

Evaluation of a School-Based Gambling Prevention Program for Adolescents: Efficacy of Using the Theory of Planned Behaviour

Renée A. St-Pierre,¹ Jeffrey L. Derevensky,¹ Caroline E. Temcheff,² Rina Gupta,¹ & Alexa Martin-Story²

¹ International Centre for Youth Gambling Problems and High-Risk Behaviors, McGill University, Montreal, Quebec, Canada

² Département de Psychoéducation, Université de Sherbrooke, Sherbrooke, Quebec, Canada

Abstract

The theory of planned behaviour (TPB) and the concept of negative anticipated emotions (NAEs) have attracted research attention in the formulation of effective preventive interventions. This approach has identified several key constructs of the TPB (i.e., intentions, attitudes, subjective norms, perceptions of behavioural control) and NAEs as valid predictors of gambling behaviours and problems. However, no empirical investigation has used these constructs in the design or evaluation of a preventive intervention for adolescent problem gambling. The current research aimed to assess the efficacy of targeting NAEs and key TPB constructs in a prevention video for modifying gambling beliefs, intentions, and behaviours. A sample of 280 high school students were randomly assigned to either an intervention or a control condition. Participants were assessed at pre-intervention, post-intervention, and 3-month follow-up. Results reveal that the video was not effective in producing desired changes in NAEs, the key constructs of the TPB, or the frequency of gambling behaviour. The findings suggest that the video, delivered as a universal preventive intervention, may be insufficient for modifying NAEs and other TPB key constructs, or for changing gambling behaviours.

Keywords: adolescents, problem gambling, prevention, theory of planned behaviour (TPB), negative anticipated emotions, narrative communication

Résumé

Pour la formulation d'interventions préventives efficaces, l'attention de chercheurs s'est portée sur la théorie du comportement planifié et le concept d'émotions négatives anticipées. Cette approche a permis de relever plusieurs constructions clés de la

théorie du comportement planifié (soit, les intentions, attitudes, normes subjectives, perceptions du contrôle comportemental) et des émotions négatives anticipées comme indicateurs valides de comportements et de problèmes liés au jeu. Cependant, aucune étude empirique n'a utilisé ces constructions dans la conception ou l'évaluation d'une intervention préventive pour le jeu des adolescents. La recherche actuelle visait donc à évaluer dans quelle mesure il était efficace de cibler les émotions négatives anticipées et les constructions clés du comportement planifié dans une vidéo de prévention afin de modifier les croyances, les intentions et les comportements du jeu. Un échantillon de 280 élèves du secondaire a été affecté au hasard à une condition d'intervention ou de contrôle. Les participants ont été évalués avant et après l'intervention et au suivi, trois mois plus tard. Les résultats révèlent que la vidéo n'a pas été efficace pour produire les changements souhaités dans le cas des émotions négatives anticipées, les constructions clés du comportement planifié ou la fréquence du comportement du jeu. Les résultats permettent de conclure que la vidéo présentée comme intervention préventive universelle ne suffit pas à modifier les émotions négatives anticipées ni d'autres constructions clés du comportement planifié ou des comportements de jeu.

Introduction

Adolescent gambling and problem gambling has emerged as an area of concern over the past 3 decades (Volberg, Gupta, Griffiths, Ólason, & Delfabbro, 2010). Despite a lack of consensus about the prevalence of severe gambling problems—a result of jurisdictional differences and the use of diverse survey methodologies and instruments—available research published since 2000 suggests that approximately 0.2 to 12.3% of adolescents meet the criteria for problem gambling (Calado, Alexandre, & Griffiths, 2017). Although gambling behaviour may be transitory and may not necessarily lead to adult gambling for some adolescents, evidence also shows a rapid increase in gambling involvement after young people make the transition from adolescence to adulthood and are of legal age to gamble on commercially available activities (Delfabbro, King, & Griffiths, 2014; Delfabbro, Winefield, & Anderson, 2009). Further, a small but growing body of research suggests that the onset of gambling behaviour in preadolescence or adolescence is associated with, or a marker for vulnerability to, later development of gambling problems (Rahman et al., 2012; Slutske et al., 2014; Vitaro, Wanner, Ladouceur, Brendgen, & Tremblay, 2004).

Of equal concern is that adolescent gambling problems are frequently associated with multiple negative behaviours or problems. Specifically, adolescent problem gambling is shown to be correlated with greater gambling expenditure, academic problems, poor or disrupted family relationships, engagement in risky sexual behaviours, delinquency, alcohol and substance use problems, mental health problems, and suicidal ideation and behaviours (Blinn-Pike, Worthy, & Jonkman, 2010; Cook et al., 2015; Hansen & Rossow, 2008; Volberg et al., 2010). Untreated problematic

gambling in adolescence is further observed to be prospectively associated with criminal behaviour (Wanner, Vitaro, Carbonneau, & Tremblay, 2009) and depression (Dussault, Brendgen, Vitaro, Wanner, & Tremblay, 2011) in young adulthood. Although recent research has suggested that externalizing problems present in early elementary school may predict early initiation into several potentially risky behaviours such as substance use and gambling (see Temcheff, Déry, St-Pierre, Laventure, & Lemelin, 2016), the adverse concurrent and prospective correlates of adolescent gambling and gambling problems nonetheless draw attention to the need to sensitize youth to the risks associated with gambling.

In response to this need, various school-based prevention initiatives have been developed (Williams, West, & Simpson, 2012). Despite their importance, only a limited number of these prevention initiatives have been empirically evaluated for efficacy (see Ladouceur, Goulet, & Vitaro, 2013; St-Pierre, Temcheff, Derevensky, & Gupta, 2015; and Williams et al., 2012, for a comprehensive list and review of existing youth gambling prevention programs that have been tested for efficacy). Of those initiatives that have been systematically assessed, many have reliably obtained improvements in knowledge or decreases in misconceptions about gambling (Ladouceur et al., 2013; St-Pierre, Temcheff, et al., 2015). Conversely, few of the existing prevention initiatives have been successful in producing sustained changes in skills or behaviour (Ladouceur et al., 2013; St-Pierre, Temcheff, et al., 2015).

Considering that the principal goal of any prevention initiative is to decrease the incidence of a potential problematic behaviour, there is a clear need to develop youth problem gambling prevention initiatives in the context of new theoretical models of behaviour change in order to improve the likelihood of successful long-term outcomes (Williams, Wood, & Currie, 2010). Health and social cognition research reveals that several factors can play an influential role in behaviour decision making and change, including perceptions of risk in performing the behaviour, notions of self-efficacy, and intentions or motivations to change the behaviour (Ogden, 2012). It is plausible that effectiveness of existing prevention initiatives is generally restricted because they fail to target all of the salient factors found to influence behaviour change. This situation has led researchers to propose consideration of the theory of planned behaviour (TPB; Ajzen, 1991, 2002) as an alternate framework that could more accurately describe behavioural decision-making processes in gambling (Cummings & Corney, 1987; Evans, 2003).

TPB and Anticipated Emotions

A social cognition model, the TPB proposes that the execution of any behaviour is determined by the individual's intention to exert effort and complete an action. The theory further asserts that intentions are influenced by three independent factors: attitudes, subjective norms, and perceptions of behavioural control (PBCs). Attitudes consist of an individual's overall positive or negative evaluations of the behaviour. Subjective norms are an individual's perceptions of social pressure from important

others to perform the behaviour. PBCs represent an individual's expectations about the level of ease or difficulty in executing the behaviour.

The explanatory value of the TPB model for young adult gambling and problem gambling behaviour has received some empirical support in the literature (Martin, Nelson, Usdan, & Turner, 2011; Martin et al., 2010; Wu & Tang, 2012). Overall, these studies reveal that that gambling-related attitudes, subjective norms, and PBCs predict the frequency of gambling behaviour and of problem gambling. These studies also indicate that intentions to gamble mediate the relationships between gambling behaviours and the other TPB determinants. Research with younger youths has provided additional evidence for the utility of the TPB in explaining the frequency of gambling behaviour and perceived gambling problems (Moore & Ohtsuka, 1997; St-Pierre, Derevensky, Temcheff, & Gupta, 2015).

A criticism of the TPB model acknowledged in the literature is the framework's strict focus on cognitive processes. Researchers have suggested that viewing decision making for different types of risk-taking behaviours as a similar, rational process overlooks several key elements of risky behaviour (Gibbons, Houlihan, & Gerrard, 2009). One element largely ignored by the TPB is the impact of emotions or anticipated affective reactions on decision processes (Gibbons et al., 2009; Richard, de Vries, & van der Pligt, 1998; van der Pligt & de Vries, 1998). Negative anticipated emotions (NAEs), such as regret and guilt, are presumed to particularly influence participation in high-risk or addictive activities. Under conditions of risk, NAEs serve to guide behavioural decision-making processes toward the gathering of relevant data to make informed choices, the selection of goals to attain, and the selection of actions needed to attain the chosen goal (i.e., selection of behavioural intentions; Bagozzi, Dholakia, & Basuroy, 2003; Baumeister, Vohs, DeWall, & Zhang, 2007).

Findings from empirical studies provide support for the significance of NAEs in gambling decision making and intentions (Li et al., 2010; Risen & Gilovich, 2007; Wolfson & Briggs, 2002) and their importance over and above the effects of other TPB components (Sheeran & Orbell, 1999; Zeelenberg & Pieters, 2004). Recently, in their examination of adolescent gambling behaviours, St-Pierre, Derevensky, et al. (2015) observed that adolescents' attitudes, PBCs, and NAEs were significantly associated with intentions to gamble. Their findings therefore lend empirical support to the idea that the TPB model of gambling behaviour should be extended to include NAEs and suggest that NAEs affect gambling behaviour through decision-making processes, particularly the selection of behavioural intentions.

TPB in Adolescent Behaviour Change Interventions

Currently there exist in the literature a number of studies that have applied the TPB to the development of interventions aimed at modifying beliefs, intentions, and behaviours for several adolescent risk activities, or to the evaluation of these interventions (e.g., Buckley, Sheehan, & Shochet, 2010; Jemmott, Jemmott,

Braverman, & Fong, 2005; Jemmott, Jemmott, Fong, & McCaffree, 1999; Poulter & McKenna, 2010). However, the theory has been relatively neglected in the field of addiction (Webb, Sniehotta, & Michie, 2010). In one study, Cuijpers, Jonkers, De Weerd, and De Jong (2002) evaluated a TPB-based prevention program designed to target secondary school students' attitudes, social norms, and self-efficacy with respect to tobacco, alcohol, and cannabis use. Their results revealed a significant decrease in the proportion of students reporting daily tobacco use and weekly alcohol use for the intervention group at 3-year follow-up, but not for the control group. Guo, Lee, Liao, and Huang (2015) also evaluated the efficacy of a TPB-based substance-use preventive education program in enhancing students' behavioural intentions to abstain from and reduce their illicit drug use. They observed that students who received the prevention program demonstrated greater changes in their substance-related attitudes, subjective norms, PBCs, and intentions over time than did those who received no intervention. In addition, Guo et al. found that, compared with that in the control group, a significantly smaller proportion of participants in the TPB-based intervention group reported illicit drug use 6 months and 1 year following program delivery. These preliminary findings have prompted researchers to recognize the value of behaviour change theories such as the TPB in the development of interventions for addictive behaviours (Webb et al., 2010).

Although the TPB has been demonstrated to be suitable for the development of interventions for adolescent risk and addictive behaviours because it allows for the selection of appropriate targets, an important aspect of the model is that it offers limited guidance on the specific behaviour change strategies that will maximize a program's effectiveness. Decisions regarding the selection of behaviour change strategies must therefore be informed from supplementary sources of information, including other theoretical frameworks and research identifying effective tools for changing behavioural determinants (Webb et al., 2010).

Narrative communication is one method for motivating and supporting behaviour change that has been identified in the literature (Hinyard & Kreuter, 2007; Petraglia, 2007). A narrative refers to any representation of a sequence of events, characters, and consequences that has an identifiable structure and contains implicit messages about the topic under consideration, but does not explicitly present and defend issue-relevant arguments (Dunlop, Wakefield, & Kashima, 2010; Kreuter et al., 2007). Narrative communication is therefore characteristically different from traditional expository or advocacy persuasive messages (Dunlop et al., 2010), and it can take a range of forms, including official stories regarding events, first-hand experiential stories or testimonials, and invented stories with accurate information (Hinyard & Kreuter, 2007).

The basic premise behind the utility of narrative communication in behaviour change is that individuals will be persuaded by information or messages conveyed in a narrative as they become "transported" or absorbed. The psychological process of transportation ultimately leads to changes in beliefs, intentions, and behaviours by

lowering resistance to persuasive appeals, reducing counter-argument, enhancing perceptions of group and/or personal susceptibility through identification with the characters of the narrative, and allowing for individuals to engage in mental simulations of performing novel behaviours (Green, 2006; Hinyard & Kreuter, 2007). An increasing number of research projects have incorporated narrative communication in universal educational interventions targeting specific adolescent risk and addictive behaviours with positive results (Poulter & McKenna, 2010; Turner, Macdonald, Bartoshuk, & Zangeneh, 2008; Turner, Macdonald, & Somerset, 2008; Warren et al., 2006).

Although recent research has supported the utility of the TPB and NAEs in explaining the frequency of gambling behaviour and gambling problems (Martin et al., 2010, 2011; Moore & Ohtsuka, 1997; St-Pierre, Derevensky, et al., 2015; Wu & Tang, 2012), application of the TPB framework and its related construct of NAEs for the design or evaluation of adolescent gambling preventive interventions has not been achieved. Additionally, despite the growing trend of using narrative communication in intervention programs for adolescent high-risk behaviours, only two youth gambling prevention initiatives to date have incorporated narrative communication as a component for promoting changes in gambling-related beliefs and behaviours (Turner, Macdonald, Bartoshuk, & Zangeneh, 2008; Turner, Macdonald, & Somerset, 2008). The content of these interventions included brief skits designed to illustrate how adolescents can become overly involved in gambling as a result of emotional distress, early wins, or erroneous beliefs about gambling. Evaluation of these programs revealed no significant effects on students' gambling attitudes, involvement, or problematic behaviours. However, it is important to note that in their prevention initiatives, these authors (Turner, Macdonald, Bartoshuk, & Zangeneh, 2008; Turner, Macdonald, & Somerset, 2008) used several other strategies (e.g., mock gambling activity, group discussion, interactive lecture) in addition to narrative communication in order to promote changes in gambling-related beliefs and behaviours. It is therefore difficult to determine whether it was one particular strategy used, or the program as a whole, that was responsible for the lack of observed changes. No empirical study, to date, has specifically evaluated the effectiveness of narrative communication alone in school-based preventive interventions for adolescent gambling.

Research Goals and Hypotheses

The current study was designed to explore the efficacy of a universal, school-based preventive intervention for eliciting changes in adolescent gambling-related beliefs (i.e., attitudinal, normative, and control), anticipated negative emotional consequences, intentions, and behaviours. The intervention specifically evaluated in this study was the *Clean Break* (International Centre for Youth Gambling Problems and High-Risk Behaviors, 2006) video, a narrative communication intervention. The unique 25-min docudrama centres on the testimony of a problem gambler who describes his various personal experiences with gambling. In addition to the testimonial, dramatic scenarios depicting realistic situations faced by adolescents

who become overinvolved with gambling feature prominently in the video-based intervention. The scenarios portray the consequences of the characters' problematic gambling behaviour for their relationships with others, as well as for their own psychological and emotional health. Throughout the scenarios, certain attitudinal, normative, and control beliefs about gambling are targeted, such as "gambling with friends is a harmless form of entertainment for teens," "most friends/family members think it's acceptable to gamble," "and "no matter what the game is, there are strategies an individual can use to help him or her win." Further, the intervention features follow-up discussion questions addressing common gambling-related normative and control beliefs, as well the emotional consequences of becoming overinvolved in gambling. Although the results from focus groups provide preliminary evidence for the appropriateness of the video for high-risk and general adolescent populations (International Centre for Youth Gambling Problems and High-Risk Behaviors, 2006), its impact on adolescent gambling beliefs, intentions, and behaviours needs to be established.

Drawing from the theoretical and empirical literature on the TPB, NAEs, and behaviour change interventions, the following hypotheses were proposed: (1) Greater increases in self-reported NAEs are expected for students in the intervention condition than for those in the control condition; (2) greater decreases in self-reported positive gambling attitudes, subjective norms, and PBCs are projected for students in the intervention condition than for those in the control condition; and (3) greater decreases in self-reported gambling intentions and gambling frequency are expected for students in the intervention condition than for those in the control condition.

Method

Participants

This research was designed as a controlled experimental trial. Participants were 387 adolescents in grades 9, 10, and 11 from one large secondary school in the greater Montreal, Canada, area. Of those 387 participants, 280 completed the surveys at all three measurement times, and these participants were selected for analysis. Two additional participants were excluded from the final sample because of insincere responding (e.g., inconsistent responses on reverse-coded items). Power analyses revealed that a minimum sample of 230 students was needed to detect effects.

Students, by individual classrooms, were randomly assigned to the video-based preventive intervention condition ($n = 141$; 71 males) or a control condition ($n = 139$; 69 males). Random assignment of classrooms to conditions was completed by using a random number table, under the constraint that close to one half of the total number of participating classrooms would be in either condition. Approximately one third of participants were in grade 9 ($n = 100$, 35.7%), slightly over one third were in grade 10 ($n = 107$, 38.2%), and a little over a quarter were in grade 11 ($n = 73$, 26.1%). Overall, the mean age of participants was 15.11 years ($SD = .94$; range = 13–17).

Measures

With the exception of items to measure NAEs, all scales used for this study were selected on the basis of their use in prior research that examined the applicability of the TPB to adolescent and young adult gambling behaviour (i.e., Martin et al., 2010, 2011; Moore & Ohtsuka, 1997; St-Pierre, Derevensky, et al., 2015; Wu & Tang, 2012), their appropriate use with adolescent populations, and their adequate psychometric properties (i.e., Fisher, 2000; Moore & Ohtsuka, 1997; St-Pierre, Derevensky, et al., 2015). All measures used constitute primary outcome measures.

Gambling Attitudes Scale (Moore & Ohtsuka, 1997). This scale is a 12-item measure assessing respondents' attitudes toward gambling and its consequences. Each item is rated on a 5-point Likert scale (1 = *strongly disagree*, 5 = *strongly agree*). Items are summed to produce a scale score ranging between 12 and 60, with higher scores representing more positive attitudes toward gambling. The internal consistency of the scale was acceptable within this sample (Cronbach's alpha = .82).

Gambling Injunctive Norms Scale (Moore & Ohtsuka, 1997). This 12-item scale is used to assess perceived family and peer norms regarding gambling on a 5-point Likert scale (1 = *strongly disagree*, 5 = *strongly agree*). Two additional items are included to measure motivation to comply with a specific referent (i.e., family or friends). Items on this scale were revised to be appropriate for a Canadian adolescent sample (e.g., "pokies" renamed as "slot machines or video lottery terminals"). To provide a single measure of subjective norms, each normative belief item is multiplied by the motivation to comply with the specific referent, and derived scores are summed together to produce a unitary subjective norms scale score. Scores on this scale range from 12 to 300, with higher scores representing perceptions of more positive social norms toward gambling. In the present study, the internal consistency of this scale was acceptable (Cronbach's alpha = .82).

Perceived Control over Gambling Refusal Scale (Wu & Tang, 2012). A 10-item measure was used to assess PBCs over resisting gambling under various conditions. Participants rated each item on a 4-point Likert scale (1 = *strongly disagree*, 4 = *strongly agree*). A scale score ranging from 10 to 40 is obtained by summing the item responses, with higher scores representing a greater level of perceived self-control in refusing to gamble. The internal consistency of this scale was found to be excellent (Cronbach's alpha = .93).

NAEs for Gambling. A four-item scale was used to measure NAEs for participating in and for becoming overinvolved in gambling. The scale was adapted from other anticipated regret measures (e.g., Caron, Godin, Otis, & Lambert, 2004; Conner, Sandberg, McMillan, & Higgins, 2006). Participants rated each item on a 5-point Likert scale (1 = *strongly disagree*, 5 = *strongly agree*). The scale score consists of an average response to all items, with higher scores indicating more anticipated negative emotions regarding gambling involvement or overinvolvement. The test-retest reliability of the scale was previously validated by using a two-way

mixed-effects model of average intraclass correlation (Temcheff, St-Pierre, Derevensky, & Gupta, 2014). The results indicated adequate test-retest reliability for the scale, intraclass correlation (3, 132) = .72, 95% confidence interval [.61, .80]. The internal consistency of this scale was acceptable in this sample (Cronbach's alpha = .88).

Gambling Intention Scale (Moore & Ohtsuka, 1997). This scale is a seven-item measure that assesses respondents' intentions to gamble on a 5-point Likert scale (1 = *strongly disagree*, 5 = *strongly agree*). The scale items were revised to be appropriate for a Canadian adolescent sample (e.g., "poker machines" renamed as "slot machines or video lottery terminals"). Items are summed to produce a scale score ranging between 7 and 35, with higher scores representing stronger intentions to gamble. The internal consistency of this scale was acceptable (Cronbach's alpha = .88).

Gambling Activities Questionnaire – Adapted (Gupta & Derevensky, 1996). To determine respondents' frequency of gambling participation, 11 items from a modified version of the Gambling Activities Questionnaire were administered. Items asked respondents to specify the frequency they had gambled on a variety of common gambling activities during the past 3 months by using a 4-point Likert scale (0 = *not in the past three months*, 3 = *at least once per week or more*). Items are summed to produce a frequency scale score ranging between 0 and 44, with higher scores representing greater frequency of gambling. The internal consistency of this scale was acceptable (Cronbach's alpha = .70).

Procedure

Following approval from the ethics review committees of McGill University and Université de Sherbrooke, and subsequent to ethical review by participating school boards, requests to conduct research were distributed to all English language public schools in the region. One large institution agreed to participate, the second largest English high school in the province of Quebec. Parental consent was obtained during an orientation day at the school and student assent was acquired in the classroom prior to administration of the baseline survey. All eligible students were informed that participation was voluntary and that they could terminate participation at any time without consequence. It was also explained that responses to the questionnaires were anonymous and confidential; only respondents' date of birth, mother's surname, and last two digits of their telephone number were required to match pre-test questionnaires to post-test and follow-up surveys.

Prior to program delivery, all participating students were administered a baseline survey (Time 1) to measure identified predictors of gambling intentions, as well as participants' frequency of gambling participation. After completion of the survey, students assigned to the intervention group viewed the 25-min video, while students in the control group proceeded with their regular academic activities. Approximately 1 week following completion of the survey, students assigned to the intervention group participated in a booster discussion session for 20-25 min, while students in the control group proceeded with their regular academic activities. A post-intervention

survey containing all scales except the Gambling Activities Questionnaire was then administered to all participants (Time 2). Finally, a follow-up survey paralleling the baseline questionnaire was administered to all participating students approximately 3 months after completion of the program (Time 3). In general, students in both the intervention and the control group were observed to be attentive and responsive to the trained program facilitators and research assistants throughout the study.

Data Analysis

Data analysis was performed by using SPSS Statistics, version 22.0. Initial screening of the data revealed that less than 3% of the sample had one or more missing responses on each of the scales. Consequently, multiple imputation was selected as an appropriate method for estimating missing observations on these scales because it is considered best practice for handling missing data compared with traditional methods, such as case deletion and mean substitution (Osborne, 2013). In this study, the Markov Chain Monte Carlo method with 25 iterations was used to produce five multiple data sets.

All subsequent analyses were conducted with an intent-to-treat approach, in which all participants were analyzed in the condition to which they were randomized. Differences between groups on continuous measures (attitudes, subjective norms, PBCs, NAEs, and intentions) across time (pre-intervention, post-intervention, follow-up) were examined by using hierarchical mixed models containing random intercept and random slope terms, as well as fixed effects for condition. To run mixed model analyses in SPSS for the multiple imputation pooled data set, we applied a procedure described by van Ginkel (2014) and van Ginkel and Kroonenberg (2014) to obtain F values, standard errors, p values, and degrees of freedom for group-by-time interactions. This procedure involves both the reformulation of analysis of variance models as regression models by using effect coding of the predictors and application of existing combination rules for regression models (van Ginkel & Kroonenberg, 2014). The procedure also adjusts for the degrees of freedom of the combined results.

Effect sizes were calculated from the standardized mean change within conditions divided by the standard deviation of the difference scores (see Lakens, 2013). The standard deviation of the difference scores was computed from the within-conditions sample variances and the cross-conditions correlation (see Kline, 2004). Additionally, traditional confidence intervals for dependent sample effect sizes were computed with procedures described by Kline (2004).

Results

At baseline, approximately 40% of participants ($n = 277$) with complete data on gambling frequency reported having gambled on at least one activity in the past 3 months. The data showed that although participants had modest intentions to gamble ($M_{pooled} = 12.54$) and anticipated substantial negative emotions from gambling or becoming overinvolved in gambling ($M_{pooled} = 3.39$), they also perceived

high behavioural control for refusing to gamble ($M_{pooled} = 33.34$). The data also indicated that participants had moderately favourable gambling attitudes ($M_{pooled} = 35.43$), but that their perceptions of family's and peers' approval of gambling was modest ($M_{pooled} = 78.08$). Further, the frequency of gambling during the past 3 months was relatively low among participants ($M_{pooled} = 1.42$).

Preliminary analyses revealed that although there were no observed gender differences between groups, $\chi^2(1, N = 280) = .01, p = .91$, there were significant differences between participants in the intervention versus control groups with respect to grade level, $\chi^2(1, N = 280) = 26.99, p < .001$, Cramer's $V = .31$. Pairwise comparisons revealed that significantly fewer grade 11 students ($n = 18$) were in the intervention group than were grade 9 ($n = 56$) or grade 10 students ($n = 67$), $\chi^2(1, N = 173) = 16.93, p < .001$, odds ratio = 3.89 and $\chi^2(1, N = 180) = 25.09, p < .001$, odds ratio = 5.12, respectively.

Evaluation of Short-Term Intervention Effects

Results of mixed model analyses revealed a significant main effect of time for gambling-related attitudes, $F(1, 270.53) = 19.05, p < .001$; for gambling-related subjective norms, $F(1, 272.81) = 19.32, p < .001$; and for PBCs over refusal to gamble, $F(1, 270.90) = 17.48, p < .001$. As shown in Table 1, both the intervention and the control group demonstrated more positive gambling attitudes at post-intervention than at pre-intervention. Similarly, both the intervention and the control group showed more positive peer and family subjective norms at post-intervention

Table 1
Short-Term Intervention Effects

| Parameter | Intervention ($n = 141$) | | | | Control ($n = 139$) | | | |
|-------------------------------|----------------------------|-----------|--------------------------|---------------|-----------------------|-----------|--------------------------|---------------|
| | <i>M</i> | <i>SE</i> | Effect size ^a | 95% CI | <i>M</i> | <i>SE</i> | Effect size ^a | 95% CI |
| Attitudes | | | 0.14 | [0.03, 0.25] | | | 0.18 | [0.08, 0.28] |
| Pre-test | 35.03 | 0.54 | | | 35.83 | 0.54 | | |
| Post-test | 35.94 | 0.55 | | | 37.03 | 0.58 | | |
| Subjective norms | | | 0.22 | [0.07, 0.37] | | | 0.23 | [0.09, 0.38] |
| Pre-test | 78.55 | 2.91 | | | 77.60 | 3.02 | | |
| Post-test | 86.06 | 2.92 | | | 85.85 | 2.99 | | |
| Perceived behavioural control | | | 0.18 | [0.04, 0.33] | | | 0.25 | [0.10, 0.39] |
| Pre-test | 33.54 | 0.44 | | | 33.14 | 0.45 | | |
| Post-test | 32.60 | 0.41 | | | 31.89 | 0.38 | | |
| Negative anticipated emotions | | | 0.17 | [0.04, 0.30] | | | 0.00 | [-0.13, 0.13] |
| Pre-test | 3.45 | 0.07 | | | 3.34 | 0.07 | | |
| Post-test | 3.59 | 0.07 | | | 3.33 | 0.08 | | |
| Intentions | | | 0.08 | [-0.09, 0.24] | | | 0.17 | [0.02, 0.32] |
| Pre-test | 12.89 | 0.48 | | | 12.19 | 0.48 | | |
| Post-test | 12.45 | 0.48 | | | 13.17 | 0.49 | | |

Note. *M* is the pooled mean values calculated from multiple imputation data sets. *SE* is the pooled standard error values calculated from multiple imputation data sets. 95% CI is the 95% confidence intervals of effect sizes.

^a Effect size is the standardized mean difference effect size for single-group repeated measures design, expressed as Cohen's d_{mm} .

than at pre-intervention (see Table 1). Further, as depicted in Table 1, both the intervention and the control group demonstrated a decrease in PBCs over their ability to refuse gambling at post-intervention than at pre-intervention. Small effect sizes were consistently observed across both groups.

Mixed model analyses also indicated a significant group-by-time interaction for intentions to gamble in the future, $F(1, 273.43) = 4.63, p < .05$. The control group showed a greater increase in intentions to gamble from pre-intervention to post-intervention than did the intervention group, with a small effect size. However, no significant group-by-time interactions were observed for gambling-related attitudes, subjective norms, NAEs, or PBCs over refusal to gamble (see Table 1). When gender and grade level were entered into the models as covariates, analyses revealed that main effects of gender and grade level, as well as all interactions with gender or grade level, did not reach statistical significance.

Evaluation of the Maintenance of Intervention Effects

Mixed model analyses were used to investigate the maintenance of effects at 3-month follow-up for both the intervention and the control group. Results revealed a significant main effect of time for gambling-related attitudes, $F(1, 272.81) = 30.28, p < .001$; subjective norms, $F(1, 249.99) = 13.41, p < .001$; and NAEs, $F(1, 273.38) = 9.81, p < .05$. As shown in Table 2, both the intervention and the control group

Table 2
Maintenance of Intervention Effects

| Parameter | Intervention ($n = 141$) | | | | Control ($n = 139$) | | | |
|-------------------------------|----------------------------|-----------|--------------------------|---------------|-----------------------|-----------|--------------------------|---------------|
| | <i>M</i> | <i>SE</i> | Effect size ^a | 95% CI | <i>M</i> | <i>SE</i> | Effect size ^a | 95% CI |
| Attitudes | | | 0.21 | [0.09, 0.34] | | | 0.23 | [0.13, 0.33] |
| Pre-test | 35.03 | 0.54 | | | 35.83 | 0.54 | | |
| Follow-up | 36.39 | 0.55 | | | 37.35 | 0.59 | | |
| Subjective norms | | | 0.22 | [0.07, 0.38] | | | 0.20 | [0.04, 0.36] |
| Pre-test | 78.55 | 2.91 | | | 77.60 | 3.02 | | |
| Follow-up | 86.60 | 3.11 | | | 84.36 | 2.81 | | |
| Perceived behavioural control | | | 0.01 | [-0.16, 0.19] | | | 0.10 | [-0.07, 0.26] |
| Pre-test | 33.54 | 0.44 | | | 33.14 | 0.45 | | |
| Follow-up | 33.60 | 0.42 | | | 32.62 | 0.42 | | |
| Negative anticipated emotions | | | 0.11 | [-0.04, 0.25] | | | 0.16 | [0.04, 0.29] |
| Pre-test | 3.45 | 0.07 | | | 3.34 | 0.07 | | |
| Follow-up | 3.36 | 0.07 | | | 3.19 | 0.08 | | |
| Intentions | | | 0.15 | [-0.03, 0.32] | | | 0.05 | [-0.09, 0.19] |
| Pre-test | 12.89 | 0.48 | | | 12.19 | 0.48 | | |
| Follow-up | 12.08 | 0.45 | | | 12.45 | 0.49 | | |
| Frequency of gambling | | | .008 | [-0.07, 0.23] | | | 0.19 | [0.01, 0.37] |
| Pre-test | 1.40 | 0.21 | | | 1.44 | | | |
| Follow-up | 1.20 | 0.20 | | | 0.95 | | | |

Note. *M* is the pooled mean values calculated from multiple imputation data sets. *SE* is the pooled standard error values calculated from multiple imputation data sets. 95% CI is the 95% confidence intervals of effect sizes.

^a Effect size is the standardized mean difference effect size for single-group repeated measures design, expressed as Cohen's d_{mm} .

demonstrated more positive gambling attitudes from pre-intervention to follow-up. Similarly, both the intervention and the control group showed more positive peer and family subjective norms from pre-intervention to follow-up (see Table 2). Further, both the intervention and the control group demonstrated a decrease in NAEs from pre-intervention to follow-up. Results also indicated a significant main effect of time for frequency of gambling behaviour, $F(1, 236.51) = 5.37, p < .05$. Specifically, both the intervention and the control group demonstrated a decrease in frequency of play from pre-intervention to follow-up (see Table 2). Again, small effect sizes were observed for both groups across the different variables.

However, mixed model analyses revealed no significant group-by-time interactions for gambling-related attitudes, subjective norms, PBCs, NAEs, or intentions, indicating that changes from pre-intervention to follow-up were not statistically different between the intervention and the control group. Additionally, no significant group-by-time interaction was observed for frequency of gambling behaviour. Further, when gender and grade level were again entered into the models as covariates, analyses revealed that main effects of gender and grade level, as well as all interactions with gender or grade level, did not reach statistical significance.

Discussion

This study aimed to test the efficacy of a universal adolescent gambling prevention tool, the *Clean Break* docudrama, for modifying gambling beliefs, intentions, and behaviours. The results suggest that none of the initial hypotheses were confirmed. Rather, adolescents in both the intervention group and the control group reported small but significant increases in positive gambling attitudes and positive peer and family subjective norms at post-intervention and at follow-up. Additionally, although adolescents reported a slight but significant decrease in PBCs over their ability to refuse gambling at post-intervention, as well as small but significant decreases in NAEs and frequency of gambling behaviour at follow-up, no significant group differences were found. Further, no significant changes were revealed for gambling intentions at follow-up for either group. However, the intervention group's intentions to gamble in the future were observed to be stable from pre- to post-intervention, whereas the control group reported a minor but significant increase in intentions to gamble at post-intervention.

Overall, the results of this study suggest that the *Clean Break* narrative communication intervention, delivered to a general audience in isolation, may not be appropriate for modifying the theoretically important predictors of gambling intentions and gambling participation, and it may be insufficient for changing gambling behaviours over the short term. These findings are largely inconsistent with other research that has applied the TPB to the development or evaluation of preventive interventions for various adolescent risk or addictive activities (e.g., Buckley et al., 2010; Cuijpers et al., 2002; Guo et al., 2015; Jemmott et al., 1999, 2005; Poulter & McKenna, 2010). In contrast, they are in line with research that included a narrative

communication component within a brief preventive intervention for adolescent problem gambling (e.g., Turner, Macdonald, Bartoshuk, & Zangeneh, 2008).

There may be several plausible explanations for this study's paradoxical findings. One possible reason that *Clean Break* may not have successfully modified the theoretically important precursors of gambling intentions and gambling participation is that it was delivered as a "universal" adolescent gambling prevention tool. Similar to this study, previous research on program effectiveness (e.g., Buckley et al., 2010; Cuijpers et al., 2002; Guo et al., 2015; Jemmott et al., 1999, 2005; Poulter & McKenna, 2010; Turner, Macdonald, Bartoshuk, & Zangeneh, 2008; Turner, Macdonald, & Somerset, 2008) targeted student populations that were not identified on the basis of individual risk. However, the *Clean Break* intervention was originally intended to acquire the "attention of high-risk youth while still being compelling to all teens" (International Centre for Youth Gambling Problems and High-Risk Behaviors, 2006, p. 5). *Clean Break* may not be a preventive intervention that is suitable for adolescents who have never gambled or have gambled infrequently. Gillespie, Derevensky, and Gupta (2007) contend that adolescents who do not gamble are acutely aware of the risks of gambling, and, as a result, additional risk messages may do little to change their immediate behaviour because their gambling is not problematic. Indeed, Turner, Macdonald, and Somerset (2008) observed that their program generally had the strongest impact on those students who were most in need of the information (i.e., those students who gambled more problematically). Gillespie et al. (2007) also maintain that for social (or low-frequency gamblers), the strength of risk messages may be weakened, as these adolescents often experience the positive outcomes of gambling in the absence of negative outcomes. Further, Breitenbecher and Scarce (2001) assert that awareness campaigns are often unsuccessful because the information or persuasive messages presented, although viewed as powerful, are not perceived as being personally relevant or applicable to the intended targets. Given that participants in the intervention group reported being low-frequency gamblers at baseline, it is conceivable that the persuasive appeal of the risk messages integrated within the *Clean Break* intervention was weak among this sample. As it remains unclear whether this intervention would result in successful outcomes when used as a selective prevention tool for higher frequency adolescent gamblers or adolescents at risk for developing gambling problems, this possibility should be systematically investigated.

Another plausible reason that the *Clean Break* prevention tool may not be ideal for modifying the proposed predictors of gambling intentions and behaviours is that the intervention was not designed from an extended TPB framework specifically for the population that was investigated in this study. According to Nation et al. (2003) and Weissberg, Kumpfer, and Seligman (2003), effective youth prevention programs are tailored to the community, cultural, and developmental norms of the participants and make efforts to include the target group in program planning. Similarly, Fishbein and Ajzen (2010) propose that development of behaviour change interventions that use the TPB requires identification of salient beliefs and intentions that adequately explain the variance in the behaviour of interest through qualitative and

quantitative empirical research with representative population samples. Although the video's storylines address certain attitudinal, normative, and control beliefs about gambling, selection of the beliefs to be targeted in *Clean Break* was not based on empirical research with samples of adolescent non- or low-frequency gamblers. Fishbein and Ajzen (2010) further stipulate that modification to or addition of one or two beliefs may not be sufficient to produce desired changes in intentions or behaviour; they therefore recommend selecting multiple beliefs to target whenever possible. However, only a relatively small number of these beliefs were targeted in the video. It is thus plausible that efficacy of this prevention tool was restricted because it may not have targeted a sufficient number of salient TPB-related beliefs in order to influence behaviour change for adolescent low-frequency or non-gamblers.

Related to this issue, the *Clean Break* narrative communication intervention also aims to increase adolescents' awareness and understanding of the warning signs and "potential dangers associated with excessive gambling" (International Centre for Youth Gambling Problems and High-Risk Behaviors, 2006, p. 3). We did not, however, measure changes in participants' knowledge or misconceptions about gambling, given the current study's strict focus on the TPB and its theoretically important predictors of gambling intentions and behaviours. It may be that *Clean Break* is an intervention that is well suited for improving knowledge or decreasing misconceptions about gambling particularly because the majority of existing prevention initiatives have reliably obtained improvements in knowledge or decreases in misconceptions about gambling (St-Pierre, Temcheff, et al., 2015). This needs to be clarified in future research.

Likewise, it may be the case that the outcome measures used for the current study (e.g., reduced frequency of gambling) are incongruent with the aims of the *Clean Break* intervention. The video was originally designed as a sensitization and harm-minimization tool for use with high-risk adolescents, such as adolescents in alternative schools and treatment settings, high school dropouts, homeless youth, and young people in detention centres (International Centre for Youth Gambling Problems and High-Risk Behaviors, 2006). Midford (2009) argues that proper selection of outcome measures that are directly related to a prevention program's goals is important in developing a meaningful evaluation. He also contends that with harm-reduction interventions, the measurable objective should be a reduction in harm, rather than abstinence from use or use reduction, especially when the product is legally available, socially acceptable, and readily accessed (e.g., alcohol, gambling). Midford further asserts that harm-reduction programs may have a differential effectiveness in terms of reduced harm versus reduced use. Indeed, McBride, Farrington, Midford, Meuleners, and Phillips (2004) noted that high school students who received the School Health and Alcohol Harm Reduction Project intervention were only 4.2% less likely to consume alcohol at risky levels 32 months later, but were 22.9% less likely to experience alcohol-related harm from their own use. It is therefore possible that the *Clean Break* intervention may be efficacious in minimizing the risk of harm associated with one's own (or other people's) gambling by sensitizing youth to the potential dangers and warning signs of excessive gambling,

but has no effect on the frequency of gambling behaviour. This needs to be clarified in future efficacy research with high-risk adolescent groups.

A final plausible reason for the observed lack of changes is that *Clean Break* consists of a brief, video-based intervention combined with a concise discussion session. Nation et al. (2003) and Weissberg et al. (2003) indicate that the most effective youth prevention programs are comprehensive and incorporate a combination of interventions to address the salient precursors or mediators of the problem behaviour. They also reveal that effective youth prevention programs use diverse teaching methods that focus on acquiring or enhancing skills, in addition to increasing awareness of the problem behaviour. Indeed, many of the effective TPB-based interventions targeting youth high-risk or addictive behaviours were multi-session curricula that included various types of learning activities and teaching tools, and/or incorporated a skills training component (e.g., Buckley et al., 2010; Cuijpers et al., 2002; Guo et al., 2015; Jemmott et al., 1999, 2005). The efficacy of this prevention tool in changing gambling intentions and behaviour, by itself, may have been restricted because of its brevity and its failure to incorporate multiple teaching methods and/or interventions for addressing the salient precursors of gambling intentions and behaviour. Indeed, Turner, Macdonald, and Somerset (2008) indicated that the time frame of a 1-hr intervention was insufficient to have any substantial effect and, as a consequence, they developed a preventive curriculum to deliver gambling-related material in a more sustained manner. The efficacy of this prevention tool as part of a comprehensive curriculum needs to be explored (see Table 2 in St-Pierre, Temcheff, et al., 2015, for a list of other effective intervention strategies for changing TPB behavioural determinants).

Implications and Limitations

The current research is original in its examination of the applicability of an extended TPB framework for evaluating a school-based, adolescent problem gambling preventive intervention. Several existing youth problem gambling prevention initiatives target the development of adolescent decision-making skills, the strengthening of their skills for resisting peer pressure and coping with stressful life events, and the enhancement of their self-esteem and self-image, in combination with increasing knowledge and reducing erroneous cognitions. Not yet examined, however, is the impact of enhancing the salience of anticipatory negative emotions and gambling-related beliefs in a problem gambling preventive intervention on adolescents' gambling intentions and frequency of play.

This research reveals that the *Clean Break* docudrama delivered as a universal prevention tool may be insufficient for modifying the theoretically important predictors of gambling intentions and behaviour, or for changing the frequency of gambling. Although this study represents only an initial step toward testing the applicability of an extended TPB framework on the design and evaluation of a youth problem gambling prevention initiative, the findings have important implications for guiding future prevention work. Indeed, the findings suggest that adolescent problem

gambling preventive interventions such as *Clean Break* may need to be incorporated within more intensive and comprehensive curricula, and they may be more useful as selective preventive interventions that target higher frequency adolescent gamblers or problem gamblers because there is more latitude for change. This study's findings also suggest that addressing a larger number of TPB-related beliefs about gambling in a preventive intervention such as *Clean Break* may be necessary for producing significant changes in the precursors of intentions to gamble or gambling behaviours.

Still, the findings must be interpreted in light of their preliminary nature, and future research is needed before definitive conclusions may be reached. Other study limitations should also be considered. First, the data in this research were based on self-report surveys. Respondents were assured of the anonymity and confidentiality of their responses prior to completion of the surveys in order to minimize social desirability biases. A series of checks were also used to ensure the validity of the data before analyses were performed. However, it is impossible to ascertain each participant's engagement during the intervention or the assessment process, or the seriousness with which they completed the surveys. Nevertheless, the baseline survey responses in this study were largely consistent with previous research by St-Pierre, Derevensky, and colleagues (2015) and therefore suggest a generally representative sample.

A second limitation is that the results were generated from a convenience sample. The current study tested the efficacy of the *Clean Break* prevention tool at only one public institution in the greater Montreal, Canada, area. The data do not permit us to determine how well these results would generalize to all high school students, or even high-risk students, given a lack of comparison groups. Further, in view of the nature of the sample, the findings may not be representative of all adolescents in Canada, much less other countries. To improve the results' generalizability, future studies are needed in other jurisdictions and with a wider sample of adolescents (e.g., private school students, alternative school students, adolescents in youth residential facilities).

Summary

The necessity of adolescent problem gambling prevention initiatives is increasingly acknowledged by researchers, mental health professionals, and public policy makers, given the adverse concurrent and prospective correlates of adolescent gambling problems. In response to this need, several school-based prevention initiatives have been made available. Their importance notwithstanding, empirical evidence for sustained changes in adolescent gambling and problem gambling behaviour is limited. This study aimed to test the efficacy of the *Clean Break* docudrama for eliciting changes in the extended TPB's proposed predictors of intentions to gamble in the future and of frequency of play behaviour (i.e., attitudes, subjective norms, PBCs, and NAEs). Results suggest that the *Clean Break* video delivered as a universal preventive intervention may be insufficient for modifying NAEs and other TPB key constructs, or for changing gambling behaviours over the short term.

Future studies should investigate the prevention tool's efficacy in improving knowledge or decreasing misconceptions about gambling, as well as its suitability as a selective preventive intervention for higher frequency adolescent gamblers or problem gamblers.

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For correspondence: Renée A. St-Pierre, Ph. D., International Centre for Youth Gambling Problems and High-Risk Behaviors, McGill University, 3724 McTavish Street, Montréal, Québec, Canada H3A 1Y2. E-mail: renee.st-pierre@mail.mcgill.ca

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