and nonsmokers (American Indians)
Prevention (n=1)	School	Shegog, 2005	average 12 years old (6 th grade), US	2,227	Smokers and nonsmokers

Table 2. Summary of study design and methods

First author, year	Study design	Unit of randomization	Outcome measure	Analysis	Follow up	Sites
Bowen, 2012	RCT	Individual	Smoking Prevention Interactive Experience ASPIRE	T-test, Chi-square test, Factor analysis	At post intervention	1 summer camp
Evers, 2012	RCT	School	Youth Risk Behavior Surveillance Survey (YRBSS)	Random effects logistic models, Last observation carried forward (LOCF), Repeated measures models	3 months & 14 months	22 middle schools
Abrom, 2008	RCT	Individual	Salivary cotinine analysis (6 month), Fagerstrom Test for Nicotine Dependence (FTND)	T-tests, Chi-square	3 months & 6 months	1 college
Norman, 2008	RCT	Individual	Likelihood of Action Scale for Smoking–Adolescents (LASS-A)	Multi-level logistic regression	3 months & 6 months	14 secondary schools
Buller, 2008	RCT	School	Piece et al.'s susceptibility measure et al.	Linear mixed models	At post intervention	25(Australia)+21 middle schools (US)
An, 2008	RCT	Individual	Hooked on Nicotine Checklist (HONC), CO breath testing	Logistic regression modeling	8, 20, and 30 weeks	1 college
Woodruff, 2007	RCT	School	National Youth Tobacco Survey/American Legacy Foundation, the California Youth Tobacco Survey	Generalized estimating equation	3 months & 12 months	14 high schools

Mermelstein, 2006	RCT	School	Carbon monoxide level	Chi-square, Hierarchical linear modeling, Mixed model logistic regression	3 months	29 high schools
Patten, 2006	RCT	Individual	Fagerstrom Tolerance Questionnaire, Cigarette Timeline, CO level.	Chi-square test, Generalized estimating equations (GEE)	4, 8, 12, 24 & 36 weeks	3 States
Chen, 2006	Quasi-experimental study	N/A	Modified smoking risk questionnaire	Chi-square test, T-test, ANCOVA, correlation	At post intervention	1 high school
Shegog, 2005	Quasi-experimental study (Single group)	N/A	Texas Tobacco Initiative Survey	Paired t-test, General linear model	At post intervention	9 middle schools
Abroms, 2004	Quasi-experimental study	N/A	Youth Risk Behavior Surveillance Survey (YRBSS)	Chi-square test, T-tests	At post intervention	1 local mall in one city

Note. RCT=randomized controlled trial

Table 3. Characteristics of youth Internet-based programs

First author, year	Theoretical Basis	Treatment			Control	Frequency Duration Intensity
		Program	Personal involvement	Description		
Bowen, 2012	Not indicated	Adapted SmokingZine	Initial set up+ giving time for the program	Culturally tailored educational modules with multimedia components	No treatment	1 hour/session Daily access Over 4 weeks
Evers, 2012	Transtheoretical Model	Your Decision Count TM	Initial set up+ giving time for the program	Web-based with tailored feedback+ family guide material	No treatment	30-minute/session Three sessions Over 3 months
Abroms, 2008	Social cognitive theory	X-Pack	Personal counseling+ counseling emails	Personal counseling+ self-help kit+ counseling email-based f/u	Clearing the Air program (adult-oriented in-person counseling) w/o f/u	15minutes(counseling)+ Counseling E-mails: 10-12 weekly Over 6 months
Norman, 2008	Likelihood of Action Index and multiple health behavior models	Adapted Smoking Zine	Group motivational interview+ sending f/u emails	Web site+ paper journal+ small group motivational interview+ tailored f/u emails	Review of website on climate change+ journal+ small group discussion	60-min/ session One session+ Monthly e-mails Over 6 months

Buller, 2008	Social cognitive theory/ Arousal theory	Consider This	Initial set up+ giving time for the program	Educational modules with multimedia +tailored feedback	Standard health education	45-60 minutes Once
An, 2008	Social cognitive and problem behavior theory	RealU	Sending f/u emails	Online magazine with tailored feedback + peer support email	Informed of smoking contest and other smoking cessation websites	20 weekly website visits Over 30 weeks
Woodruff, 2007	Social learning and stage of change, social suppose/group interaction theories	Breathing Room Virtual world	Counseling in virtual world+ Motivational interview	Virtual reality program with avatar, interaction with peers and counselor + motivational interview	No treatment	45 minutes/session 7 weekly sessions Over 7 weeks
Mermelstein, 2006	Not indicated	Not on Tobacco+ NOT plus	Phone calls	4 phone call + website [Not Hooked] + quit line	Standard NOT program (Control group: 10 weekly sessions)	5 weekly session+ Follow up sessions Over 6 months
Patten, 2006	Social learning theory, health communication and decision making theories	Stomp Out Smokes (SOS)	Response to questions	Information, journaling, art gallery, Q&A, quiz	Clinic-based, brief office intervention (Counseling + motivational	Over 6 months (Control group: 40-60min/session 4 weekly sessions Over 4 weeks)

interview)

Chen, 2006	Social learning theory	Plus an Internet assisted	Regular group sessions+ set up	Information, group discussion, role-play + discussion forum	No treatment	2 hours/session Weekly sessions Over 6 weeks
Shegog, 2005	Not indicated	Headbutt	Initial set up	Tailored feedback + a graphic character, multimedia components	N/A	20-50 minutes/session Once
Abroms, 2004	Not indicated	STRENGTH + Ezine	Initial health program	STRENGTH program+ Health Ezine (email magazine with quiz and an advice column)	STRENGTH program only without email sessions	10 Ezine volumes+ 20 weekly e-mails Over 7 months

Note. f/u=follow up; w/o=without

Table 4. Effect of youth Internet-based programs based on the program characteristics

Treatment group	Author, year	Control group	Outcomes
Individual based Internet program	Patten, 2006	Clinic based program	<p>Quit rates (30 day abstinence with bio measure): Quit rates were higher for control group than intervention group (12% vs. 6%) at week 24 ($p>0.05$) and (13% vs. 6%) at week 36 ($p>0.05$).</p> <p>Number of days: Treatment group was associated with a significantly greater reduction in average number of days smoked than control group ($P = 0.006$).</p>
	An, 2008	Other online information about smoking	<p>Quit rates (7day and 30 day abstinence with bio measure): Quit rates at week 30 was significantly higher in the treatment (Self-report: 40.5%, CO: 33.1%) vs. the control group (Self report: 23.1%, CO: 16.9%), ($p<0.05$).</p> <p>Number of smoking days: No difference between groups.</p> <p>Readiness to quit: Increased in the intervention group compared to the control group ($p<0.05$).</p>
Individual based Internet program in a group setting	Bowen, 2012	No treatment	<p>Smoking status: Not significant changes in both groups (Proportion of nonsmokers in the treatment group and control 85% vs. 83%, 83% vs. 80% at baseline vs. f/u)</p> <p>Smoking intention: Decline in the intentions to smoke a cigarette in the treatment group and increase in the control group ($p<0.5$).</p> <p>Attitudes: Changes in attitudes about drug effects and negative effects of smoking only in the treatment group in a positive, intended direction ($p<0.5$). No changes in the attitudes regarding social action in both groups.</p>
	Evers, 2012	No treatment	<p>Quit rates (30 day abstinence): Among current users at baseline, higher percentage of quitters in the treatment group vs. control group (33.0% vs. 17.1%, $p<0.05$) at 3 month and at 14 month (28.7% vs. 22.4%, $p>0.05$).</p> <p>Smoking stage: Increase (3.4%) in the treatment group in action/maintenance vs. decrease (-3.7%) in the control group at posttest and 3 month, after controlling for covariates, over time ($p<0.5$). No difference at 14 month. Among people at pre-action stage, there were higher percentage of quitters in the treatment group vs. control</p>

			group (39.6% vs. 24.6%, $p < 0.001$) at 3 month and at 14 month (36.9% vs. 32.1%, $p > 0.05$).
	Buller, 2008	Standard health education	Quit rates (30 day abstinence): Quit rates were higher in the intervention group vs. control in Australia (4.9% vs. 3.0%, $p < 0.05$). Among smokers, 30-day smoking prevalence (whole cigarette) was reduced in the treatment group after controlling for grade level, compared to the control group in the Australia (whole cigarette $p < 0.05$, puff > 0.05) and in the US ($p > 0.05$). Smoking uptake: Non-smokers are less likely to smoke in the treatment, compared to the control group in the US and Australia ($p > 0.05$)
	Shegog, 2005	N/A	Smoking intention: Decreased at the post intervention ($p < 0.05$). Attitude about use of the cigarettes: Changed in a positive direction ($p < 0.05$).
Combination with other components	Norman, 2008	Different program with combination (not about smoking)	Cigarette use: Nonsmokers decreased likelihood of heavy cigarette use and no significant changes in smokers Intention: Nonsmokers ($p > 0.5$) and smokers ($p < 0.5$) reduced the likelihood of heavy cigarette use adoption in the treatment group for 6 months. Resistance: Nonsmokers ($p > 0.5$) and smokers ($p > 0.5$) increased their likelihood of high resistance to continued cigarette use in the treatment vs. control group for 6 months.
	Woodruff, 2007	No treatment	Quit rates (7 day abstinence): Significantly higher in the intervention group than control ($p < 0.05$) at post assessment, but no difference at 12 month f/u Smoking use: Smoked fewer cigarettes and few days in the treatment group than the control group at post intervention ($p < 0.05$), but no difference in the at 3 month and 12 month f/u. Latency to first cigarette and readiness/intentions to quit: Improved in both group, but no difference between groups
	Mermelstein, 2006	Same program w/o Internet components	Quit rates (7 day abstinence with bio measure): Quit rates are higher in the intervention vs. control (12.2% vs. 4.7%) at the end of the program ($p = .06$) and (20.4% vs. 15.7%) at 3-month follow-up ($p < .05$) in the treatment vs. control group, controlling for the covariates.

	Chen, 2006	No treatment	<p>Daily cigarette consumption: Cigarette consumption was reduced ($p<0.05$) and lower in the intervention vs. control group ($p<0.05$). Quit attempt was increased in the experimental group ($p<0.05$) and higher compared to the control group ($p<0.05$).</p> <p>Attitude towards smoking and self-efficacy: Self-efficacy was increased and higher in the intervention vs. control ($p<0.05$). Attitudes (likelihood of smoking) was decreased and lower in the intervention group vs. control ($p<0.05$).</p>
Internet-based follow up source	Abroms, 2008	Different program w/o Internet components	<p>Quit rates (7 day abstinence with bio measure): Higher quit rates (31.3 and vs. 2%) in the treatment vs. the control at 3month ($p>0.5$) and (20.0 vs. 5.7%) 6 month ($p>0.5$).</p> <p>Quit days and number of cigarettes: More consecutive days at the 3 ($p<0.5$) and 6month ($p<0.5$) in the treatment vs. control group. Changes in the number of cigarettes is higher in the treatment vs. control at 3 month ($p<0.5$) and at 6 month ($p>0.05$).</p>
	Abroms, 2004	No follow up	<p>Smoking rates (30 day prevalence): Differences in rates of smokers between the treatment vs. control group (16.2 vs. 18.2%) was not significant ($p>0.05$).</p>

Table 5. Evaluation of study quality

First Author, year	Study question ^a	Study population ^b	Comparability of subjects ^c	Randomization ^d	Blinding ^e	Interventions ^f	Outcomes ^g	Statistical analysis ^h	Results ⁱ	Discussion ^j
Bowen, 2012	●	●	●	◐	◐	●	◐	◐	●	●
Evers, 2012	●	●	●	◐	○	●	●	●	●	●
Abrom, 2008	●	●	●	●	○	●	●	●	●	●
Norman, 2008	●	●	●	◐	○	●	●	◐	●	●
Buller, 2008	●	●	●	◐	○	●	●	●	●	●
An, 2008	●	●	●	●	○	●	◐	●	●	●
Woodruff, 2007	●	●	●	◐	○	●	◐	●	●	●
Mermelstein, 2006	●	●	●	●	○	●	●	●	●	●
Patten, 2006	●	●	●	◐	○	●	●	●	●	●
Chen, 2006	●	●	●	N/A	N/A	●	●	○	●	●
Shegog, 2005	●	●	N/A	N/A	N/A	◐	◐	●	●	●
Abroms, 2004	●	●	◐	N/A	N/A	●	●	◐	●	●

Note. ●=Elements are completely addressed; ◐ = Elements are partially addressed; ○= Elements are not addressed.

Note: Elements for evaluation in each domain are as follows: ^aStudy question: Is the study question clearly focused and appropriate? ^bStudy population: Is the study population well described? Are inclusion and exclusion criteria clear? ^cComparability of subjects: Is group comparability assured? ^dRandomization: Is adequate concealment method used for randomization? ^eBlinding: Is double-blinding used to treatment allocation? ^fInterventions: Is intervention clearly detailed for all study groups? ^gOutcomes: Is there primary and secondary outcome measures specified? Is the method of measurement used standard, valid, and reliable? ^hStatistical analysis: Is there an appropriate analytic technique used to address study withdrawals, loss to follow-up, missing data, and intention to treat? ⁱResults: Are the outcome effect and measures of precision provided? ^jDiscussions: Are conclusions supported by results with the consideration of potential biases of the studies?

CHAPTER 4: Manuscript 2– Concept Analysis: Agency in Health Behavior and
Promotion

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Abstract

Aim. The aim of this concept analysis was to improve our understanding of agency as a positive factor influencing adolescent health behavior.

Background. Positive health behavior change interventions are a critical concern for healthcare providers as many diseases and deaths occur primarily as a result of unhealthy behaviors. As agency is a key concept that helps to explain human behavior and the relationships between individuals and their environments, understanding the concept of agency is important for improving health behavior and thus promoting a healthier lifestyle.

Design. Descriptive concept analysis

Data sources. Articles were retrieved from Pubmed, CINAHL, and Ovid Medline search engines using keywords to search the literature published between 1993 and 2013.

Methods. This concept analysis followed Walker and Avant's approach to examine the concept of agency and to identify the relationship between agency and health behavior. The definition and use of agency in the context of health was examined by reviewing the literature.

Results. The findings indicate that agency explains how people may act or react to their environment as owners of their lives, particularly when addressing social structure and environment related to health behavior. Based on the antecedents, attributes, and consequences of the agency, an operational definition is suggested and ways to apply agency to improve health behavior are discussed.

Conclusion. This analysis has important implications for health behavior change by linking the individual and social domains. The result of the concept analysis will provide

a basis for conceptual clarification in health behavior theories and facilitate the development of more effective health promotion interventions.

Summary Statement

Why is this research or review needed?

- Agency is a key concept for explaining human behavior in the context of a diverse background, especially when human behavior is explained within a social structure.
- Agency has been used in the context of health; however, there is no clear understanding of this concept.

What are the key findings?

- The attributes of agency are: (1) voluntary, (2) enabling, (3) controlling, and (4) proactive.
- The consequence of agency is reasoned behavior, which results in healthy behaviors and health promotion.

How should the findings be used to influence policy/practice/research/education?

- The attributes, elements, and consequences of the concept of agency are principle components in health behavior interventions that can be implemented to achieve more sustainable results in areas such as policy, practice, research, and education.
- The concept of agency needs to be applied for the further development of health behavior theories.

Keywords: agency, concept analysis, health promotion, public health

Concept Analysis: Agency in Health Behavior and Promotion

Introduction

Agency is one of the most important concepts applied to explain human behavior. This concept has been used in conjunction with terms such as “human agency,” “personal agency,” and “self-agency,” demonstrating that agency is defined differently and can be used in varying ways depending on the context. Since the concept of agency is a key concept for explaining human action, particularly intended human behavior (Bandura, 1989, 2001; Hilton & Elder, 2007), social scientists have explored this concept in some detail. Agency is a major internal determinant of intended human action or behavior within social contexts, and a key concept for explaining humans as social products or social producers (Bandura, 2001; Holland, Lachicotte, Skinner, & Cain, 1998).

In spite of having access to advanced medical technology and seemingly better health systems in general, serious public health issues, such as obesity, cancer, diabetes, and other chronic diseases, persist. These health issues are often preventable, and in part influenced by individual choices and health habits, or *health behaviors*, with an individual’s environment making him or her a logical target of *health promotion* initiatives (Glanz, Rimer, & Viswanath, 2008; Kulbok, & Cox, 2002). Since agency is a key concept in explaining human behavior, particularly with regard to the relationships between individuals and their environments in human action, it is important to understand how the concept of agency can be applied to improve health behavior and thus promote a healthier lifestyle by conducting a thorough concept analysis.

Background

This concept analysis was designed to explore the concept of agency by examining how it has been defined and used in different disciplines and contexts, by applying different philosophical perspectives, and by tracing its historical development. The attributes, antecedents, and consequences of agency were analyzed and an operational definition suggested. These findings were based on integrated analysis of literature that critically examined how the concept has been treated in scholarly articles in the context of health. Finally, ways to apply agency to improve health behavior and identify new approaches that can be used to promote healthy habits are discussed.

Walker and Avant's Concept Analysis Method

Walker and Avant's (2010) concept analysis method was used to analyze the concept of agency. Since this approach provides a thorough understanding of the concept that supports theory building, it allowed us to examine how the concept of agency has been used in different contexts and within different theoretical perspectives in addition to its use in health related research. It will thus enable us to understand the application and significance of the concept of agency by appreciating how different aspects of the concept are viewed from multiple perspectives (Baldwin, 2008; Hupcey & Penrod, 2005). As Walker and Avant's (2010) approach also allows for a systematic analysis of core attributes by clarifying ambiguity in the way the concept is used, it also allowed us to examine the recent literature on agency in the context of health.

Procedures

The following procedures suggested by Walker and Avant (2010) was followed in the current analysis. First, the aims of the analysis of the concept of agency were clearly established. Second, key scholarly articles or books, including philosophical, theoretical,

and empirical articles that use the concept of agency, were reviewed to provide a precise focus on scientific progress and theory development (Hupcey & Penrod, 2005). Third, the defining attributes were then explored by synthesizing the findings reported in the existing literature. These studies were carefully read and coded in tabular form into categories including antecedents, attributes, and consequences (Table 1). Fourth, common themes were synthesized, and confirmed by comparison with the findings from historical sources. This required referring back to key articles and books and creating unstructured ways of organizing ideas by incorporating flexibility during the review of the historical development of the concept (Walker & Avant, 2010). The process of searching, coding, and analyzing was continued until the themes became clear. Saturation was achieved once the attributes, antecedents, and consequences of the concept referred to in each article, the model, and any related and contrary cases could be clearly identified.

Data Sources

The search strategies applied to identify scholarly articles included philosophical, theoretical, and empirical articles that use the concept “agency” specifically in the context of health. Surrogate terms for “agency”, namely “self-agency,” “human agency,” or “personal agency,” along with the terms “nursing,” “health,” “health behavior,” or “health promotion” were used to search the Pubmed, CINAHL, and Ovid Medline databases. Additional ancestry searches were conducted to identify relevant articles from the references of included articles. Articles were included in the analysis if they were published in peer-reviewed journals in the past 20 years; were written in English; and discussed the concept of agency in the context of health. The initial search produced 407

articles, and their titles and abstracts were then screened for inclusion. After the initial screening based on the inclusion criteria, 122 articles were selected for further review, during which the articles were assessed for the conceptual clarity of their use of the term “agency.” After this second screening 13 articles that provided conceptual definitions and a theoretical rationale in the context of health promotion were selected for the final analysis and coded. The coding scheme included definitions, statements, antecedents, attributes/elements, consequences, measurements, and findings. Two reviewers conducted the analysis to ensure consistency; there was no disagreement in the findings between reviewers.

Results

Identifying Use of the Concept

The origin of the concept “agency” comes from the Latin word “agentia,” which means “doing.” In the Middle Ages, the equivalent word in English, agent, meant “someone or something that produces an effect” from the Latin word “agere” (*Oxford English Dictionary, 2010*). Since then, the concept of agency has continued to evolve as a topic of major inquiry among philosophers and has been applied in the development of a number of theories about human behaviors in different disciplines.

Discussion of human action in the context of social structure, particularly social class as addressed by Marxism, has evolved considerably as part of the dialogue about the role of agency in the relationship between human and society (Brooker, 2003). Subsequently, post-modernism developed the concept further by arguing whether human beings have free will in a society (Cockerham 2005). Since then, scholars, mainly in sociology, have continued to discuss the agency of human beings. In recent years one of

the main topics in sociology has been the debate on agency vs. social structure, which has raised questions regarding how much agentic freedom human beings have, or whether human beings even have freedom within a society (Hilton & Elder, 2007).

Different theoretical perspectives and/or disciplines have viewed agency differently depending on their perception of how human behaviors are explained, particularly in terms of the relationship between an individual and society or the roles of human relationships. In neuroscience or psychology, cognitive mechanisms can play important roles in determining human action, especially when capabilities for action via neurological or psychological mechanisms within individual are emphasized (Bandura, 2001; Fishbein & Ajzen, 2009). In disciplines where human interactions or social context are emphasized in explaining human behaviors (Bandura, 2001; Holland et al., 1998; Lewis, 2000; Stoutland, 2008; Wenger, 1998) individuals are seen as existing within the community. As a result environment, including social norms, culture and social interaction, influences human actions and must be considered alongside individual psychological capacity when explaining agency (Wenger, 1998). Agency can also be used to explain individuals' active participation within a community (Holland et al., 1998; Wenger, 1998) and their utilization of resources in a physical environment (Bandura; 2001). From an emancipatory movement viewpoint, which is often referred to as "social structure," environment is viewed as a major opponent or determinant of human action. Agency is explained as an individual's reproduction or production of social structure by empowerment or voice (Bourdieu, 1977; Foucault, 1991; Lewis, 2000; Weber, 1946).

Uses of the Concept in Health. The concept of agency has been theoretically and empirically explored extensively in health related studies (Bandura, 2001; Baker, Little, & Brownell, 2003; Cockerham, 2005; Koenig, 2011; Lukkarinen & Hentinen, 1997). Social learning theory, the integrated theory of reasoned behavior, and the theory of planned behavior theory have addressed agency, implicitly or explicitly, in the context of health behavior studies. Social learning theory defined the concept of agency by proposing that individuals have the capacity to change or build environments, identifying the attributes of agency as self-reflectiveness, intentionality, and self-reflectiveness (Bandura, 2001). In the integrated theory of reasoned behavior and the theory of planned behavior, the concept of agency has been defined as perceived control and self-efficacy that influences people's health behavior (Fishbein & Ajzen, 2009).

Agency has also been applied for the better symptom management of patients with various diseases (Epstein & Street, 2007; O'Hair et al., 2003). O'Hair et al. (2003) listed three steps towards enhancing patients' capacity for agency: controlling health, which includes adopting coping mechanisms to help patients deal with uncertainty; empowerment in clinical treatment by encouraging patients to engage in active information seeking and express their concerns through the use of "voice" as an empowering tool; and enhancing agency, defined using the concepts of self-efficacy, control, behavioral actualization, ability, and volition to solve problems.

The concept of agency has also been utilized in public health settings for multi-level health promotion approaches at the individual or community levels. The interactive health promotion model by Rutten and Gelius (2011) explains the relationship between different levels of agency, including individual and social level and its interaction.

Stoutland's (2008) concept of "social agency" explains how collective groups' agency strengthens community level agency by enabling individuals' social participation, as explained by Bandura's (2001) notion of "collective agency", or agency at a group or community level. This perspective emphasizes the contribution made by many individuals working together to change at the community and policy level to improve public health, which ultimately influences individual agency (Emirbayer & Mische, 1998).

Health equity is another area where the concept of agency has been applied in the context of health (Abel & Frohlich, 2012; Blacksher & Lovasi, 2012; Williams, 2003). Since agency is a useful concept for explaining social structure and social environment, it has been used to address health outcomes and social determinants that limit access to health care and reduce opportunities for health education for vulnerable populations such as low socio-economic class or minorities.

Antecedents

Since the concept of agency is considered a major motivator for intended actions or behaviors, particularly when used (as it frequently is) in the context of structure of society, physical and social environments are major antecedents (Factor, Kowachi & Williams, 2011; Rhodes et al., 2011). Physical environment includes the built environment, resources, and media, all of which can influence individuals' thoughts and choices of action (Rutten & Gelius, 2011). In contrast, social environment includes social position, social interactions, and cultural norms; social positioning includes socio-economic factors, and social interactions include interpersonal relationships, while cultural norms mean the norms in that community (Rhodes et al., 2011; Cockerham,

2005; Karlsen & Nazroo, 2002). These structures play important roles in influencing (enhancing or suppressing) human actions, highlighting the importance of environment for individual actions.

Individual factors such as life chances, which are an individual's previous experiences, such as diseases or past life events, and their individual beliefs, attitudes, and knowledge, are all antecedents of agency (Blacksher & Lovasi, 2012; Cockerham, 2005; Sirkeci & Cindoglu, 2012; Gong, Xu, Fujishiro & Takeuchi, 2011). These individual factors, especially knowledge, attitudes and beliefs, are relatively easily modified by educational opportunities.

Attributes

Individual Domain. Agency can be explained on two levels, individual and social (Stoutland, 2008). Individual level agency refers to the way agency affects individual behavioral changes action and social level agency refers to action influencing society. Under both domains, the attributes of the concept of agency are categorized as proactive, controlling, enabling and voluntary, as summarized in Tables 1 and 2.

'Proactive' characteristics may be the most important element of agency as they involve 'future thoughts' about actions and often refer to an awareness of the temporal results of action based on critical thinking about the causal relationship of an action and the future consequences of behaviors when determining those behaviors (Bandura, 2006; Blacksher & Lovasi, 2012; Hilton & Elder, 2007; O'Hair et al, 2003; Rhodes et al., 2011). With regard to the proactive aspect of agency, a self-reflection process that includes critical thinking with future thoughts can result in desired, rational choices of action (Bandura, 2006).

‘Controlling’ characteristics are another important element of agency, and these require an awareness of self-identity with a strong sense of autonomy, with individuals setting their own lifelong goals by controlling their lives as owners (Gong et al., 2011; Karlsen & Nazroo, 2002; Lukkarinen & Hentinen, 1997; Rhodes et al., 2011).

Controlling characteristics reflect the sense of ownership for agency; the characteristics of controlling their lives allows individuals to realize who does action for whom with “I-thoughts” (Synofzik, Vosgerau, & Newen, 2008). In other words, individual’s realization of their ownership of their behaviors and their awareness of having control over their life can enhance positive behaviors with a sense of responsibility (Deci & Ryan, 1995).

‘Enabling’ characteristics, which realize an individual’s capabilities and perceptions of their own power in their behaviors, are another important element of agency (Bandura, 2001; O’Hair et al, 2003) that gives people confidence to take action. Even though people may be aware of the consequences and care about those consequences, when they feel that they are not able to do something it will prevent them acting (Atwood et al., 2011; Lukkarinen & Hentinen, 1997). The element of ‘enabling’ provides an important mechanism that empowers individuals’ behaviors, so it is important to support individuals to enable them to be capable of performing that action. This is explained by a number of similar concepts, such as self-confidence, self-control, self-efficacy or self-esteem (e.g. “I can do it”, “I can control my behavior”, “I know I can do it” and “I am a person who can do it).

The final element is ‘voluntary’ intention (e.g. “I want to do it and I am willing to do it”) for action. Agency is directly related to action, associating a high level of intention with voluntary willingness and achieving the most effective result in action based on the

willingness to perform that action and caring about the outcome of actions, with high levels of motivation and commitment (Bandura, 1993; Miller, 2003). Thus, the voluntary element, which stems from motivation, willingness, and voluntariness (Baker et al., 2003; Gong et al., 2011; O’Hair et al, 2003), is an important part of the concept of agency.

Social Domain. Agency is an important concept for the social domain as it helps explain the underlying power and the causes of the social actions or behaviors in a community or society. Agency in a social domain can be described in terms of the same four attributes as those used above for the individual domain: proactive, enabling, controlling, and voluntary. Proactive characteristics involve the application of critical thinking and future thoughts to understand causal relationships, and an awareness of the temporal results of action, particularly the causal relationships of action in the environment.

Controlling characteristics are explained by the sense of ownership in or of their community and the surrounding environment. When individuals have a strong sense of ownership, they are able to control their environment in their community as insiders through their own actions or behaviors in their community. Ownership requires an awareness of the environment, including an awareness of the social environment that includes social contexts and social norms, and the physical environment such as physical resources and media (Blacksher & Lovasi, 2012).

Enabling characteristics result in self-confidence in a group. The power that comes with self-confidence in groups and communities empowers the individuals in those groups to participate and make their voice heard in their community or in society as

a whole. Thus, having confidence in their community provides individuals with a safe base from which to take action or participate in group activities (O’Hair et al, 2003).

Voluntariness of individuals’ action is another important characteristic related to behaviors in the social domain. Voluntary intention to change their environment or motivation to act in their environment springs from motivation and willingness to take action and how much people care about their environment or community.

Consequences

The primary consequence of agency is action and planned behaviors, which is explained by two levels of domains. The consequences of agency at an individual level are individual choices of action and individual health behaviors, both of which produce real health outcomes (Atwood et al., 2011; Blacksher & Lovasi, 2012; Cockerham, 2005; Factor et al., 2011; Gong et al., 2011; Rhodes et al., 2011; Sirkeci & Cindoglu, 2012). Several studies have shown how limited agency results in negative health choices, such as drug use (Rhodes et al., 2011), and transactional sex (Atwood et al., 2011). In addition, researchers have demonstrated how agency can bring positive results. For example, personal choices for immigration, with a high level of agency, is associated with positive mental health (Gong et al., 2011) and a high level of agency in the medical decision making process has been shown to result in more active participation (Koenig, 2011; O’Hair et al., 2003).

The consequences of agency at a social level include action as participants and voices in communities or society at large. In addition, social agency or collective agency at the collective level can result in social structure changes in cultural norms, social interaction, and social position, as well as changes in the physical environment. This

could ultimately lead to community action or initiatives that result in better community health and policy changes (Blacksher & Lovasi, 2012; Cockerham, 2005; Rutten & Gelius, 2011).

Antecedents, agency, and consequences influence each other through iterative processes, which means that the consequences can serve to change the antecedents of the agency. Thus, agency can change individual health and ultimately influence social factors, including the physical and social environment, which again can influence personal agency at an individual level (Koenig, 2011; Rutten & Gelius, 2011).

Model Case

A 7th grade adolescent lives in a rural area, where both tobacco and alcohol are available to the minors in some stores, and advertisements and movies on the television show scenes of smoking (physical and social environment). Smoking is a common sight, as it is not banned in restaurants. Tobacco farming is widespread in the county; his grandfather worked on a tobacco farm and his father is a smoker (physical and social environment). However, in school health classes he has learned about the harm caused by smoking, and he does not like smoking (knowledge, belief, and attitudes). Recently, some of his classmates have started to smoke and have tried to introduce tobacco to him (social environment). His lifelong goal is to become a football coach or sports physician or manager and he enjoys sports (controlling - ownership). He knows the consequences of smoking and does not want to smoke since he thinks he is too good for it (proactive-future thoughts). He knows that he has the power to reject smoking (enabling - power). Therefore, he decides that he does not want to smoke (voluntary - intentionality).

Very recently, his grandfather died due to lung cancer, and he started to research smoking related issues, learning about political policies and tobacco companies' actions (life chance). He has joined the anti-smoking campaign club in his community (voluntary - intentionality), and started to tell his father and friends about what he has learned and try to persuade them to quit smoking (controlling - participation and voice). He knows the culture of his friends in school and he feels he is an insider there, so is pretty confident in expressing his feelings and thoughts about smoking to other kids (enabling - power). He believes that sharing his thoughts may change others' behaviors or lives (proactive - future thoughts).

Contrary Case: Disposition to Act (Habitus)

The contrary case is well explained by the concept of “dispositions to act.” This concept can be explained in terms of irrational action. A chubby adolescent boy who has just graduated from high school comes from a family that likes to eat fried food and high calorie snacks, seldom if ever buy fresh vegetables, and tends to eat snacks at night. Since his mother and father both work, he often eats fast food. His mother has uncontrolled diabetes. However, he has not questioned his family's eating patterns, and follows his existing eating habits without a second thought. When he enters college, he finds that many people drink alcohol during parties. He does not think about the consequences of alcohol seriously, and frequently drinks alcohol.

Related Concept: Motivation, Self-efficacy, and Empowerment

Motivation, self-efficacy, and empowerment are important concepts that are closely linked to the concept of agency and key concepts, influencing health behaviors (Bandura, 1989; Miller, 2003). Although these are important concepts for understanding

and explaining human behaviors, they are not as sufficient and thorough as the overarching concept of agency for explaining human behaviors, particularly given that they focus primarily on a single aspect, which may be either individual or societal, rather than the associated mechanisms at an individual and societal level. Motivation, self-efficacy, and empowerment can be viewed as part, antecedents or consequences of agency, depending on the theoretical background or perspective.

Empirical Referents

An important part of the concept analysis was to identify several empirical references that attempt to measure the concept of agency or other similar concepts. Since the nature of the concept “agency” is inherently quite complex and the relationship between social structure and individual choice of behavior is especially challenging, reports of the measurement of agency in a quantitative way are limited. However, several researchers have attempted to measure the concept of agency and a number of instruments have been proposed. The General Self-Efficacy Scale (Schwarzer & Jerusalem, 1995) assesses personal agency using 10 items (e.g. “I can usually handle whatever comes my way, I am confident that I could deal efficiently with unexpected events”); the Self-Reflection and Insight Scale (Grant, Franklin & Langford, 2002) uses 20 items (e.g. “I don’t often think about my thoughts”) to assess engagement and the need for self-reflection; and collective efficacy is measured using 12 items that assess school environments (Goddard, 2002).

The way agency is measured can vary widely depending on the conceptual framework of the study concerned or the specific domains that instruments are designed to measure. In the context of health, self-efficacy for specific health behaviors

(Schwarzer & Jerusalem, 2005) or self-care agency is the specific domain in which the concept is applied in nursing science. The Self Care Inventory (Self-as-Carer Inventory (SCI)), which was developed to measure self-care agency with 40 items (Hanson & Bickel, 1985), was tested for different populations such as coronary heart disease patients ($r=0.85$ to 0.78) (Lukkarinen & Hentinen, 1994). The Mental Health-Related Self-Care Agency Scale (MS-SCA scale) is another example that has been designed to serve a specific population ($r=0.90$) (West & Isenberg, 1997). The Appraisal of Self-Care Agency (ASA) scale (Evers, Isenberg, Philipsen, Senten & Brouns, 1993) and the Appraisal of Self-Care Agency (ASAS-R) with 15 items ($r=0.89$) (Sousa et al., 2009) both measure individual self-care agency, which is conceptualized as the capacity for individual self-care and general health promoting behaviors.

Discussion

In summary, agency is defined as an individual's ability to make behavior changes or take action in either an individual or social domain, which includes their own health behavior and capacity to change or build environments in the context of health. According to the analysis, the concept of agency consists of four attributes: "proactive," "enabling," "controlling," and "voluntary." Antecedents of agency are varied, such as life chances, beliefs, attitudes, and knowledge, and physical and social environments. Consequences of agency are expected to be individual behavior changes, which can result in health promotion, as well as social participation and voice in the social domain, which can result in community health.

The findings of this analysis of agency are useful for sustainable behavior changes with implications for health promotion. The concept of agency explains major internal

determinants of intended action or behaviors within social contexts, based on complex mechanisms of health behaviors. The four attributes imply that providing power to individual participants in health promotion programs to control their behaviors and opportunities makes them realize their ownership in their behaviors is important. In addition, a proactive approach, allowing individuals to think about consequences of behavior in the future, is important. To allow individual action for change in a group or society, providing confidence as an insider of the society, and opportunities to be able to understand the environment and the consequences of their behaviors are important. With this approach, individuals will be able to produce more agentic changes in behavior, because these behaviors come from self-realization about their personal goals, intention, and the consequences.

Agency is widely accepted as an important concept for explaining human behavior in society. As such, it is clearly important for developing a theory of health behavior and health promotion that explains how people take care of their health and why they may not. Agency is a particularly useful concept in explaining these relationships more clearly and predicting how people may act or react to their environment as owners of their lives, given the fact that health behaviors are as complex as the human beings and society in which they take place and are intertwined with numerous social factors. Although many health behavior and health promotion theories have evolved and been applied in various ways, there are still limitations when attempting to explain such complex human health behavior in a comprehensive way, largely due to the many different factors that may have an impact, especially interpersonal, environmental and social factors, and the relationships between these individual factors.

A better operational definition of agency may allow researchers to apply the concept more efficiently and thus enable them to identify appropriate ways to explain and change people's health behaviors in the future. Also, interactions between individuals and social levels using the concepts of social agency or collective agency may have implications for public health initiatives. Agency may help create more effective models for vulnerable populations to promote health equity by addressing social structures.

There are some limitations in this concept analysis study as the analysis was conducted solely within the health context and could therefore have resulted in missing some elements of the concept of agency. Also, there could be bias in the analysis phase, although the two reviewers carefully followed the guidelines developed in an attempt to reduce errors. Under the concept of agency, there is an implicit assumption that desired behaviors occur as a result of rational thinking or intentional willingness, which can be a potential limitation given that in the field real-world behaviors are often associated with emotional or irrational thinking. There is also an underlying assumption that agency is a concept that influences and determines health behavior, and is thus a construct that can predict health behaviors.

Conclusion

By considering the elements of the concept of agency identified, it is clear that agency can usefully be applied for a variety of nursing issues to achieve more desirable health outcomes (Hupcey & Penrod, 2005; Walker & Avant, 2010). Addressing the concept of agency may increase the effectiveness of nursing interventions by enabling participants to become more engaged by emphasizing future thoughts (proactive), ownership (enabling), power (controlling), and voluntariness (voluntary) of their

behaviors and life. In addition, agency may provide a better understanding of how to address environmental factors such as cultural norms and the built environment more effectively when delivering nursing interventions for health promotion at the population level. In addition, as a further step, instruments that can be used as an empirical reference need to be developed by incorporating better, more precisely defined concepts.

Since agency relates to human nature and human action, it may be particularly helpful in nursing theories, which deal with human actions and reactions under the stress of various health conditions (Hupcey & Penrod, 2005). In addition to middle-range theories such as health behavior and health promotion, agency could possibly be applied to develop other grand nursing theories. This integrated concept analysis will contribute to nursing research and theory building by providing clearer definitions and a better in-depth understanding of the concept of agency.

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Table 1. Analysis of Agency

Attributes	Selected excerpts
Proactive (Future thoughts)	<p>“..live to different degrees in the past, present, and future.” (Blacksher & Lovsasi, 2012, p.173)</p> <p>“..careful planning can have consequences for future prospects...”(Gong et al., 2011, p. 1618)</p> <p>Agents are “striving for purposeful self-determination, attempting to make sense of, initiate, influence, and cope with events in line with personal values, goals, and expectations of the future in a context of cultural norms, traditions, and past experiences” (O’Hair et al. 2003, p.198, citing Fryer, 1998, p. 12).</p> <p>“Agency can thus be considered a process in which individuals, influenced by their past but also oriented toward the future (as a capacity to imagine alternative possibilities) and the present (as a capacity to consider both past habits and future situations within the contingencies of the moment), critically evaluate and choose their course of action” (Cockerham, 2005, p. 55 citing Emirbayer & Mische 1998, p.963)</p> <p>“...temporal process of social action...” (Koenig et al., 2011. p. 1106)</p> <p>“agency having several analytically discernible components, including the ability to imagine possible future trajectories and the competency to make practical choices in response to the emerging demands in real-time situations.” (Koenig et al., 2011, p. 1106, citing Emirbayer & Mische ,1998)</p>
Controlling (Ownership)	<p>“Human agency highlights the active choices individuals make and actions they take to construct their own life courses under the constraints of social and historical contexts” (Gong et al., 2011, p. 1618, citing Elder, 1994)</p> <p>“..they exercise agency to actively participate in treatment decisions....Patients assert their rights as active participants in medical decision making.”(Koenig et al., 2011. p. 1112)</p> <p>“A state or condition where individuals become empowered to the extent that they understand the choices they want to make, advocate their own rights, take control of their own destiny, and demonstrate the competency necessary for acting in their own best interests.” (O’Hair et al. 2003, p.198)</p> <p>“This dynamism casts agents as capable of having transformative interactions with social structure, including the capacity to ‘critically shape their own responsiveness to problematic situations” (Blacksher & Lovsasi, 2012, p.173)</p> <p>“Through concerted actions such as empowerment and advocacy initiatives, patients should have greater voice in how care will be offered to them and consequently will assume greater control of the context through an enhanced sense of agency. “ (O’Hair et al., 2003, 195)</p>
Enabling (Power)	<p>“...having choices and the competencies to act on them” (O’Hair et al. 2003, p. 198)</p> <p>“..the capabilities of individuals to act.” (Rutten & Gelius, 2011, p. 953)</p>

“The self-care agency includes a set of basic capabilities, such as perception and memory, a set of knowing and doing capabilities, a set of dispositions affecting the goals sought, and a set of significant orientative capabilities and values.” (Lukkarinen & Hentinen, 1997, p. 295)

“Agency beliefs are a person’s perception that he or she personally possesses or can use a specific means to obtain a given outcome, similar in concept to self-efficacy.” (Baker et al., 2003, p. 190)

“We envisage self and drug transitions emerging in a process of ‘structuration’, out of ‘bounded agency’” (Rhodes et al., 2011, p.446).

“Transactional sex appeared to provide adolescent females with a type of social agency, within the confines of their difficult economic circumstances, which enabled them to participate in the post-conflict economy without feeling left behind.” (Atwood et al., 2011, p. 115)

“Self-care agency is the complex acquired ability to meet one’s constant requirements for care that regulates life processes, maintains or promotes the integrity of human structure, functioning and development and promotes well-being.” (Lukkarinen & Hentinen, 1997, p. 295)

“...human agency implies more than just “acting”. It involves being knowledgeable of the rules that govern social interaction.” (Rutten & Gelius, 2011, p. 953)

Voluntary
(Intention)

“...human agency usually involves three elements, including voluntariness, reasons for migration, and planning. (Gong et al., 2011, p. 1618)

“...agency goes beyond the reinforcement of existing structures and points to the ability of actors to draw on patterns of action they already know from other setting when trying to handle new situations.”(Rutten & Gelius, 2011, p. 955)

“Structure and agency interact, with agency playing a role in choosing courses of action among available options that are structured by resources, norms, and class circumstances.” (Blacksher & Lovsasi, 2012, p. 173)

“...agent–patients know that those choices can be made and that they understand where such resources can be accessed.” (O’Hair et al., 2003, p. 198)

Table 2. Attributes, antecedents, consequences, and empirical referents of agency for health behaviors

Individual domain	Social domain
<u>Antecedents</u>	
Life chance Belief Attitude Knowledge	Physical environment Resources Media exposure Social environment Social interaction Cultural norms Social position
<u>Attributes (Important concepts)</u>	
Proactive (Future thoughts) Voluntary (Intention) Controlling (Ownership) Enabling (Power)	Proactive (Future thoughts) Voluntary (Intention, awareness) Controlling (Ownership, Insider of environment) Power (Empowerment)
<u>Consequences</u>	
Health behavior Health promotion	Participation and voice Community health

CHAPTER 5: Manuscript 3 –Youth Participatory Video Production Program for
Smoking Prevention

Target journal for submission: Journal of Adolescent Health

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Abstract

Objectives: The major goal of this pilot study was to develop a youth video production program for youth smoking prevention. This study tested the feasibility of utilizing a youth participatory video making program for tobacco control by identifying attrition rates, necessary resources, reasons for participation and program satisfaction and explored whether youth participatory video making (4th - 8th grade youths) enhances participants' psychological empowerment for tobacco control.

Methods: Participatory video production was implemented in eight sessions over four weeks during the summer program at a youth community center in a low-income neighborhood. Twenty-three youths participated in the program. Multiple data sources including checklists and interviews were used to assess attendance rates, time and resources required, reasons for participation, and program satisfaction. Changes in psychological empowerment and smoking outcomes were measured by pre- and post-intervention surveys (*i.e.*, Youth Group Member Survey and Youth Risk Behavior Survey). Primary quantitative analyses utilized a Wilcoxon test and a secondary thematic analysis of qualitative data was conducted.

Results: Participants produced four video clips containing anti-smoking messages. Three main themes (active engagement, agentic participation for community health, and personal growth and healthy development) emerged from the interview data, providing valuable insights into participants' experiences. There was a significant positive change between the baseline and post intervention in the outcome of all domains of psychological empowerment ($p < 0.05$) and more than 75 percent of the participants considered the program excellent and stated it met their expectations.

Conclusions: This pilot study demonstrated an effective new approach to youth health promotion using participatory video creation by examining how participants' active involvement in producing an anti-smoking video for a community health-promotion campaign decreased their intention to smoke and empowered them as advocates for a non-smoking community. The findings from this study will inform future health promotion research by providing a better understanding of how to use new media and interactive technology to actively engage youth participants in health promotion programs.

Youth Participatory Video Production Program for Smoking Prevention

Adolescent smoking is a serious public health concern, with approximately 3,800 young people taking up smoking each day in the United States (U.S.) alone. Of current adult smokers, 88%, or an estimated 45.3 million, began smoking during their adolescent years (U.S. Department of Health and Human Services [DHSS], 2012; Centers for Disease Control and Prevention [CDC], 2012); and half of all smokers will die from smoking-related causes (DHSS, 2012). Thus, primary prevention of smoking is particularly important because tobacco companies target youths and the effort required to quit smoking is immense and the health consequences are serious, it is far better to never start. However, the success of youth smoking prevention programs with traditional approaches including information delivery, social competence, and social influence has been limited.

Most prevention programs fail to decrease adolescent smoking rates and few effective strategies have been identified (Backinger, Fagan, Matthews, & Grana, 2003; Thomas, McLellan, & Perera, 2013; Johnson et al., 2007). This may be because traditional approaches work on the assumption that adolescents are passive recipients who are highly susceptible to smoking behaviors. As a result, efforts based on education in school alone suffer from severe limitations (DHSS, 2012; Thomas et al., 2013). Therefore, researchers have begun to find evidence on smoking prevention programs that use age-appropriate teaching methods and youth-empowerment approach (Bier et al., 2013; Bottorff et al., 2014; Leiva et al., 2014), and there are promising results to indicate the effect of to enhancing youth participation and engagement (Bozlak & Kelley, 2010; Ross, 2011; Suleiman, Soleimanpour, & London, 2006; Winkleby MA et al., 2004).

There has been increasing interest in the use of digital media, defined as media using Internet or digital devices, for health promotion in various contexts (Buchanan & Murray, 2012; Chou, Hunt, Beckjord, Moser & Hesse, 2009; Eysenbach, 2008; Gubrium, 2009). Most commonly, new media is increasing in popularity as a health education mode or health communication method among healthcare providers and consumers due to its interactive features (Gubrium, 2009; Kass-Hout & Alhinnawi, 2013; Timimi, 2013). Moreover, due to its participatory nature, new media enhances the authentic voices of participants in a community setting as well as engaging people in public health interventions (Iseke & Moore, 2011; O'Mara, 2013). It is also useful for recruitment or surveillance because of its ease of access, enabling health workers to reach large numbers of people in a very cost effective way (Park & Calamaro, 2013).

Digital media involves the process of creating a specific message, which may take the form of art, videos, photographs, written material, or podcasts, and distribution of these messages or products has received growing attention as a way to support positive youth development and civic engagement (Levine, 2008; Lombardo, Zakus & Skinner, 2002; Montgomery, 2000; Stewart, Riecken, Scott, Tanaka & Riecken, 2008). In particular, there is the potential for policy changes or social actions through encouraging young people to participate in the wider society as insiders (Guse et al., 2012; Howard, 2005; Levinson, 2013). In addition, the use of digital media may also enhance the confidence of adolescents by empowering them and by acknowledging their social capital and assets (Berg, Coman, & Schensul, 2009; Thackeray & Hunter, 2010). The pedagogical benefits of digital media make it especially effective as an educational method, because it is more likely to attract the attention of youths, motivate them to

participate and become active learners, and enhance media literacy (Bennett, 2008; Peppler & Kafai, 2007).

Considering these characteristics of digital media for youth development, research has shown the potential benefits of using it for youth health promotion (Eysenbach, 2008; Norman & Skinner, 2007; Robb & Ebberts, 2003). Among the different digital media applications, video making is particularly suited to youth health promotion as it enables adolescents to create messages about health behavior issues and share these messages with the public (Ager, Parquet & Kreutzinger, 2008; Guse et al., 2012; Pel, McClain, Hill & Hayashida, 2012; Sharma, Reimer-Kirkham & Meyerhoff, 2011). Youth generated videos can provide tailored messages on health promotion, allowing us to hear the authentic voices of the adolescents. This in turn can help create more effective messages (De Lange & Geldenhuys, 2012; Flicker et al., 2008; Morton & Montgomery, 2012; Sharma et al., 2011; Poureslami, Murphy, Rootman, Nicol & Balka, 2007) and has the potential for further development as a peer-education method for adolescents.

However, in spite of the growing interest in digital media and its use for adolescent health promotion, there is limited knowledge regarding how best to integrate the process and its outcomes in adolescent health promotion such as tobacco control. Therefore, the purposes of this study this pilot study were to: 1) evaluate the feasibility of the youth participatory video making program for smoking prevention by assessing participants' (a) attendance rate, (b) the total time and resources needed, (c) reasons for participation, and (d) program satisfaction; and, 2) examine how youth participatory video making (4th -8th graders) enhances participants' (a) psychological empowerment for tobacco control, and changes participants' individual smoking behavior related

outcomes, including (b) intention not to smoke and (d) behavior for non-smoking (among smokers).

Conceptual Framework

The Youth Empowerment Framework (Holden et al., 2004a; 2004b) guided this study. In a tobacco control context, the Youth Empowerment Framework is derived from the Nomological Network for Psychological Empowerment Model (Holden et al., 2005; Flicker et al., 2008). Psychological empowerment (PE) is rooted in social action theory and is defined as “empowerment at [the] individual level that integrates perceptions of personal control, a proactive approach to life, and a critical understanding of the sociopolitical environment” (Holden et al., 2004b, p. 581). It is composed of three domains: intrapersonal, interactional, and behavioral. According to the conceptual framework, opportunities to gain control, mobilize resources, and critically understand socio-political issues, enhance the PE of young people (Perkins & Zimmerman, 1995). The intrapersonal domain includes domain-specific efficacy, perceived sociopolitical control, and participatory competence and the interactional domain is composed of knowledge of resources, assertiveness, and advocacy. The behavioral domain includes psychological empowerment related actions (Holden et al., 2005).

METHODS

Study Design

An embedded mixed method design was used to follow the concurrent embedded experimental model (Andrew & Halcomb, 2009; Sandelowski, 1996), with qualitative data supplementing the quantitative data from one group pre- and post-intervention design. This study focused on the feasibility of adopting this approach for adolescent

health promotion. This design was used to provide a comprehensive understanding of the process and the outcome of the proposed intervention (Creswell & Plano Clark, 2007).

Setting and Sample

The Baldwin Center in Pontiac, Michigan, a non-profit community center, agreed to host the study. The Baldwin Center is in a low-income neighborhood and provides a range of educational activities for local youths (10-17 years of age). The demographics in the school district of the Baldwin Center is 39.7 % African American; 49.8 % male and 50.2% female (U.S. Census Bureau, 2010). At the Baldwin Center, 60-70 students enrolled in the summer program.

Inclusion criteria for study participants were: 1) 10-14 years of age, including smokers and non-smokers, and 2) interest in participating in the video production program. A convenience sampling strategy for recruiting intervention participants was applied. Fifteen of the participants were recruited for further individual interviews using a non-probabilistic, purposive sampling approach with attempts to ensure data variability.

Twenty-three young people participated in this study. The majority of the participants (65%) were female and African Americans (46.4%) (Table 1). Two thirds of the participants were average or above average in school achievement and almost all (96%) planned to go to college. Most participants had not tried smoking cigarettes, with nearly all reporting that they had never smoked (n=21).

Procedures

The Institutional Review Board (IRB) approved procedures and materials for this study. The investigator recruited participants from those enrolling in the summer programs provided by the participating non-profit youth community center, and leafleted

local schools, libraries, and other youth organizations using IRB approved flyers.

Approved consent forms included both minor assent and parental consent sections; both students and their parents were required to sign. When adolescents enrolled in the program, they were asked to participate in pre-intervention interviews and surveys. The participants of the intervention received \$10 gift cards as incentives.

Intervention

Eight 60-minute sessions were held twice a week for four weeks. On the first day, groups of 3 to 5 participants were formed and each assigned the task of producing a video. The process consisted of three phases, pre-production, production, and sharing. The pre-production phase included ice-breaker activities, goal sharing of the program, and interview activities. As part of the interview activities, participants created questions for the interviews to assess the thoughts of other people regarding smoking and conducted interviews with other teenagers or adults at the youth community center to learn about smoking issues. They also practiced making video recordings. In the second week, participants identified the determinants and the consequences of smoking and researched issues related to smoking, focusing particularly on media and tobacco companies. In the third week, the youth group participants planned the scenes and plots, wrote the scripts, and shot the videos. In the fourth week, participants edited the videos produced and reshot scenes if necessary. In the final session, the participants disseminated the videos by inviting members of their social networks, including other teenagers at the Baldwin Center, to a formal viewing.

At the beginning of each session, all the groups of youth participants met in a large room and discussed the goals of the session. The program leader and staff provided

program plans with goals, instruction resources for the youth participants (10 minutes), and the investigator taught video camera skills (10 minutes). After the initial instruction, groups of 3 to 5 participants worked by themselves for the most part, with the assistance of staff, program leaders, and the investigator as needed (30 minutes). After small group work in every session, all the groups attended a debriefing session to share what they had done (10 minutes). The program leader, staff, and youth participants shared their thoughts about the process. The participants worked in the same groups throughout, and total of 4 videos were completed.

Measures

The demographic survey measured possible covariates of the intervention outcome. The attendance rate was collected using the program progress notes and checklist. Participants' program satisfaction and barriers were assessed using the program evaluation survey (Appendix D) and semi-structured interviews.

Psychological Empowerment. The 19-item Youth Group Member Survey (YGMS) (Holden et al., 2004a, 2005) was used to measure psychological empowerment. The instrument includes several subscales. The interactional domain includes three attributes: knowledge of resources, assertiveness (Cronbach's $\alpha=0.67$), and advocacy. The knowledge of resources is a single-item measure, and advocacy has two items; the Cronbach's α is not reported for these constructs. Attributes of the intrapersonal domain, *i.e.*, domain-specific efficacy (Cronbach's $\alpha=0.65$), perceived socio-political control (Cronbach's $\alpha=0.64$), and participatory competence, were confirmed (CFI>0.96). Because the participatory competence is a single-item measure, the Cronbach's α is not reported. Sample items include, "How sure are you that you can

convince family members not to smoke?” “How sure are you that you can convince your friends not to smoke?” “I can influence the decisions my group makes.” The self-report instrument uses a 5-point Likert scale (e.g. strongly agree to strongly disagree) and one open-ended item. The Youth Group Member Survey (YGMS) is written at a 3rd grade level and typically takes 15 minutes to complete. Scale dimensions were supported by confirmatory factor analysis (Holden et al., 2004a). The CFA and SEM revealed a good fit of the model with a single latent PE factor (Holden et al., 2004a). Permission was obtained from the authors to use this instrument.

Smoking Outcomes. Non-smoking behavior and intention for non-smoking were measured using four items from the standard Youth Risk Behavior Survey (YRBS) (CDC, 2004). Reliability was supported by two test-retest reliability studies for adolescents ($\kappa=61-100\%$) (Brenner, Collins, Kann, Warren & Williams, 1995). Content validity was supported by an expert panel’s literature review. The intention to smoke was measured using the YGMS; the psychometric properties of reliability and validity for youth (10 to 21 years old) were well supported (Cronbach’s $\alpha=0.86$) with high CFA factor loadings. These items were based on the susceptibility scale measures, which showed high predictive validity, as strong associations were found between each item and later smoking experimentation and smoking behaviors.

Interview. Semi-structured interviews were conducted before this program started and after the total session ended. Among the total 23 participants, 14 youths participated in the pre-interview and 13 youths in the post interview. The interviews were undertaken at the Baldwin Center, and voluntary participation was clearly explained and assured. At the pre-interview, the researcher asked youths to talk about reasons for

participation and past experience in video making programs or tobacco control programs. Youths were asked about expectation of participants. At the post-interview based on the interview guide, youths described their experience and thoughts about this program, including aspects they liked and did not like. This semi-structured interview format enabled youth to express their opinions on smoking and the programs. Each interview took about five to ten minutes. Interviews were tape recorded, transcribed verbatim, and checked for accuracy.

Data Analysis

Both quantitative and qualitative data were analyzed separately. For quantitative measures, descriptive statistics were computed (means, standard deviations) (Table 3) and Wilcoxon Signed Rank test was used to examine the effects of the intervention, with the software SPSS (Table 4). The 0.05 level of significance was used throughout and the Wilcoxon Signed Rank test was used to compare the differences of the scores for the PE level of each domain and total scores for intention for non-smoking between pre- and post-tests.

Qualitative data from the semi-structured interviews were analyzed with an inductive descriptive qualitative approach and thematic analysis (Murnane & Willett, 2010). To provide a broader perspective on the study findings, an open coding technique was applied. Based on the initial coding process, several categories were identified. From reading the data transcription thoroughly, strips were identified and clustered according to their similarities. Categories were arranged by similarities to form themes and compared with the pre-set coding schemes. Additional schemes that occurred were added to the coding scheme as needed. In the second stage of the analysis, triangulation of the

data was conducted by comparing the complete results of the quantitative and qualitative data analysis, focusing on how the results of the analysis supported each other, and similarities and differences were highlighted. Trustworthiness of the qualitative data was maintained by several strategies (Murnane & Willett, 2010): (1) the lead author maintained a reflective notebook to document the process and any preconceived notions about the data as well as maintaining an audit trail and (2) codes, categories and themes were reviewed by two independent researchers for consensus building (EP and JKM).

RESULTS

Feasibility

Program Evaluation. Overall attendance rate was 73.4%, and the attrition rate was 17.3%. Among 23 participants, the average attendance rate of four participants, who missed the sessions more than half, was 37.5%. The average attendance rate was 80.9%. The videos produced are described in Table 2. To produce the videos, one flip camera per group was needed, along with a Mac computer loaded with I-Movie software. These resources were borrowed from a local university. Program satisfaction was high among those who completed the program, as described in Table 3. According to the survey, 75% of the participants considered that the program met their expectations at the “excellent” level. As a result of the program, students produced four videos, containing anti-smoking messages.

Qualitative Data. Interview data gathered at the beginning and end of the program provides an in-depth understanding of students’ motivation for participation, their expectations, program satisfaction, evaluation of the program, and the experience they gained from this program. Several questions were asked to address these evaluative

areas. Based on the transcribed interview data, three themes emerged: active engagement, personal growth and healthy development, and agentic participation for a healthy community.

Active Engagement. Participants perceived the video production program as a ‘fun’ activity. Many participants expected that they would enjoy this program, and this expectation was the main reason they youth wanted to join this program. The reason why this program was generally perceived as a fun program was described well in one student comment: “Because it’s fun. It’s like it’s not just teaching kids to listen but it’s also like you having fun with it too.” This expectation was met, as another student explained: “I just wish we had more people that would participate in this because it’s actually teaching and it’s also fun at the same time. And many young people would like that so.”

Students perceived this program as an active learning process that provided them with opportunities to enhance their creative process. Another student described the process as follows: “Well we got to help create stories instead of you just giving us something and we have to just go with it. We had to improvise and help create what we wanted to do.” These students’ comments show the uniqueness of this program, where much of the control is given to the students, and how important it is to enhance students’ engagement. Unique features of this program included creating scenes, acting, and shooting videos, all of which engaged students in each process and created space for them to express their voices.

Although most students expressed their satisfaction with the program, one student comment provide insights about the challenges of this program: “It was fun, but the only thing I kind of didn’t like was being directed the whole time, and then you only got to be

in one scene, so.” As this student did not have a chance to participate in an acting role, questions are raised about how to make power equal in the groups and distribute roles fairly among students to avoid potential conflicts and maximize every student’s participation.

Personal Growth and Healthy Development. Reinforcement for becoming a non-smoker was one of the main goals that most students wanted to achieve by participating in this program. This included specific educational purposes such as learning about the causes and consequences of smoking and being able to refuse to smoke, as one participant noted: “So I can learn more stuff. Like to not smoke when I get older.” Interestingly, most youth participants were aware of the fact that refusing smoking is not an easy thing to do, even though they were aware that smoking is bad for their health even before they participated in the program. Thus, youths admitted that they need a special program to help support their commitment to lead a healthy life.

As a result of the program, youths’ belief about the harmfulness of smoking was reinforced, and the video production process helped students visualize this harmfulness in a very real way. One participant described it thus:

“I learned lots of things. Smoking’s not really good for you, and I could probably get sick from smoking. I learned that if you smoke, you can get lung cancer, and it’s not good for your body, because once you breathe it in, you can get asthma and stuff like that, and once you get old, you’ll have one of them things around you and then up your nose, and it’s really bad for you.”

In addition to healthy development, youths sought opportunities for self-development by learning a new thing. Several youths in the program expressed their

interest in the filmmaking process and learning new skills related to new technology. In addition, some participants' future dream and goals to become an actress led them to join this program, as they seized the opportunity to gain the skills they would need to pursue their personal dreams. As one explained: "Well, I'm interested in technology and things. And in the future one day, people are going to see me as an actress. So I may as well just get used to it right now." Most youths were satisfied that this was a good learning opportunity, as another said: "Well I learned how to make videos. I learned how to make them and stuff." One participant directly compared this program with other health education programs, saying: "This one is much better. Way much better because you get to, not only teach people, not only help people in their lives but you can also learn different stuff like you can learn how to record and how to edit videos and stuff like that", clearly demonstrating why participants engaged with and enjoyed this program.

Agentic Participation for a Healthy Community. The desire to help other people to not smoke is another key element that youths pursued during this program. One participant expressed this as follows: "I expect the program to teach me so when I get older I don't start smoking, and so I can tell my friends that it's not good to smoke." Youth participants expected that they would learn how to help not only themselves but also other people not to smoke. As one explained: "I want to join in the program so people can know that smoking is not good." This expectation was met, as shown in one youth's comment comparing this program with other traditional education programs: "we're making like videos that helps people to stop smoking."

This program helped participants gain the confidence to help others, as expressed by one participant as follows: "Mm-hm. That's something that at first I was kind of

scared to do. Now it's just like I could, can actually tell people not to smoke. On a scale of one to 10, I'm an eight. Before I was at like a three, four." All but one youth wanted to share the videos they created with others, and they were confident that their videos would be helpful, as described in a participant's comment: "videos will help people that might be going through something, they don't know how to get out or to help somebody get out of a situation they were struggling in". Another described their rationale on the power of videos, as follows: "Well it will be better than somebody just telling somebody to stop smoking because you're actually seeing what can happen. You can actually see what your future might run out, how your future might turn out because you're smoking or how your future will turn out if you stop smoking." Some youths really cared about the effect of the videos produced, as described in the following comment: "Really the only concern I have is that it might not affect some people the way that I think it will. That's mainly my only concern I have." One participant pointed out that it was really about how to help others: "[I learned] a lot of different things like how other people feel about it in different situations where people might not want to but if you give them the right push they actually might actually want to stop, or some people might want to stop but they just don't know how."

It is clear that their personal experience with smokers influenced their willingness to participate in this program, as shown in another youth's comment: "I expect it to change the way people think about smoking because my dad is a smoker." Participants started the program for their personal contacts, but went on to extend their concerns to people that they did not even know. The audiences that participants aimed to help

extended from their local community to the global community, described by several as follows:

- “I think it’s good for me and other people in the United States. No it [different smoking prevention program at school] was just we watched videos on, like we watched different videos on people who used to smoke and what happened to them. How their life turned out and stuff like that. And they was just talking to us and telling us not to smoke.”
- “Everybody in the whole wide world. So they’ll know you’re not supposed to smoke.”
- “For to help, well, try to help any way that I can. Any age group. That could listen.”

Participants’ personal beliefs about smoking were reinforced by the action they took in creating anti-smoking videos for other people and contributing to a healthier community. They expressed their concerns about other teenagers and smokers, as follows:

- “I think it really—it should really stop because it’s going to—it’ll probably hurt them more than it would an adult because of how when—I’ve seen videos and people say when they first started smoking it really did hurt. So I’m like somebody could literally really, really get hurt and end up being in the hospital or even dying from it.”
- “I don’t really agree with teenagers smoking. Don’t think it’s very healthy for them to smoke because it’s hurting their lungs.”

Psychological Empowerment

Quantitative Data. There was a significant change in the pre-test and the post-intervention test at the end of the program in all three domains of psychological empowerment – Intra personal domain, interactional domain and behavioral domain (Table 4). In the intra personal domain, perceived sociopolitical control, participatory competence, and self-efficacy were all enhanced. In the interactional domain, the means of advocacy and assertiveness also changed in a positive way. In the behavioral domain, youths’ intention to smoke decreased, which indicates that they were less likely to start smoking as a result of participating in this program.

Discussion

This study has important implications for health behaviors as well as public health due to its novel approach in the application of digital media. Youth empowerment with video making is particularly relevant for young people in the “YouTube Generation,” as today’s youth are digital natives with high levels of accessibility and use of technologies. The findings from this study provide process and outcome evaluations and deepen our understanding of how digital media that facilitates the process of generating and sharing messages can be used for empowerment in the context of tobacco control. The high levels of program satisfaction and feasibility measured as a result of this program, confirm that the theme of producing videos was perceived as an opportunity for active engagement, agentic participation for a healthy community, and personal growth and healthy development. This study suggests that the use of digital media such as video creation may be an effective model for a sustainable youth tobacco control program in the broader context of youth health promotion and building a sense of community.

Moreover, the findings of this study support a better understanding of more useful and effective ways to develop advanced health communications for young people. Given these benefits, allowing for authentic youth voices, digital media clearly has the potential for further development of a peer-education or culturally tailored prevention initiatives. Considering the relative ease of the video production process made possible by today's technology and ready access by a wide audience, the implications of utilizing digital media to guide the possible development of youth health promotion programs extends to the macro-level of society. In this context, the use of digital media may provide a way of connecting individual youth to society as active producers of messages promoting healthy behaviors and supporting anti-smoking campaigns, given that the findings of this study indicate positive changes in psychological empowerment. The program was also perceived as opening up new opportunities for youth to participate in community health promotion efforts (Oladipo, 2009; Holden et al., 2004a, 2004b).

Producing a video with anti-smoking messages for family, friends, and the public, is theorized as an individual action to enhance health promotion among members of society. The study findings suggest that video production of anti-smoking messages will result in psychological empowerment over individuals' health behavior, which ultimately contributes to a smoke-free society. The paradigm of health promotion strategies is changing and a youth oriented approach is becoming more common; this positive approach to prevention based on the use of a new type of technology can be a key theme of research for adolescent health education and health promotion. Thus, digital media can provide a useful and effective way to guide this new and innovative approach to changing health behaviors in adolescents.

However, there are limitations affecting this study. First, a one-group pre-and post-comparison study design can pose a threat to validity for causal inference of the results (Murnane & Willett, 2010). Second, sample biases with convenience sampling procedures, given the practical issues inherent in community-based settings, and lack of variability due to relatively small samples, could potentially limit the study's power, statistical validity, and generalizability of the findings (Cook, 1979). Because this is a feasibility study, exploring the process from the participants' experience rather than statistical significance was the main priority (Bowen et al., 2009). Third, there may be a potential bias in the trustworthiness of the qualitative data given the mixed method design; specifically related to the researchers' bias from the quantitative data, potential sampling errors, and lack of participants' disclosures, even though different strategies to ensure trustworthiness such as credibility, transferability, dependability, and conformability were utilized. In addition, the sample characteristics in this study could also be the source of selection bias, considering that this sample volunteered to participate. In addition, there was a risk of social desirability bias, as the students may have wanted to provide the "correct" answers in order to please the researcher.

The findings of this study suggest a number of questions for further research. Although the participatory video making strategies were identified as positive educational strategies to empower youth for their healthy development and social participation, the question of how much guidance should be given to the participants and how much power can be given to the youth participants remains open to debate. In addition, to make this participatory video-making program more generally applicable, strategies to minimize

potential bias need to be implemented. Further research could include follow-up to determine long-term impact on smoking behaviors months or years later.

This study shows effective strategies of video production that empower young people to resist taking up smoking and to voice their thoughts on tobacco control for their community. Thus, this program may be useful for other health behaviors, particularly for community-based approach in diverse settings including school. In addition, the video making strategies can be extended with various devices such as mobile phones, I-Pads, web-cameras, and home videos. These devices have a high level of accessibility in today's society. The findings of this study will guide future youth health promotion research and practice by providing understanding of the innovative use of new media and technology.

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Table 1. Demographic Information

<u>Variables</u>	<u>Participants</u>
	<u>N (%)</u>
Gender	
Female	15 (65.2%)
Male	8 (34.8%)
Race	
White/ Caucasian Americans	2 (8.7%)
Black/African	13 (56.5%)
Latino/ Hispanic	8 (34.8%)
School Achievement	
Better than average	13 (56.5%)
Average	6 (26.0%)
Below average	3 (13.0%)
Don't know	1 (4.3%)
College	
Plan to go to college	22 (95.6%)
Do not plan to go to college	1 (4.3%)
	Mean (SD)
Age	10.95 (1.43)
Smoked cigarettes	
Have you ever tried cigarettes smoking, even one or two puffs?	
Yes	2 (8.7%)
No	21 (91.3%)
Total	23

Table2. Description of Videos Produced

Group 1 (6:18)	Scene 1	A girl starts smoking due to academic stress and peer pressure.	
Drama	2	She is persuaded by her boyfriend's persuasion to quit smoking.	
	3	She discusses the consequences of smoking with her friends.	
	4	After she has quit smoking, she tells others about her success, including her healthy pregnancy.	
Group 2 (4:24)	1	Intro - comments about why smoking is bad for health	
Interview	2	Rap on harmfulness of smoking	
	3	Interview 1	
	4	Interview 2	
	5	Interview 3	
	6	Interview 4	
	7	Interview 5	
Group 3 (1:31)	1	Dramatization of the consequences of being a young smoker	
Drama			
	Group 4 (4:56)	1	Dramatization on the initiation of smoking
			Hospitalization after smoking
			Traffic accident
			Hospitalization
			Young people's smoking scene
		Consequences of smoking: Going to jail	

Table 3. Program Satisfaction

Program Satisfaction	
Program met my expectations	
Excellent	21 (75.0%)
Good	2 (7.1%)
Satisfactory	0 (0%)
Fair	0 (0%)
Poor	0 (0%)
Content and usefulness of handouts	
Excellent	20 (71.4%)
Good	3 (10.7%)
Satisfactory	0 (0%)
Fair	0 (0%)
Poor	0 (0%)
Overall, how would you rate this program?	
Excellent	19 (69.9%)
Good	4 (14.3%)
Satisfactory	0 (0%)
Fair	0 (0%)
Poor	0 (0%)
How much did you like this program?	
Excellent	21 (75.0%)
Good	2 (7.1%)
Satisfactory	0 (0%)
Fair	0 (0%)
Poor	0 (0%)
How much did you learn from this program?	
Excellent	19 (67.9%)
Good	4 (14.3%)
Satisfactory	0 (0%)
Fair	0 (0%)
Poor	0 (0%)

Table 4. Comparison of Pre and Post-test in Changes of Psychological Empowerment

	Pre-intervention (Mean (SD))	Post- intervention (Mean (SD))	p-value
Intra personal Domain			
Perceived sociopolitical control	12.85 (2.37)	14.92 (2.37)	0.01
Participatory competence	7.23 (1.30)	9.0 (0.90)	0.001
Self-efficacy	10.18 (3.61)	14.79 (1.92)	0.005
Interactional Domain			
Advocacy	4.27 (2.91)	5.17 (2.92)	0.004
Assertiveness	10.55 (1.50)	13.6 (1.92)	0.007
Behavioral Domain			
Smoking Intention	16.60 (3.42)	18.71 (0.69)	0.016

CHAPTER 6: Conclusion

Smoking is one of the most challenging health behavior issues for adolescent health promotion, as adolescent smoking has serious consequences for both the individual and public health (Centers for Disease Control and Prevention [CDC], 2012; U.S. Department of Health and Human Services [DHHS], 2012). Preventing adolescent smoking initiation is critically important; once adolescents start smoking, it is difficult for them to quit due to the addictive effects. In addition, considering that they are starting the habit at a critical time for youth physical growth and will likely go on to smoke for the rest of their lives, the harmful effects of smoking for adolescents are particularly serious (CDC, 2011). Smoking initiation is a complex health behavior issue with multiple factors, such as individual, interpersonal, and socio-contextual factors (Ennett et al., 2010, Hiemstra, Otten & Engels, 2012; Kulbok et al., 2008; Leatherdale, McDonald, Cameron & Brown, 2005; Mahabee-Gittens et al., 2011; Morrell, Song, & Halpern-Felsher, 2010; O'Loughlin, Karp, Koulis, Paradis & DiFranza, 2009). Moreover, adolescence is an important time for smoking prevention, given their unique developmental characteristics at this stage in their lives; for example, adolescents have high levels of resilience, autonomy, and curiosity (Albert & Steinberg, 2011).

Given the needs for innovative youth smoking prevention programs, this pilot study provides important understanding for youth smoking prevention and health promotion research. The findings of the literature review provide an understanding of how Internet and digital media have been applied to adolescent smoking prevention, and the interactive features are identified as a key component for a successful outcome. Furthermore, the conceptual understanding of agency and the findings of the feasibility

study support that digital media is an important medium for youth empowerment. Using digital media in adolescent smoking prevention programs has the potential to enhance youth agency and thus support individual positive health behaviors for the youth's own health promotion and for community health participation.

The findings of this pilot study have important implications for practice, research, theory, and policy. This study has implications for practice that will advance youth health promotion interventions by applying up-to-date scientific knowledge related to the use of participatory technology. This study identified the roles of the Internet and digital media as well as its uses in youth smoking prevention, and explored how the youth video making approach can be used for youth smoking prevention. The findings from this study on how digital media can enhance youth agency development and thus support positive health behaviors for both an individual's own health promotion, as well as community health participation. In addition, the findings provide useful knowledge about the process of applying interactive technology to youth health promotion programs. This new direction of digital media shows promise for future applications, as well as in the development of new ways to use digital media as useful and effective guides to enhance youth engagement for health education programs.

Moreover, the findings of this pilot study have public health implications; specifically, to develop health communication strategies and tailored health promotion messages for the younger generation, who are "digital natives" with high level of accessibility via mobile phones, web-cameras, or home videos, and the easy access to computers. Digital media is particularly beneficial to reach adolescents, who are not generally easy to reach for health promotion interventions. This study will also guide the

development of youth health promotion and positive youth development programs that encourage youth to become agents who contribute to their individual smoking prevention and local smoke-free community; creating a more sustainable intervention to enhance health promotion. Thus, public health implications of this study include the possibility of developing innovative health promotion programs and targeting individual- and community-level health promotion programs.

This pilot study also has implications for future research, as the findings contribute new knowledge to the area of adolescent smoking prevention and health promotion by addressing the gaps identified in the literature. First, this study provides the first review on the application of Internet for youth smoking prevention and identified the limitations and gaps in the literature. Based on these findings, the feasibility of participatory video making is explored as the first study that applied participatory video making in the youth tobacco control context. In addition, the findings that digital media can guide youth agency development and empowerment adds knowledge in the youth tobacco control research. These findings can help build a better understanding of adolescent smoking prevention and health promotion, and identify the needs for further research on the application of participatory digital media in youth health promotion.

This pilot study has implications for theory building. The findings of this study add to the conceptual understanding of the concept of agency. More importantly, the findings also provide direction for building a health promotion model. The findings of this study support the role of agency in the context of youth smoking prevention and health promotion with digital media as a medium to facilitate the outcome of individual participants' health promotion, as well as individuals' participation for their community

health. Given the findings of this study, there is greater potential to develop multi-level health promotion strategies and models for individual-level health promotion programs, as well as community-level interventions.

This pilot study provides policy implications for youth smoking prevention and health promotion. As the paradigm shifts from traditional health education studies to more youth-oriented approaches, which are more positive and pro-active, the findings of this study point to considerations for policy makers to fund more youth-oriented health promotion programs. Furthermore, this study provides implications related to the use of the Internet and digital media in future applications, and the development for health promotion, health communication, and public health. Given the fact that digital media is popular in younger members of society, it may be worthwhile to provide support for developing new types of the prevention approach to reach these “digital natives.”

In conclusion, this pilot study will guide future efforts to advance the process of youth participation in health promotion programs using digital media production. Since this study occurred in a community based organization and findings show youths’ contribution to community health, digital media can be used to enhance partnerships and community engagement, as well as provide new ways to utilize digital media for community building studies. Moreover, considering the characteristics of digital media, which are relatively simple to produce and readily accessible by a wide audience, the implications of utilizing digital media in this fashion to guide the possible development of youth health promotion programs extends to the macro-level of society. Furthermore, the findings on ways of how to enhance youth agency for health promotion using digital

media may help create more effective models for marginalized populations, including youth promoting their voices by enhancing their agency and addressing social structures.

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