Preventing substance abuse and relationship violence: Proof-of-concept evaluation of a social, multi-user, tablet-based game

Nada Elias-Lambert [a,*], Javier F. Boyas [b], Beverly M. Black [c], Richard J. Schoech [d]

[a] Texas Christian University, Department of Social Work, United States
[b] The University of Mississippi, Department of Social Work, United States
[c] The University of Texas at Arlington, School of Social Work, United States
[d] The University of Texas at Arlington, Department of Computer Science & Engineering, United States

ABSTRACT

Increasing evidence suggests that using technology and Internet-based methods in prevention programming can be an efficacious delivery practice. This literature implies that applying digital technologies to prevention may provide a unique opportunity to carry out interventions with reliability and in a manner that is more appealing and suitable to youth. This exploratory study reports on a proof-of-concept evaluation of *Choices & Consequences*, a substance abuse and relationship violence prevention program that integrates digital technologies and devices with game-based behavior change techniques. Six focus groups ($N = 44$) were conducted with youth living in a Southwestern city. Results suggest that youth preferred various aspects of this prevention game to traditional methods. They especially liked that the game was engaging and that they were able to learn in both formal and informal environments, that is interacting with each other and a facilitator or playing the game on their own. Results also found that youth learned many lessons while playing the game and they believe the game may help prevent substance abuse and relationship violence among the target population of early adolescents. Thus, this research suggests that prevention programs for youth that combine interactive methods, mobile technology, social networking, and competitive gaming could be a strong alternative to traditional delivery methods.

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1. Introduction

There is growing recognition that the leading health hazards among youth in the United States (US) are health-risk behaviors (Paperny, 2004). Two risky behaviors that have detrimental consequences for health among youth are substance abuse (SA) and relationship violence (RV). For example, according to the US Centers for Disease Control and Prevention (CDC), injection drug use among youth is a recognized path of transmission of blood borne infections, mainly HIV and hepatitis B and C, while the use of illicit drugs is linked to increased rates of tuberculosis and sexually transmitted diseases (Belani et al., 2012; CDC, 2007). In relation to RV, the CDC (2006b) found that youth victimized by physical RV are more likely to engage in risky behaviors including episodic heavy drinking, sexual intercourse, attempted suicide, smoking, and physical fighting. Silverman, Raj, Mucci, and Hathaway (2001) found that RV (both physical and sexual) among youth was significantly associated with drug abuse (heavy smoking, binge drinking,

driving after drinking, and cocaine use), unhealthy weight control (diet pill and laxative use), sexual risky behavior (intercourse before the age of 15 years and having three or more sex partners in the past three months), and suicidality (considered and attempted suicide). Psychological RV, such as control and intimidation tactics, also affect the physical and psychological health and well-being of youth (Campbell et al., 2000; Coker, Smith, Bethea, King, & McKeown, 2000). Psychological RV correlates with high levels of depression, poor educational outcomes (Johnson, 1995), risk behaviors including episodic heavy drinking, adolescent sexual intercourse, and fatal suicide attempts (Coker et al., 2000; Gormely & Lopez, 2010). Thus, there is a continuing need for identifying innovative prevention approaches that deter youth from engaging in health-compromising behaviors such as RV and SA.

Increasing evidence suggests that using technology and Internet-based methods in prevention programming can be efficacious and a preferred delivery practice to reach today's youth versus traditional face-to-face and didactic delivery methods (Paperny, 2004; Schinke, Schwinn, & Fang, 2010; Spector, 2013). For example, in one study, Tercyak, Abraham, Graham, Wilson, and Walker (2009) found that youth reported a strong willingness to use e-mail and multimedia software, portable electronic devices, and the Internet to engage with health promotion. In another study, Williams, Griffin, Macaulay, West,

* Corresponding author at: Texas Christian University, Department of Social Work, TCU Box 298750, Fort Worth, TX 76129, United States. Tel.: +1 817 257 6762; fax: +1 817 257 5784.
E-mail address: n.eliaslambert@tcu.edu (N. Elias-Lambert).

and Gronewold (2005) found promising results with regard to the efficacy of a SA preventative intervention using CD-ROM technology among 12- and 13-year-olds. The authors found that, at posttest, youth in the treatment group reported significantly lower pro-drug attitudes and less identification with SA norms. The youth in the treatment group also reported increased knowledge of relaxation and anxiety reduction skills compared to those in the control group. This literature suggests that applying digital technologies to prevention may provide a unique opportunity to carry out interventions with reliability and in a manner that is more appealing and suitable to youth (Bosworth, 2006). This phenomenon may be related to the fact that youth in the US are technologically savvy and engulfed by a wired world, which partially explains why they have incorporated technology in all facets of life (Pew Internet, 2005). The communication and interaction of youth has moved increasingly from a face-to-face group-based setting to a mobile, Internet-based setting involving instant messaging (text, voice, and video) and social networking on platforms such as Facebook and Twitter. Simultaneously, spare time activities have increasingly moved online towards computer games and more recently social, interactive games using mobile devices.

Given youths' strong propensity to utilize technology in various facets of life, a need exists for prevention programming that incorporates the digital world of youth in order to make the delivery of prevention programs more age and contextually appropriate and by extension, possibly more successful. To address this need, we developed a social, multi-user, tablet-based game for middle school youth called *Choices & Consequences* (*C&C*). The purpose of this manuscript is to report the results of a proof-of-concept evaluation of *C&C*, a SA and RV prevention program that integrates digital technologies and devices with game-based behavior change techniques.

2. Literature review

2.1. Prevalence of substance abuse and relationship violence

Although overall rates of substance use have declined in the US (The Partnership at Drugfree, 2012), SA remains a social concern. In the US, youth continue to report the highest levels of illicit drug use across the industrialized nations (Johnston, O'Malley, Bachman, & Schulenberg, 2012). Epidemiological statistics from the CDC (Kann et al., 2014) suggest that youth continue to exhibit a high prevalence of drug use behaviors. Thus, there continues to be a need for prevention programs that can help youth abstain from substance use and abuse.

Existing studies suggest that between 20–59% of high school students have experiences with RV (Eaton, Davis, Barrios, Brener, & Noonan, 2007; Hickman, Jaycox, & Aronoff, 2004; Silverman, Raj, & Clements, 2004). The variation in reports of RV exists because some studies ask only about physical violence, while other studies include psychological violence. The prevalence of physical RV ranged from 7.0% to 14.8% across statewide surveys and from 7.4% to 16.8% across community surveys (Kann et al., 2014). Psychological violence is even more widespread than physical violence among youth. About half of youth report experiencing at least one form of psychological abuse (Catallozzi, Simon, Davidson, Brietbert, & Rickert, 2011). Recent research suggests that experiencing psychological dating violence was about equal for boys and girls (Ybarra, Espelage, Langhinrichsen-Rohling, Korchmaros, & Boyd, 2013). Girls and boys are both victims and perpetrators of all forms of RV (Tjaden & Thoennes, 1998; Ybarra et al., 2013). Ybarra et al. (2013) found that girls are almost equally likely to be perpetrators and victims of dating violence: 41% reported victimization and 35% reported perpetration at some point in their lives. Among boys, 37% said they had been the victim, while 29% reported being the perpetrator. Twenty-nine percent of the girls and 24% of the boys reported being both a victim and perpetrator of dating violence (Ybarra et al., 2013).

2.2. SA and RV prevention efforts

Although SA cannot be viewed as a cause of RV, a number of studies have established that the two share a significant and complementary relationship (Polit, London, & Martinez, 2001; Swan, Bossarte, & Sullivent, 2008; Xue, Zimmerman, & Cunningham, 2009). Given current research and the need for schools to provide programs for multiple social problems, it is logical that any prevention efforts address both problems. It also seems practical that these SA and RV prevention programs are delivered in the school setting.

Prevention programs are most often conducted in the school system (Botvin, Griffin, & Nichols, 2006; Foshee, Bauman, & Greene, 2000; Jaycox et al., 2006; Weisz & Black, 2001) and are increasingly targeting middle school youth (Fay & Medway, 2006; Weisz & Black, 2009). Schools provide access to a diverse and universal audience, offer consistent attendance and interaction with large numbers of youth (Harned, 2002; Pittman, Wolfe, & Wekerle, 2000; Weisz & Black, 2009), and provide access to resources such as space, transportation, staff assistance, and connections to parents and school personnel. Brand, Felner, Shim, Seitsinger, and Dumas (2003) maintain that the literature consistently corroborates the notion that schools serve as "contexts of socialization" that influence students' developmental outcomes. In addition, youth view the school setting as a place of learning (Rambaldo, Wilding, Goldman, McClure, & Friedberg, 2001), which likely facilitates increased buy-in to prevention messages. Thus, the school environment remains an optimal location for SA and RV prevention programs (Weisz & Black, 2009).

While study findings on the effectiveness of school-based prevention programs are inconsistent, a number of school-based prevention programs targeting SA and RV have been successful in deterring youth from engaging in SA and RV (Chou et al., 1998; Faggiano et al., 2010; Lemstra et al., 2010; Marsiglia, Kulis, Wagstaff, Elek, & Dran, 2005; Pentz et al., 1989). For example, the highly regarded and cited *Safe Dates* program has been found to significantly decrease the use of psychological violence, physical violence, and sexual dating violence perpetration, with changes maintained for three years (Foshee et al., 2004). In terms of SA, the prevention program *keeping it R.E.A.L.* (*kiR*) has shown positive results (Hecht et al., 2003; Marsiglia et al., 2005). *kiR* evaluations found that participants in the treatment group were significantly more likely to report lower incidences of recent substance use and some participants also reported increased rates of reduced and discontinued use of alcohol (Hecht et al., 2003; Marsiglia et al., 2005).

2.3. Gaming as a learning tool

Gee (2009) and many others maintain that computer games should be regarded as platforms for learning, which is why video games have been explored as pedagogical tools with multiple categories of students (Ko, 2002; Moreno & Mayer, 2002; Ravenscroft & Matheson, 2002). In the past decade, there has been an increase in the number of digital game-based learning (DGBL) projects (Chiu, Kao, & Reynolds, 2012). Wang and Shen (2012) suggest that in some settings, this form of delivery is substituted for aspects of traditional teaching and learning because learning is a dynamic, individual experience that permits learners to reflect on what they comprehend and this knowledge forms their understanding of the world and sense of self (Rankin, Gold, & Gooch, 2006). Research suggests that DGBL enhances players' cognitive capacities and learning through visualization, experimentation, problem solving, higher order thinking, manipulation of objects, and intrinsic decision-making through visualization of the cause and effects of their own actions (Amory, Naicker, Vincent, & Adams, 1999; Betz, 1995; Leutner, 1993; Rankin et al., 2006).

A number of the pedagogical techniques used in gaming are underpinned by specific learning principles and theoretical constructs related to cognition, such as dual-coding theory and formal and informal learning (Wang & Shen, 2012). According to Paivio (2006) dual-coding