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ORIGINAL PAPER

Using Fear Appeals in Warning Labels to Promote Responsible Gambling Among VLT Players: The Key Role of Depth of Information Processing

Yaromir Munoz · Jean-Charles Chebat · Jacob Amnon Suissa

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Abstract Video lottery terminals (VLT) are a highly lucrative gambling format, but at the same time they are among the most hazardous. Previous research has shown that threatening warnings may be an appropriate approach for promoting protective behavior. The present study explores the potential benefits of threatening warnings in the fight against compulsive gambling. A 4 × 2 factorial design experiment was used to test our model based on both *Elaboration Likelihood Model* and *Protection Motivation Theory*. 258 VLT adult players (58% males, 42% females) with various degrees of problem gambling were exposed to three threat levels (plus a control condition) from two different sources (i.e., either a medical source or a source related to the provider of VLT's). Our results show that both higher threat warnings and the medical source of warnings enhance Depth of Information Processing. It was also found that Depth of Information Processing affects positively attitude change and compliance intentions. The theoretical and managerial implications are discussed.

Keywords Warning label · Threatening warnings · Pathological gambling · Information processing · Attitude change

Introduction

The present study deals with two major issues related to the communication of the dangers inherent to gambling with Video Lottery Terminals (VLT's): the first issue is related to the

Y. Munoz (✉)
Eafit University, Cra 49 # 7Sur-50, Medellin, Colombia
e-mail: ymunoz@eafit.edu.co

J.-C. Chebat
HEC Montréal, 3000, Ch. Côte Sainte-Catherine, Montreal, QC H3T 2A7, Canada
e-mail: Jean-charles.chebat@hec.ca

J. A. Suissa
Université du Québec à Montréal, UQAM, 405, Rue Sainte-Catherine Est, Montreal, QC H2L2C4, Canada
e-mail: Suissa.amnon@uqam.ca

appropriate level of threat, and the second issue is related to the source. We are interested in the effects of threat and source credibility on information processing and change attitudes toward gambling with VLT's.

Use of fear appeals proved to be efficient in anti-smoking campaigns (Hammond et al. 2007). Few studies have yet explored their potential benefits in the field of gambling, though gambling is a risk-laden behavior and is associated with strongly adverse social and public health outcomes, specifically with respect to pathological gambling (Azmier 2005).

As for the effects the sources of warnings, the objective of our study is to understand which source is most efficient in communicating the dangers of VLT gambling. Warnings are typically issued by government agencies, generally medical sources associated with governments. The present research deals with the effects of warnings issued by sources related to medical sources linked to the government versus sources related to the provider of VLT's. In the specific case of the Province of Quebec (Canada) the current source of preventive messages used against pathological gambling is a foundation created by the lottery provider. In several other regions of North America, the source of warnings is also the source of gambling services (e.g., Oklahoma Lottery, New Hampshire Lottery). Though the communication literature stresses the effects of source credibility, no study has yet dealt with the strategic choice of the appropriate source of gambling warnings.

This paper explores the cognitive appraisal and emotional responses resulting from the fear appeals and the type of source for warnings calling for responsible gambling behavior from video lottery terminal (VLT) gamblers. Basically, our study deals with the following three research questions: Do fear appeals promote responsible gambling? If so, which of the threat levels (weak, moderate and strong) is the most effective at promoting attitude change and compliance intentions among VLT players? Which source of the warning (medical source related to the government versus source related to the provider of VLT's games) affects its effectiveness more effectively?

Pathological Gambling and Video Lottery Terminals

Electronic gaming machines (EGM's) have been shown to be the most hazardous gambling format (e.g., Bélanger et al. 2003; Griffiths 1990). Recent studies have supported the claim that VLT players are more likely to experience gambling problems than the general gambling population (Smith and Wynne 2004). Moreover, VLT's were identified as "the predominant type of gambling in pathological gamblers seeking treatment" (Morgan et al. 1996, p. 458).

Prevention Efforts

Public health officials have shown increasing interest in primary prevention as a way to address the issues associated with problem gambling (Korn et al. 2003). For instance, pamphlets related to responsible gambling measures are left on VLT's to help players make informed choices Schrans et al. 2004). Such measures were shown to influence player behavior through a positive effect on irrational cognition, which in turn leads to the development of problem gambling (Blaszczynski 2000; Delfabro and Winefield 2000).

Such studies were based on cognitive behavioral models, which do not include emotional responses. The studies have focused on counterbalancing irrational cognitions and attenuating the short-term outcomes for gamblers (Gray et al. 2007). However, problem gambling leads to more serious negative personal outcomes such as family and financial

disruptions, which involve emotional responses. Following the reviewed literature, we propose that messages that underscore such negative outcomes may help players engage in protective behavior. The next section describes the conceptual framework used in this study.

Elaboration Likelihood Model (ELM)

ELM is a general theory of attitude change, very likely the most influential model in today's social psychology. It suggests that there are two routes to persuasion; the central route, which involves individuals carefully scrutinizing the information received, and the peripheral route, which involves individuals who limit themselves to processing a few cues from the message (such as source or pictorial) to be persuaded (e.g., Petty and Cacioppo 1986). The central route is taken only when individuals are both motivated and able to process information (e.g., Mick 1992; Petty and Cacioppo 1986). Basically, highly involved subjects follow mostly the central route, while low involved subjects may take into account other cues of the messages, such as their source.

In the case of public health warnings, source trustworthiness is a key aspect of its believability. Medical sources were shown to be more effective than government sources, because they are perceived as having a greater concern for public welfare, carrying more responsibility in providing information, and showing a better track record of providing information (Frewer et al. 1997, p. 763).

Fear Appeals and Information Processing

Fear appeals may enhance the motivation to process information. However, reviewed studies that have addressed this topic have provided contradictory results. On the one hand, the curvilinear model (Janis 1967) suggests that moderate threats are more effective at generating motivation to process information. Both low and high levels of threat can be counterproductive: low level of threat does not attract enough attention from receivers, while high level of threat makes receivers reluctant to process the disturbing information.

On the other hand, the linear model (Sutton 1982) proposes that the higher the threat, the better the attitude changes, which is empirically supported (e.g., Benneth 1996; LaTour and Rotfeld 1997) in particular by a major meta-analysis on health warnings (Witte and Allen 2000).

Protection Motivation Theory (PMT)

Protection Motivation Theory (PMT) focuses on how fear appeals affect both cognitive and emotional responses (Rogers 1975). More precisely, PMT proposes a cognitive mediation between fear appeals and emotional responses. The cognitive appraisal of the threat includes the assessment of the *perceived severity* of the threat and *perceived vulnerability* of the receiver of the warning (Tanner et al. 1991), which might trigger negative emotions (such as fear), leading people to think about the negative consequence of their present behavior (e.g., excessive gambling). We believe that PMT can be a helpful conceptual tool to understand the role of emotions on information processing in the field of gambling, just as this model proved to be useful in other public health issues.

The next stage of the PMT process is that of coping appraisal. At that stage, individuals exposed to a warning assess two elements: response efficacy and self-efficacy. Response efficacy (e.g., the warning message recommends to call a helpline) is the degree to which the strategy put forward by the warning to avoid the negative effects of the present behavior (e.g., gambling) is perceived as efficacious, Self-efficacy is "the individual's perceived ability to carry out the response efficacy" (Tanner et al. 1991, p. 37), that is, his/her perceived capacity to perform the behavior proposed by the warning.

Research Hypotheses

Based on the literature reviewed, we propose a set of hypotheses dealing with fear-arousing messages related to pathological gambling. First, we consider the hypotheses stemming from PMT cognitive appraisal (see Fig. 1).

Hypothesis 1 The higher the threat, the higher the scores of perceived severity, perceived vulnerability, negative emotions and depth of information processing.

The second hypothesis deals with the effects of involvement, as proposed by ELM.

Hypothesis 2 The higher the involvement, the higher the scores of perceived severity, perceived vulnerability, negative emotions and depth of information processing.

The third hypothesis takes into account the effects of the source on information processing, as proposed by ELM and the literature reviewed on sources of health warnings (Frewer et al. 1997).

Hypothesis 3 A medical source generates more Depth of Information Processing than a source associated with the game provider.

Following ELM and the empirical literature, we propose our fourth hypothesis that attitude change is affected by Depth of Information Processing. Following PMT, we hypothesize that this relation is mediated by response efficacy and self-efficacy.

Hypothesis 4 Both response efficacy and self-efficacy mediate the effects of DIP on attitude change

The fifth hypothesis concerns the effects of attitude change on intentions to comply with the warning.

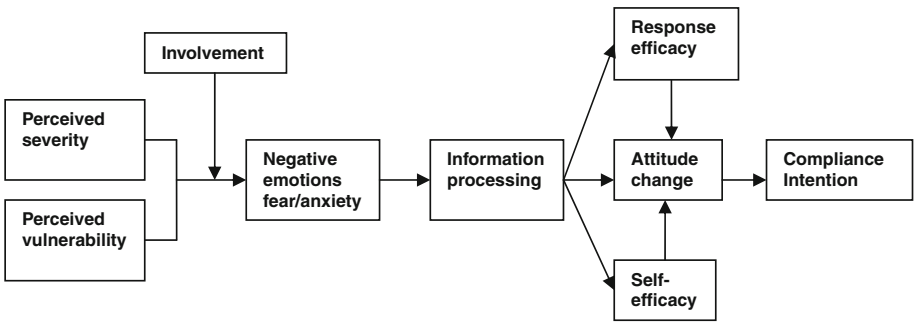

Fig. 1 Proposed model

Hypothesis 5 Attitude change is a predictor of intention to comply.

Method

Participants

The cohort consisted of 258 adults (58% males, 42% females) gambling mostly on VLTs in Montreal, Canada. The mean age of the sample was 39 years (a range of 18 to over 65 years of age). Participants recruited had to have been gambling on VLTs at least once a month. Their level of problem gambling was measured with the *Canadian Problem Gambling Index*. The participants were classified as non-problem gamblers (12%), moderate problem gamblers (51%) or problem gamblers (37%). Each subject received a $20 gift certificate from a pharmacy for their participation in the project (see Table 1).

Experimental Design and Materials

We used a 4 × 2 between-subjects factorial design (weak, moderate, strong levels of threat and a control group X the provider's game source and a medical source). Four warnings

Table 1 Sample characteristics ($N = 250$)

Variables	Level	Weak ($n = 72$)	Moderate ($n = 69$)	Strong ($n = 70$)	Control ($n = 38$)
Gender	Women	47.2	46.4	30	44.7
	Men	52.8	53.6	70	55.3
Age	18–24 years	20.5	14.5	15.7	10.5
	25–34	38.4	33.3	25.7	23.7
	35–44	20.5	21.7	10.0	18.4
	45–54	12.3	15.9	37.1	21.1
	55–64	6.8	7.2	10.0	15.8
	65+	1.4	7.2	1.4	10.5
Marital status	Single	61.1	47.8	49.3	52.6
	Married	30.6	27.5	31.3	28.9
	Divorced	6.9	17.4	13.4	13.2
	Widowed	1.4	7.2	6.0	5.3
Education	Elementary	2.7	2.9	4.3	5.3
	Secondary	21.9	33.3	40.0	44.7
	College	35.6	29.0	24.3	15.8
	University	37.0	27.5	24.3	26.3
	No answer	2.7	7.2	7.1	7.9
Annual Income	Less than $15,000	17.8	17.4	17.1	21.1
	$15,001–$39,999	36.9	49.2	47.1	36.8
	$40,000–$59,999	19.1	14.5	18.5	7.9
	$60,000–$79,999	4.1	1.4	1.4	10.5
	$80,000 or more	2.7	2.8	2.8	.0
	No answer	19.2	14.5	12.9	23.7

were used, one of them being a control condition (an existing message currently used on VLT screens). The negative outcomes mentioned in warnings tested were those reported in the literature, that is, family disruption, financial failures, suicide (Hodgins et al. 2002; Gray et al. 2007).

Nine different warnings were developed, pre-tested and then evaluated by 89 VLT players. Significant differences were found among them ($F_{8, 80} = 13.37$, $P \leq .001$). Three of them reflecting the negative outcomes mentioned above were selected to reflect three significantly different levels of threat (strong $M = 7.7$; moderate $M = 4.8$; and weak $M = 2.1$, on a 9-point scale), and significant differences were found between them ($F_{2, 28} = 28.10$, $P \leq .001$) using Tukey's post-hoc comparison.

Two sources previously pretested were manipulated. One was the "Bet on Yourself" Foundation funded by the corporation providing VLT's (i.e., Loto-Québec). The other source was the National Public Health Institute of Quebec, which proved to be perceived as more persuasive ($M = 4.7$ and 3.9 respectively, ($F_{1, 76} = 4.73$, $P \leq .05$ on a 7 point scale). These 89 participants were excluded from the next phase.

Dependent Variables

Cognitive Variables Related to PMT

Four cognitive variables from PMT were adapted from Maddux and Rogers (1983) and Laroche et al. (2001).

a *Perceived Severity and Perceived Vulnerability* were both measured with three 7-point items (e.g., "Gambling will lead to an increased risk of very serious problems"; "If I continue gambling, it is likely that I will develop problem gambling")
b *Response Efficacy and Self-Efficacy* were both measured four 7-pont items (e.g., "Calling to a helpline is an efficacious way to face problem gambling"; "Quitting gambling would be very difficult and uncomfortable to me")

Emotions (Fear)

The Fearfulness scale designed by Maheswaran and Meyers-Levy (1990), and adapted by Laroche et al. (2001) was used. It consists of five 7-point items (e.g., "This message makes me feel fearful," "It makes me feel anxious").

Information Processing

We used the procedure proposed by Petty and Wegener (1999) and Mick (1992), used by Chebat and his colleagues in several studies (e.g. Chebat et al. 2001). Subjects listed all their thoughts. Two M.S. students, acting as blind judges, not knowing of the purpose of the study, classified the thoughts into two ways: first, they counted the number of thoughts listed by each participant and; second, they classified the thoughts in the four categories described by Mick (1992). The four categories ranged from surface thoughts, (i.e., no personal inferences), to deep thoughts (i.e., inferences to personal life and experience). The inter-rater consistency among these blind judges was 89% to quantitative data and 82% to qualitative data.

Source Credibility

This scale was adapted from Chebat et al. (2007). It consists of five 7 point bi-polar adjectives to measure credibility, trustworthiness and persuasiveness.

Attitude Change

We used the scale developed by Reichert et al. (2001) to measure the cognitive change associated with the persuasiveness of a message (e.g., "Did the warning cause you to think differently about your gambling behavior?). This was made of four 7-point items, from 1 (not at all) to 7 (definitely).

Behavioral Intention

We used the scale developed by Maddux and Rogers (1983).which consists of five 7-point items on two dimensions—intention to act in the present and intention to act in the future.

Involvement

The scale developed by Cox and Cox (2001) to measure involvement with advertisements was adapted to measure involvement with the warning. Five 7-point items compose the scale: (e.g., "I got involved in what the warning had to say" and "The warning seemed relevant to me").

Procedure

Data was collected over a 6-month period in the spring and summer of 2008. After obtaining ethical approval from our university ethics committee, 89 participants were selected to pre-test both the warnings and the sources. The appropriate stimuli were then selected for the experimental conditions and a new group of participants was selected, first through advertisements in the local press, second through a snowballing sampling strategy and third by contacting organizations helping at-risk gamblers. Each subject gave his or her informed consent before participating in the study. To protect the privacy of participants, informed consent was kept separate from the questionnaire, which did not include any personal data.

The first part of the questionnaire identified games used most often and gambling frequency; it also included the *Canadian Problem Gambling Index* measuring the problem gambling assessment. In the second part of the questionnaire, participants were exposed to only one warning corresponding to their experimental condition. A blank space was left to allow the participants to write down all their thoughts inspired by the warning. The method of presenting the warnings was consistent with the way that other studies in risky health behaviors have been used (Floyd et al. 2006; Maheswaran and Meyers-Levy 1990). The third part of the questionnaire captured the emotions triggered by the warning, the level of involvement in reading the warning, the attitude change, the four cognitive variables of PMT as well as the behavioral intention. The fourth and last part of the questionnaire collected demographic data. After the respondents had completed it, they were debriefed, handed a hard copy of the consent form and thanked for their participation.

Analyses

Eight questionnaires were eliminated for incomplete answers or inconsistencies among the answers. The remaining 250 participants were included in the data analysis.

A series of analyses of variance (ANOVA), analyses of covariance (ANCOVA) and multiple analyses of variance (MANOVA) were performed to test H1, H2, and H3. A series of linear regressions were performed to test H4 and H5 (Green and Carroll 1978).

Internal Consistency of the Scales

A series of factor analyses was performed to test the scales. Six items formed the *Perceived Threat factor* (Perceived severity and perceived vulnerability) explaining 80% of the variance. The Coping Appraisal scale was subdivided into two factors, *Self-Efficacy* and *Response Efficacy*, explaining respectively 76 and 68% of the variance.

The Cronbach's alpha reliability estimates were: Fear = .95; Perceived Severity = .82, Perceived Vulnerability = .76; Response Efficacy = .77; Self-efficacy = .91; Attitude Change = .90; and Behavioral intention to Comply = .69.

Results

Manipulation Checks

1 *Manipulation Check of Threat:* An ANOVA with a Tukey post-hoc comparison showed that the three levels of threat were significantly different ($F_{3,\ 246} = 33.88$, $P \leq .001$): control group ($M = 3.9$, SD 2.3) strong ($M = 6.9$, SD 1.7), moderate ($M = 5.6$, SD 1.6) and weak ($M = 4.0$, SD 2.1) on a 9-point scale.
2 *Manipulation Check of Source Persuasiveness:* Similarly, the two sources were shown to be significantly different in terms of persuasiveness ($M = 4.7$ SD 1.8, and 4.2 SD 1.6 respectively, $F_{1,\ 210} = 3.76$, $P \leq .05$).

Hypotheses Testing

PMT Cognitive Appraisal (H1)

Threat was hypothesized to impact on both Perceived Severity of gambling problems and Perceived Vulnerability to these problems. No significant direct effects of threat were found on neither Perceived Severity ($F_{3,\ 242} = .466$, $P \geq .707$) nor Perceived Vulnerability ($F_{3,\ 242} = 3.37$, $P \geq .08$). However, Threat impacts significantly on Fear ($F_{2,\ 243} = 9.61$, $P \leq .001$) and on Depth of Information Processing ($F_{2,\ 243} = 5.62$, $P \leq .004$). H1 is partially confirmed.

ELM (H2)

H2 holds that the higher the Involvement, the higher the scores of Perceived Severity, Perceived Vulnerability, Fear and Depth of Information Processing. The distribution of involvement was split in two approximately equal groups of participants, those scoring low and those scoring high on involvement in the warning. No significant relation was found

between Involvement and Perceived Severity (high involvement: $F_{3,\ 126} = 1.10$, $P > .35$, low involvement $F_{3,\ 101} = 1.08$, $P > .36$). However Involvement affects Perceived Vulnerability: highly involved participants felt significantly more vulnerable (high Involvement $M = 5.4$ SD 1.3 versus low Involvement $M = 4.8$ SD 1.4; $F_{3,\ 126} = 2.60$, $P < .05$).

We followed the statistical procedure proposed by Baron and Kenny (1986, p. 1174) to test the potential moderating effects of involvement on the relation between both perceived severity and perceived vulnerability, on the one hand, and fear on the other hand. Involvement was shown to be a moderator on these two relations (Severity X Involvement: $\beta = .44$, $r^2 = .199$, $F_{1,\ 233} = 57.99$, $P \leq .001$; Vulnerability × Involvement: $\beta = .50$, $r^2 = .253$, $F_{1,\ 233} = 79.10$, $P \leq .001$). Threat makes gamblers feel more vulnerable and makes them assess the danger of excessive gambling as severe as long as they are highly involved.

An ANCOVA showed that Involvement affects fear ($F_{4,\ 228} = 16.95$, $P \leq .001$): high-involved subjects felt more fear ($F_{3,\ 127} = 2.67$, $P \leq .05$) than low-involved subjects ($F_{3,\ 101} = .52$, $P > .66$) (see Fig. 2). Another ANCOVA revealed that the stronger the threats, the deeper the information processing of highly involved respondents ($F_{3,\ 127} = 4.18$, $P \leq .007$) not of low involved respondents ($F_{3,\ 101} = .17$, $P > .91$). Figure 3 shows the positive effects of involvement with warning on Depth of Information Processing. H2 is therefore partially supported. We also tested the potential curvilinearity of the relation between Threat and Depth of Information Processing, only for highly involved gamblers (since in the case of low involved gamblers, Threat has no significant effects on DIP). An LSD post-hoc test shows that:

1 The effects of weak ($M = 1.63$) and control ($M = 1.82$) Threat levels are not significantly different ($P = .65$)
2 The effects of moderate ($M = 2.62$) and strong ($M = 2.17$) Threat levels are not significantly different ($P = .07$)
3 The effects of moderate and strong Threat levels are significantly stronger than those of low and control Threat levels (all P's $< .05$).

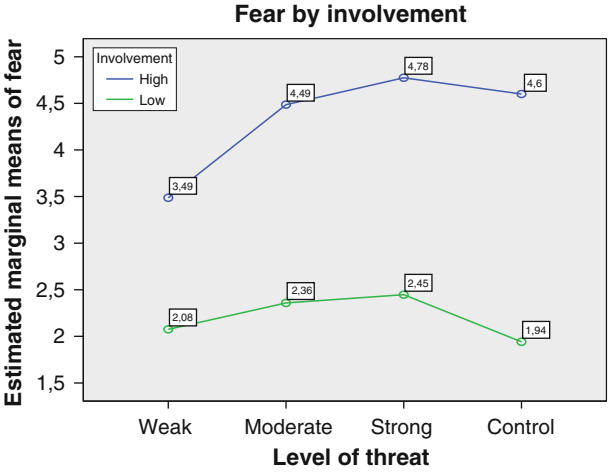

Fig. 2 Effects of threat and involvement on fear

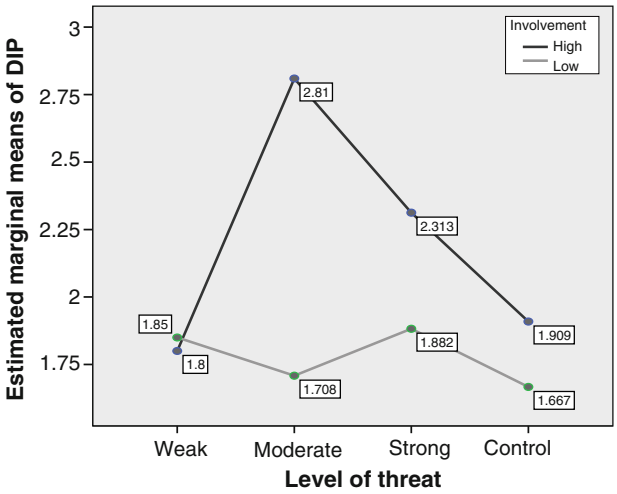

Fig. 3 Effects of threat and involvement on depth of information processing

In other words, Threat increases DIP up to its moderate level; then at strong level of Threat, there is no more increase in DIP. This plateau pattern was not expected; since the literature reviewed led us expect either a linear or a curvilinear relation between Threat and DIP.

Effects of the Source (H3)

H3 is the hypothesized relation between the type of Source and the Depth of Information Processing. An ANOVA (with an LSD test) showed the Medical Source (National Public Health Institute of Quebec) generates more Depth of Information Processing than both the Foundation funded by the game's provider source (i.e., the Bet on Yourself Foundation) and the no-source group ($F_{2,\ 247} = 4.04$, $P \leq .01$) (see Fig. 4). H3 is supported.

Mediating Effects Response Efficacy and Self-Efficacy (H4)

H4 is related to the potential mediating effects of response efficacy and self-efficacy between Depth of Information Processing and Attitude Change (see Figs. 3, 4). Following Baron and Kenny's procedure (1986, p. 1177), a series of regressions models were used. We regressed the potential mediators on the independent variable.

First, Depth of Information Processing affects Response Efficacy ($\beta = .16$, $r^2 = .021$, $F_{1,\ 241} = 5.19$, $P \leq .02$); not self-efficacy ($\beta = .16$, $r^2 = .014$, $F_{1,\ 247} = 3.51$, $P > .06$). Second, DIP affects Attitude Change (the dependent variable) significantly and positively ($\beta = .31$, $r^2 = .060$, $F_{1,\ 244} = 15.63$, $P \leq .001$). Third, Attitude Change was regressed on both DIP and Response Efficacy. While Response Efficacy affects attitude change ($\beta = .42$, $r^2 = .148$, $F_{1,\ 238} = 41.28$, $P \leq .001$), the effects of DIP on Attitude Change remain almost the same ($\beta = .24$, $r^2 = .183$, $F_{2,\ 237} = 26.55$, $P \leq .002$), meaning that Response Efficacy is a partial mediator between DIP and Attitude Change. H4 is partially supported.

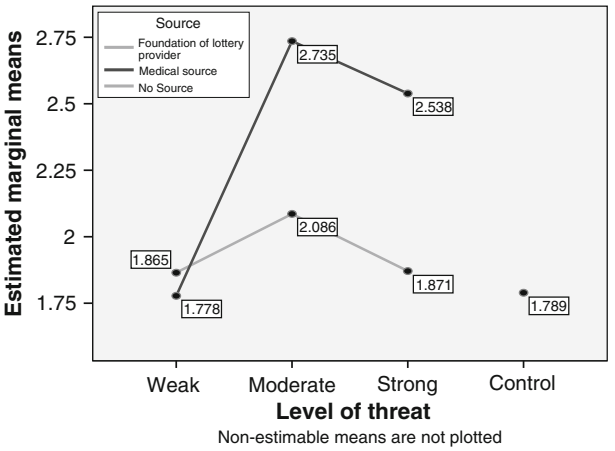

Fig. 4 Effects of source and threat level on depth of information processing

Effects of Attitude Change on Intent to Comply With the Warning (H5)

H5 is related to the hypothesized effects of Attitude Change on Intent to comply with the warning. A linear regression revealed that attitude change significantly affects intention to comply in the future ($\beta = .38$, $r^2 = .147$; $P \leq .001$), not in the present ($\beta = .013$; $r^2 = .00$, $P > .83$). H5 is therefore partially supported.

Discussion

The present research is an exploratory study of the effects of threat to promote responsible gambling among actual VLT players. This approach brings about some new perspectives.

First, the fact that our participants are adult real VLT players give the findings more ecological validity than previous studies employing students and non-players, in particular players showing no signs of problem gambling (e.g., Steenbergh 2004).

Second our theoretical perspective is the first one which combines two types of key constructs, those related to the Depth of Information Processing (i.e., Elaboration Likelihood Model) and those related to the motivation to protect health (Protection Motivation Theory) in a context of potential gambling problem. Third, this study is the first one using threatening warnings that underscore long-run negative personal outcomes to promote responsible gambling.

Overall, the results provide full or partial support for a series of hypotheses derived from our model, which is based on two major models of social psychology that is ELM and PMT. This model addresses three important concerns. First, threatening warnings work effectively in a gambling behavior setting. Second, strong warnings have a positive effect on Depth of Information Processing, which in turn enhances attitude change, which confirms previous findings (Andrews et al. 1993; Perloff and Brock 1980). Third, the source of warnings proves to be an important issue that deserves more attention than it has received so far, since a medical source is shown to generate significantly more attitudinal changes than a source closely related to the provider of gambling services.

As for cognitive appraisals of the dangers inherent in VLT gaming, our research shows that players are aware of the dangers associated with VLT gaming, which is considered the most hazardous form of gaming (Griffiths 1990; Bélanger et al. 2003). Moreover, the probability of occurrence of problem occurring is perceived as high among VLT players of our sample, which means that risk perceptions about VLTs are already been activated by public health campaigns (Schrans et al. 2004).

Threat-generated fear has been shown in this study as playing a key role in changing VLT players' attitudes. We found that the stronger the threat, the greater the fear elicited amongst highly involved VLT gamblers. Fear creates unbalance that triggers information processing and forces VLT players to perceive the risks they face. However, threat does not generate fear for low-involved gamblers.

This study confirms that threatening warnings may be appropriate tools for promoting healthy behavior, which is in line with previous studies related to smoking behavior (Hammond et al. 2007; Argo and Main 2004). It also indicates that VLT players appear to be interested in information on gambling and its potential negative outcomes.

An unexpected result deserves attention that is the plateau pattern, with a threshold effect between moderate and strong threat, which better explains the effects of threats on DIP and attitude change. This finding contributes to building an alternative model of the effects of fear, between the curvilinear model (Janis 1967) or the linear model (Sutton 1982; Witte and Allen 2000) to explain the effects of fear on persuasion. This finding suggests that the level of threat needs to be raised high enough to obtain a cognitive effect; beyond a certain threshold, threats produce neither positive nor negative effects. More research is needed to investigate the effects of threat in the specific field of gambling.

Involvement plays an important role in our model. We showed that perceived vulnerability is associated with greater fear only if involvement is high. In other words, if involvement is low, fear does not generate perceived vulnerability. If the warning does not attract gamblers' involvement in reading the warning, that is, if the way the warning is designed is not appropriate, then threat is ineffective. Very importantly and similarly stronger threats were shown to affect Depth of Information Processing more intensively under high involvement.

Highly involved subjects, as proposed by Elaboration Likelihood Model, engage more in information processing than low involved subjects. Put another way, the more people feel that warnings are relevant to their personal life, the more effective the warning in enhancing attitude changes toward compliance (Petty and Cacioppo 1981; Hammond et al. 2004; Zuckerman and Chaiken 1998).

As for the effects of the source, our study shows that a source related to the video lottery provider (Bet on Yourself Foundation) had almost the same effect as no source. Although the public acknowledges the Foundation's efforts, since it is promoting actions that may run counter to its own interests (less gambling), this source is not as efficacious as an alternative medical source at promoting responsible gambling behavior (the Quebec National Institute for Public Health, INSPQ). In their thought listings, some VLT players strongly criticized the Foundation as hypocritical, only acting to avoid lawsuits or accommodate other public policies supported by governments. In contrast, VLT players exposed to the medical source engaged in deeper Information Processing, that is, they thought of the consequences of VLT gambling on themselves. This key finding implies that such a source is considered more persuasive for these types of warnings. These results are consistent with a large body of literature on source effects (Sternthal et al. 1978; Frewer et al. 1997; Lirtzman and Shuv-ami 1986).

We found that Protection Motivation Theory is quite appropriate in the field of gambling behavior. As predicted by Lazarus (1991), coping responses restore a normal state following an unbalance state (i.e., fear). Individuals follow recommendations, namely engage in coping behavior, in order to avoid the danger, as suggested by PMT (Rogers 1983). The two variables composing this appraisal (response efficacy and self-efficacy) are strong predictors of attitude change (Maddux and Rogers 1983). Individuals with a higher self-efficacy score consider themselves able to change their attitude toward gambling in order to avoid undesirable outcomes, and this is consistent with other studies that employed Protection Motivation Theory (Rippetoe and Rogers 1987; Snipes et al. 1999).

We also found that Response Efficacy (i.e., calling a helpline) is a partial mediator between Depth of Information Processing and Attitude Change. But Self-Efficacy is not a mediator. In other words, gamblers realize through fear-generated thoughts that they are vulnerable and need to change to protect themselves. But fear-generated thoughts do not change that part of their self-image related to their own perceived efficacy. Consequently, communication strategies other than fear should be employed to enhance self-efficacy, in particular messages showing that gamblers similar to them have been able to successfully follow the process suggested to reduce gambling problems.

Some participants wrote that betting on VLTs is a kind of investment. Such a consideration may create goals conflict, and this may undermine the advantages of coping behavior aimed at giving up the dangerous behavior as well as the individual's self-control (Baumeister 2002). Some VLT players may deny the negative outcomes of their behavior by making a choice, which pushes them to prefer their goals of winning over the inherent risks (e.g., Baumeister 2002). This condition may cause them to neglect the long-term undesirable outcomes associated with their gambling behavior.

Limitations and Future Research Avenues

Some limitations must be acknowledged. First, our study cannot measure long-term attitude changes following exposure to dissuasive messages. A longitudinal study is required in order to have a clear measure of attitude change over time. Second, in our study warnings were not presented on VLT screens as this is the case usually. Third, the study was not performed in real-life conditions of bars or restaurants for instance, where gamblers' attention is reduced by noise, music, presence of other gamblers and alcohol (Focal Research 2004). In such real-life situations, it's all the more important to attract gamblers' attention through attention-arousing elements of warnings, such as threats.

Practical Implications

This study has various practical implications. Public health managers should use threatening warnings appropriately when preparing dissuasive warnings for gamblers. Such messages may enhance DIP which also enhances attitude change. The choice of a trustworthy source is also a key issue in effective communication strategies.

Since VLTs are usually isolated from public view in dark rooms, gamblers focus on the screen lights and other atmospherics cues. Therefore, in order to attract their attention on messages about negative outcomes, public health managers need to remind them of the dangers of VLT gambling through threatening warnings. This is one way to deal with their inertial gambling behavior and move them toward protective actions. Threatening

warnings could be useful as a tool to make gamblers behave more responsibly. In terms of the stages of the Trans-Theoretical Model (Prochaska and DiClemente 1983), such warnings are probably a first step toward bringing gamblers to the contemplation stage, and that they reinforce change in individuals who have already admitted their gambling problem and have moved onto other stages (Block and Keller 1998).

The issue of low involved gamblers should receive special attention, their low level of involvement may stem from the quasi-absence of warnings and advertising campaigns regarding the problems of gambling. Some advertising campaigns similar to those regarding cigarettes or road safety should be undertaken to increase their level of gambling involvement.

As for PMT coping appraisal, public health managers may want to develop messages to enhance both response efficacy and self-efficacy. Our findings suggest that public health managers should focus on increasing self-efficacy by underscoring the personal skills required to abandon such negative behavior. Moreover, messages should focus on showing individuals who have successfully overcome pathological gambling behavior by applying self-regulatory strategies. Managers should also consider de-normalizing gambling as a fun activity. Campaigns to prevent gambling behavior often paradoxically support also the fact that games of chance are a source of pleasure for most people. This can mislead some problem gamblers, reassuring them that they are just playing for fun (e.g., Zuckerman and Chaiken 1998), which could lead them to deny the problem. Our qualitative data show that happy mood is not a common emotional state enjoyed by the vast majority of gamblers of our sample who report that they are stressed by their losses. This line of inquiry shows much promise. It can enhance our knowledge about ways to raise awareness among VLT players, help public health managers deal with gambling disorders, and provide ways to help gamblers avoid crises in their personal lives.

Avenues for Future Research

The use of graphic warnings about smoking behavior has had positive effects (Hammond et al. 2007). Other studies have demonstrated that graphic warnings reduce smoking intent more effectively than text-only warnings (Golmier et al. 2007; Lowrey et al. 2009; Sabbane et al. 2009). Following this line of reasoning, we suggest that graphic warnings may improve the effectiveness of measures to promote responsible gambling among VLT players. As far as we know, no study has dealt specifically with using such a tool in this context, but given the example set by tobacco warnings, we believe that graphic warnings may work well and affect gambling behavior.

Gambling behavior is rooted in cultural issues; some cultures give a very important place to hazard activities. It could be that our thinking about pathological gambling may be influenced by such a cultural perspective. Cultural studies are therefore also required in order to understand how people react to fear appeals in the context of foreign cultures (Laroche et al. 2001). Subjective norms can also lead to responsible gambling behavior. In this sense, if public health managers try to minimize the current view that gambling is "normal behavior for fun" and enhance the effects of subjective norms in terms of behavior disapproval from others (i.e., friends, peers and family members), they could make headway in de-normalizing gaming as a fun activity.

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Appendix

See Table 2.

Table 2 Stimuli employed

Threat conditions	Warnings
Weak	"Beware of excessive gambling."
Moderate	"Excessive gambling may harm your family life, break down your couple and your home."
Strong	"Excessive gambling may drive you to intense distress and suicidal thoughts."
Control group	"Gambling should remain a game."
Type of source	
Game provider	Foundation Bet on Yourself
Medical source	National Public Health Institute of Quebec

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