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ORIGINAL PAPER

# Adolescent Gambling and Coping within a Generalized High-risk Behavior Framework

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**Abstract** Data were collected for 1998 middle/high-school students in Ontario to assess involvement in gambling, substance use, and generalized risky behavior. To predict these outcomes, measures for anxiety, family cohesion, and coping style were also administered. Three a-priori models were posited to account for the impact of risk factors, protective factors, and combined risk/protective factors on the development of risky behaviors. A high-risk cohort composed of subjects endorsing at least one risky behavior (gambling, substance use, or generalized risky behavior) within the clinical range was created to test an unobserved outcome variable created from all three measures of risky behavior, which was successfully predicted by two of the three a-priori models. Implications for the inclusion of gambling within a constellation of high-risk behaviors and recommendations for future prevention efforts are discussed.

**Keywords** Youth gambling · Coping behaviors · High-risk behavior

## Background

Research into adolescent experimentation with substances and risky behaviors has established that gambling represents one of the earliest and most common ventures by youth, even surpassing behaviors including smoking and drinking alcohol (Gupta & Derevensky, 1998a). This knowledge is still slowly disseminating among the popular audience, and gambling has yet to be accorded the same air of caution by parents and educators as other

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adolescent risk activities. This poses a potentially serious problem for youth, whose prevalence rates from meta-analytic studies and reviews suggest that problem gambling amongst adolescents may be three times higher than adults (Jacobs, 2000; Shaffer, Hall, & Vander Bilt, 1999). Youth today have more access to gambling than ever, along with concomitant endorsement by government, but very little in the way of education, awareness, or prevention.

Gambling among youth has been conceptualized as an outgrowth of an impulsive personality type (Vitaro, Arseneault, & Tremblay, 1997, 1999; Vitaro, Ladouceur, & Bujold, 1996), a common "phenotype" of heterogenous pathways (Blaszczynski & Nower, 2002) including addictive behaviors (Gupta & Derevensky, 1998b), and finally, as one more behavior within a constellation of youth high-risk behaviors (Jessor, 1998). Theories of personality tend to focus on stable traits like sensation-seeking tendencies and biology (especially gender) to try and predict gambling problems. More recently, the pathway model posits three or more distinct types of youth problem gamblers starting with very general risks which can affect anyone (conditioning and reinforcement) to the very specific portrait of individuals having been concomitant emotional, behavioral or co-morbid addictive behaviors (Nower & Blaszczynski, 2004). The last and most ambitious of the three pathways, high-risk behavior theory, attempts to subsume not only features of the above theories but also over-arching demographic, social, and environmental factors to predict a general propensity to engage in risky behavior. While it loses some specificity, the high-risk behavior model is attractive because it considers simultaneously factors which are a risk for other high-risk behavior but also factors which can prevent or lessen those same risks, accounting for youth who are *resilient* in the face of risk exposure (Lussier, Derevensky, & Gupta, 2004). Such youth are at least as important as those who succumb to destructive behaviors, and we prefer a model, which runs in both directions (risk and protection) for this reason.

Currently, longitudinal data is lacking in the field of youth gambling. The majority of studies are cross-sectional in nature and have so far yielded a wide range of correlates for gambling behavior. Except where logic dictates a precedent (gambling behavior by children cannot, for instance, cause low SES) these variables merely co-exist with gambling, and cannot be considered predictive.

## Correlates for Youth Gambling

Recent research highlights the following:

- Children who experience problem gambling are overwhelmingly male, most likely due to the fact that boys gamble more overall (at earlier ages, for higher wagers, on more games, more often on a regular basis) (Jacobs, 2000).
- Adolescent problem gamblers report beginning gambling at earlier ages than their peers who do not experience gambling pathology (Gupta & Derevensky, 1998a). Simultaneously, adolescent experimentation with risky behavior increases with age.
- Consistent with heterogeneous pathways theory (Blaszczynski & Nower, 2002), adolescent problem gamblers report heightened anxiety across state, trait, and general measures. This is indicative of an abnormal physiological resting state, which is remedied by engaging in risky behavior (Gupta & Derevensky, 1998b; Jacobs, 1986; Ste-Marie, Gupta, & Derevensky, 2002). Indeed, as youth progress along the continuum of pathological gambling, their reported reasons for gambling change from winning money and having fun to subjective feelings of invincibility or disassociation (Gupta & Derevensky, 1998b).

- Concomitant with states of anxiety, many problem gambling youth experience low self-esteem or depressive symptomology including clinical depression (Gupta & Derevensky, 1998b).
- Problem-gambling youth tend to experience more difficulty with their academic studies (Hardoon, Gupta, & Derevensky, 2004).

A more comprehensive list of risk factors can be found in Abbott, Volbger, Bellringer, and Reith (2004) and Derevensky and Gupta (2004).

## Protective Factors

To date, protective factors nominated for youth gambling have been adapted from more general models of high-risk behavior. However, it remains to be determined which factors are unique in conferring protection against problem gambling. An analysis by Dickson, Derevensky, & Gupta (in press) found having high family cohesion, that is, perceiving family members as supportive and tightly-knit and also school-connectedness, feeling welcome and integrated into the school environment were protective factors. Overall, our knowledge of risk factors far outstrips knowledge of protective factors where adolescent gambling is concerned.

Currently, there are very few longitudinal studies, which assess problem gambling in adolescents. Vitaro and his colleagues (Vitaro et al., 1996, 1997, 1999; Vitaro, Brengden, Ladouceur, & Tremblay, 2001) have published the results of a longitudinal study of low SES adolescent males. In general, these studies confirmed that impulsive personality traits in early adolescence correlated with excessive gambling behavior during late adolescence. While their main focus was on impulsivity as a predictor, their view of risky adolescent behaviors complements our own. In their most recent models, the authors allow a triad of potentially harmful behaviors to correlate amongst themselves and between two time-points, positing an integrated view of adolescent risky behaviors (Vitaro et al., 2001). The strengths of this ongoing study are its breadth, counting an N of over 1,000 and also its use of varied measures including self-report, parent and teacher ratings, and performance-based testing. The authors do concede as a limitation the total variance of gambling explained by their models (between 10% and 12%), which invites inquiry into other predisposing factors unique to gambling and shared amongst other risky behaviors.

Chemical dependence is an example of a high-risk behavior, which has been intensely investigated as a generalized high-risk behavior with several longitudinal studies. Wills and his colleagues (2001) looked at the onset of substance use in children by creating a structural equation model using a single outcome variable created from alcohol, tobacco, and marijuana use. Data were collected twice, one year apart, to monitor which youth had begun using these substances during that interval. Adolescent gambling research would benefit from a similar approach of being grouped with other high-risk behaviors using structural equivalent modeling to help predict risk and protective factors.

Ideally, social policy and prevention programming would be based exclusively on longitudinal studies, but the current cross-sectional gambling data paints a portrait of the urgent need for education and intervention even in the absence of such information (Romer, 2003). Using correlational techniques, it is possible to construct a web of the interacting risk and protective factors at a single timepoint. Structural equation modeling (SEM) integrates data from many variables into a framework, which can be used to examine a complex network of relationships of differing strengths and valences. It can also

support unobserved variables constructed from related measures, such as the chemical-use variable created by Wills from use of cigarettes, alcohol, and marijuana (Wills et al., 2001). This aspect is particularly well-suited to the theory underpinning involvement in multiple high-risk behaviors (Jessor, 1998), as the individual behaviors can be subsumed under a single, latent variable. Other more popular multivariate techniques are limited in that they must consider a single dependent variable every time a model is run, which goes against a fundamental point of *generalized* risky behavior. Parsimony dictates using the simplest techniques for any given situation, but in the case of considering a cluster of related outcome behaviors, a relatively advanced technique like SEM is appropriate. Perhaps its best feature is its ability to assess how much of the variance in any outcome the model explains; a barometer for completeness within the chosen model.

Many other techniques for analyzing correlational data (ANCOVA, multivariate analysis) operate under an assumption of error-free measurement in their predictor variables. SEM, however, includes error terms for every endogenous variable, and furthermore allows relationships between errors to be specified and observed just as with the variables of interest. In the realm of gambling behavior (and psychology more generally) the ability to treat error terms is valuable, since it is a given that most measures are prone to a certain amount of error. As longitudinal studies appear, allowing correction for errors between identical measures at different time-points will be increasingly important.

Given that the extant data on youth gambling are almost totally correlational, SEM represents an excellent technique to shed light on this pressing issue while longitudinal research is being conducted. In the present study, we intend to exploit the cross-sectional data as best possible to inform prevention efforts already underway. Logistic regression (LR) has yielded a useful model for predicting youth gambling based on the presence of risk and protective factors; we aim to model the relationships which are left unstructured by LR and also to predict a cluster of four high-risk behaviors simultaneously. When constructing our own hypothesis, we organized our variables of interest by their proximity to the outcome variable. That is to say, we consider more distal variables (temperament, family support, gender) to form a bedrock on which is built more proximal factors like attitudes and responses to stress which, in turn, narrow to a point where we expect to find involvement in risky behaviors. Given our current knowledge, we hypothesize that trait anxiety, family cohesion, age, and gender will have a strong impact on involvement in risky behavior in general which will operate indirectly through coping style. In all three of our a priori models, we consider family cohesion, trait anxiety, gender and age to precede the more sophisticated construct of coping styles, which should in turn predict proclivity to engage in risky behaviors, which can be considered themselves a form of unhealthy coping. Within this study we test three hypothetical models: the first including both helpful and unhelpful coping styles, the second trying to predict proclivity for risk using only unhelpful coping, and the final trying to predict proclivity for risk through helpful coping only. We favor Jessor's perspective that including both risk and buffer effects (Model 1) will best model our results. Although we adhere to a complicated model of risks and buffers, we test competing, more simplified models, since this is an easy and illuminating feature of computerized SEM. Particularly when combined with re-sampling methods, it is possible to consider competing models very rigorously when trying to determine which is the fairest, most authentic portrayal of a set of real relationships.

Our dataset actually comes from an earlier study done by Dickson et al., (in press), however, whereas the analyses used gambling behavior as the final outcome predicted from a set of independent variables including other risky behaviors, predicting all three risky behaviors simultaneously may represent a more faithful application of generalized high-risk behavior theory (Jessor, 1998).

## Participants

The original dataset included 2,537 youth between the ages of 11 and 18 attending Ontario schools, both public and private, who consented to participate. This set was refined for logistic regression by eliminating outliers, to form a sample of 2,179 adolescents. For the current analysis, data was further refined by listwise deletion to create more stable covariance matrices ($N$ = 1,998). This was done in order to take advantage of structural equation modeling and bootstrapping techniques.

## Measures/Constructs

Many constructs were measured during data collection, but only those that were included in the final models are reported in this paper (A complete list can be found in (Dickson et al., in press). Another important difference to note; in the previous analysis of these data, scores on many of the measures were used to create quartiles or binaries for entry into the logistic regression. However, for the present analysis, as many variables as possible were left as continuous or ordinal scores to reflect more degrees of gradation within constructs. The measurement level of the model includes demographic, temperamental or other factors beyond the child's control. These in turn influence the structural model of the youths' personal coping style, which ultimately predicts their overall proclivity to engage in risky behavior in general as a method of coping with anxiety/stress. The measures of coping are initially discussed as they are the axes through which all other variables pass to predict a general proclivity for risk.

## Structural Model Measures

- *ACOPE—Coping Skills (healthy coping α = .89, unhealthy coping α = .78).* This measure lists 54 behaviors that youth may use when faced with stress or problems, all of which are rated on a Likert scale based on how often each is employed (Patterson & McCubbin, 1987). This measure taps two styles of coping: salutory effort and stress palliation (Jorgensen & Dusek, 1990). The first is a proactive, problem-focused reaction to stress, which is generally more positive or healthy. Healthy coping generally aims at eliminating the source of stress or anxiety, such as the item "(when under stress you) organize your life and what you have to do," while unhealthy coping merely deals with the short-term affective component, as in the item "(when under stress you) daydream about how you would like things to be," while the larger problem at hand is left unresolved. The second is more emotion and avoidance focused, generally unhealthy, and overlaps with the type of dissociative feelings that pathological gamblers report (Gupta & Derevensky, 1998b) but those with other addictions (Jacobs, 1986).

## Measurement Model Instruments

- *FACES II—Family Cohesion (α = .87).* Family cohesion is the degree to which a youth feels connected to other members of his family (Olson, Portner, & Bell, 1982). Previous work has shown that Family Cohesion protects against almost all high-risk

behaviors in youth except for pregnancy (Resnick et al., 1997). Being closely bonded with family members forms the basis of many positive coping strategies, which rely on seeking the emotional or instrumental support of an adult. Endorsement of items like "In our family, it is easy for everyone to express his/her opinion" indicate that the child feels integrated into a strong group, which can be depended upon. This should translate into positive coping behaviors from the ACOPE scale such as "(when under stress you) talk to your mother about what bothers you". The unhealthy coping scale includes items such as "(when under stress you) stay away from home as much as possible", which avoid supportive contact.

- *STAI—Trait Anxiety (a = .90).* Many high-risk behaviors are associated with this generalized trait, especially behaviors, which are a form of self-medication or escape (Jacobs, 1986). Studies which treat gambling under the aegis of addictive behaviors have found support for abnormally heightened state, trait, and generalized anxiety in samples of problem-gambling youth (Gupta & Derevensky, 1998b; Ste-Marie et al., 2002). This scale contained 20 items about how the child generally feels, and included items like "I feel inadequate" or "I feel like a failure" which were rated on Likert scales based on the frequency of occurrence (Spielberger, 1983).
- *RIPS modified version—General high-risk behavior attitudes (perceived benefits a = .92, perceived risks a = .88 after revision).* The RIPS covers a wide range of risky behaviors and measures each in terms of how risky and beneficial each activity is perceived to be (Shapiro, Siegel, Scovill, & Hays, 1998). Some items were deleted from the validated version of this form at school boards' request and also to avoid overlap with the PESQ and DSM-IV-MR-J. Internal consistency was not badly compromised by this and remained strong. A theoretical score was created from the ratio of subjects' perceived risks and benefits for this study to represent positive or negative attitudes towards risky behaviors in general. This ratio did not enter into the predictive models, but was used to validate the latent outcome variable as a test of convergent validity.

## Latent Variable Measures

- *PESQ—Substance Abuse Screen (a = .91).* This screen was developed for use in clinical populations and assesses level of chemical dependency (alcohol or other drugs). A set of norms dictates whether a child's score on this test indicates a need for clinical intervention. It also contains a built-in measure to discount participants who fake bad on the scales (Winters, 1992).
- *DSM-IV-MR-J—Gambling Severity (a = .82).* This is a widely used screen, often used in clinical work and research to assess severity of gambling problems and their consequences in youth. To adapt the scale to self-report, the categorical options were replaced with multiple responses for the 9 domain questions (Fisher, 2000). A rating of 4 or more on this instrument indicates probable pathological gambling. A 3 is seriously at risk, and a 2 represents some risk. 0 or 1 indicate social gambling within healthy limits. Amongst other gambling measures, this one is the most conservative, estimating a prevalence of approximately 4–5% for pathological gambling among youth (Derevensky & Gupta, 2000).
- *RIPS modified version—General high-risk behavior involvement scale (a = .83).* This subscale from the RIPS retained good internal consistency after editing. It is a self-

report measure assessing general risky behaviors the individual has actually engaged in over the past year, as opposed to merely his attitude towards them (Shapiro et al., 1998). While the DSM-IV-MR-J and PESQ are both focused on a specific addictive behaviors, the RIPS covers a variety of risks such as unsafe sex, reckless driving, cheating, and shoplifting.

## Results

Inspection of the data revealed that the scores from the measurement and structural models were relatively normal, but that the high-risk behaviors were all consistently positively skewed (Fig. 1). This was not unexpected given serious high risk behaviors are generally rare, especially for younger children, and increase as youth age (Table 1) (Gupta & Derevensky, 1998a). To address this problem, a subsample was created from the dataset ($N$ = 647, 318 male, mean age = 15.9 years SD = 1.76) of participants who endorsed any

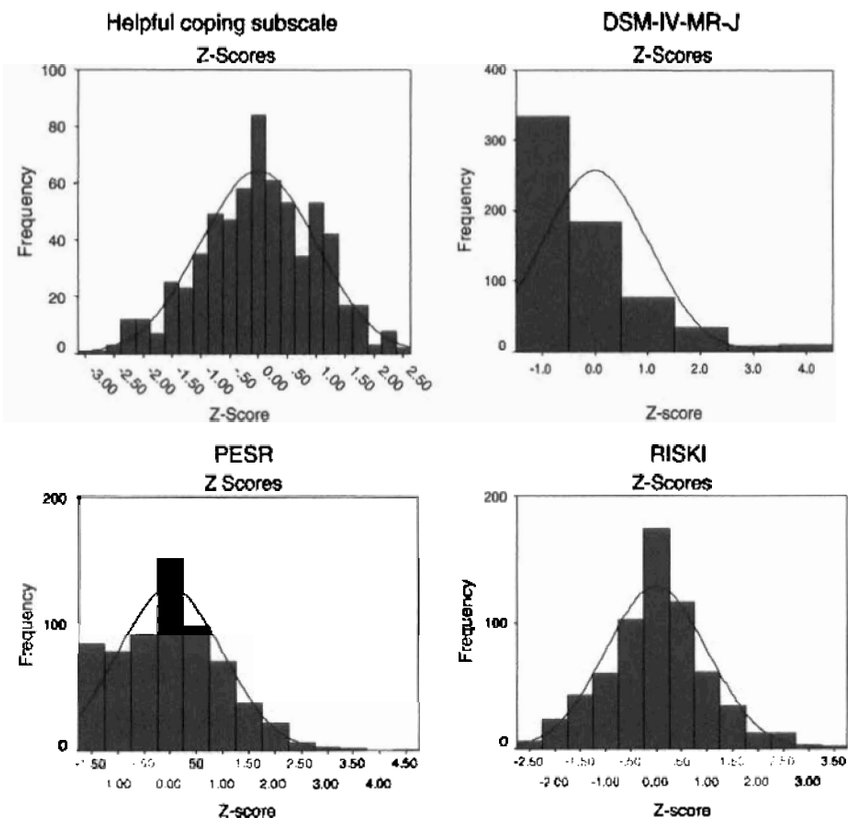


**Fig. 1** Z-score frequency distributions for unhelpful coping (predictor variable) and gambling pathology (outcome variable component). The outcome components tended to be skewed

**Table 1** Results from a survey conducted by Gupta and Derevensky (1998a) estimating prevalence of risky behaviors

| Reported involvement in addictive behaviors, by grade and gender | | | | | | |
|---|---|---|---|---|---|---|
| Activity | Total reported use[a] $N = 817$ | | | Weekly use[b] $N = 817$ | | |
| | Gr 7 | Gr 9 | Gr 11 | Gr 7 | Gr 9 | Gr 11 |
| Alcohol | 36.8% | 62.2% | 79.8% | 7.4% | 14.0% | 20.2% |
| Drugs | 3.5% | 13.4% | 26.5% | 1.6% | 2.1% | 7.6% |
| Cigarettes | 18.2% | 34.5% | 48.4% | 7.0% | 16.1% | 31.4% |
| Gambling | 79.1% | 78.9% | 83.4% | 30.4% | 37.4% | 37.1% |
| | Males ($N = 417$) | Females ($N = 400$) | | Males ($N = 417$) | Females ($N = 400$) | |
| Alcohol | 61.6% | 56.3% | | 18.9% | 8.0% | |
| Drugs | 15.6% | 12.0% | | 4.1% | 2.8% | |
| Cigarettes | 29.7% | 36.8% | | 16.3% | 18.5% | |
| Gambling | 81.5% | 78.8% | | 38.1% | 17.8% | |

[a] Percentage of those who reported engaging in this activity within the previous 12 months

[b] Percentage of those who report engaging in this activity a minimum of once per week

one of the three high-risk behaviors in the clinical range. Both the DSM-IV-MR-J and PESQ have specific cut-off points. For the RIPS, participants were included if they were within the top quartile of scores. This new sub-sample had better variation within each of the high-risk variables, although still not very normal. Nonetheless, a working latent variable was created which included all variables (Fig. 2). The assessment of normality is provided in Table 2. Risk involvement and drug use best approximate the normal curve, while gambling and attitude towards risk contain violations (c.r. surpassing |3|).

Within the latent variable, gambling remains the weakest element, while generalized risk is strongest. This latent variable (proclivity for risk) also correlated well with the theoretical observed variable for positive attitude towards risk. After this submodel was

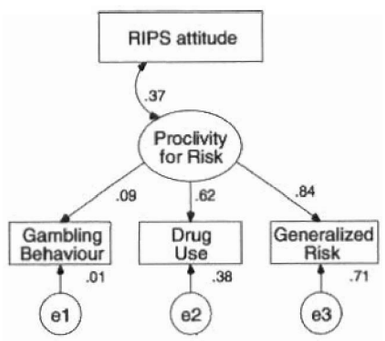


**Fig. 2** An unobserved outcome variable created from gambling pathology, drug use, and generalized risky behavior, correlated with an observed experimental index of positive attitude toward risk

**Table 2** Normality assessment for the outcome variable 'proclivity for risk'

| Variable | Min | Max | Skew | c.r. | Kurtosis | c.r. |
|---|---|---|---|---|---|---|
| RIPS-attitude | −1.216 | 13.924 | 5.132 | 53.293 | 58.527 | 303.879 |
| Gambling | −.711 | 4.093 | 1.645 | 17.086 | 2.44 | 12.666 |
| Drug use | −1.554 | 4.39 | .534 | 5.547 | .363 | 1.885 |
| General risk | −2.54 | 3.729 | .203 | 2.11 | .507 | 2.632 |
| Multivariate | | | | | 74.195 | 136.2 |

Drug use and generalized risk approximate the normal curve best

fitted, the predictive measurement model was added. Three a priori models were originally posited for these data:

1. Exogenous variables passing through helpful and unhelpful coping (Figs. 3, 4)
2. Exogenous variables passing only through unhelpful coping (Fig. 5)
3. Exogenous variables passing through helpful coping only (Fig. 6)

To choose an estimation method, we simulated the general model 100s of times using a random re-sampling method. Maximum Likelihood and Generalized Least Squares Estimates were compared by obtaining robust, bootstrapped standard errors under each method on model #1 (the most general, Fig. 3). With the advent of computational modeling, it is no longer necessary to select a single method of estimation. It is quite easy to observe

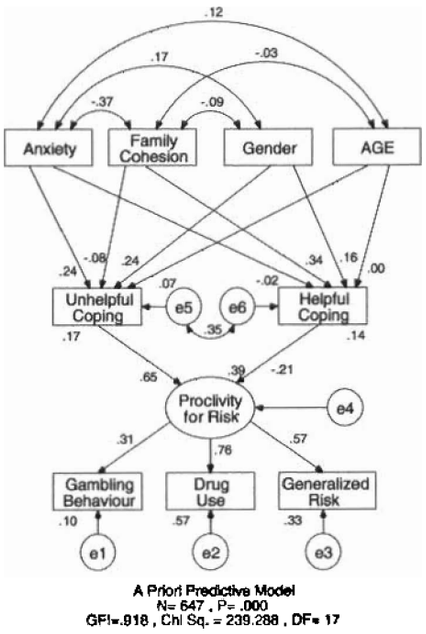


**Fig. 3** The most general model of high-risk behavior, from hypothesis 1

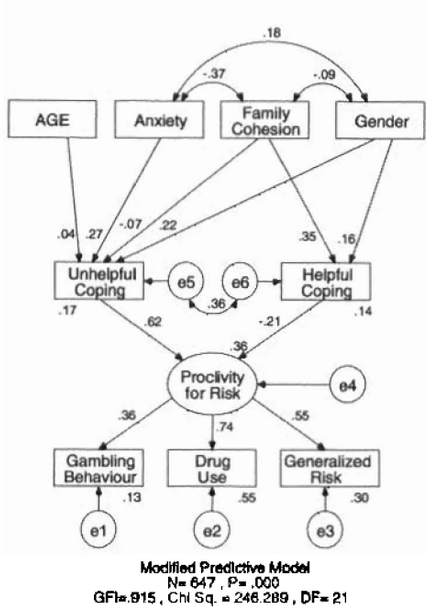


**Fig. 4** The pared-down model from hypothesis 1, retaining both risk and protective factors. All correlations are significant at the $p = .001$ level except age versus unhelpful coping ($p = .352$), and family cohesion versus unhelpful coping ($p = .058$) and family cohesion versus gender ($p = .032$)

empirically the results of different methods side by side using resampling techniques before selecting which will be used in further analyses. Both methods reliably reproduced stable estimates, but GLS was chosen because it was more sensitive to the correlation of gambling with proclivity for risk. The remaining analyses were done using GLS, and fit was recorded using chi squared and GFI. Both chi squared and GFI are absolute indices of fit. For chi squared, higher ratios relative to the degrees of freedom indicate a highly significant fit, while GFI values closer to 1 indicate better fit (Hoyle & Panter, 1995). In all analyses, the error terms e5 and e6 are freed to covary, since they are assigned to two scales from the same instrument (the helpful and unhelpful coping subscales of the ACOPE), and are likely to show common systematic error. Under this model, multivariate normality was imperfect (MV kurtosis = 8.748, c.r. = 7.907) (Table 3).

The a-priori model was pared down to include the most significant paths only. Any correlation having $p$ = greater than .05 was deleted (Fig. 4). Age's effect on unhelpful coping was retained for its theoretical importance in high-risk behavior, despite its weak correlation with unhelpful coping. The impact of family cohesion on unhealthy coping was also retained because it approached significance ($p = .058$). At a glance, it appears anxiety and family cohesion show a strong negative correlation at the structural level. Deeper within the model, anxiety and family cohesion correlate the strongest with unhelpful and helpful coping styles respectively. Unhelpful coping, in turn, is a very strong predictor for our latent outcome variable for generalized high-risk behavior whereas helpful coping, while important, has a much weaker (negative) relationship.

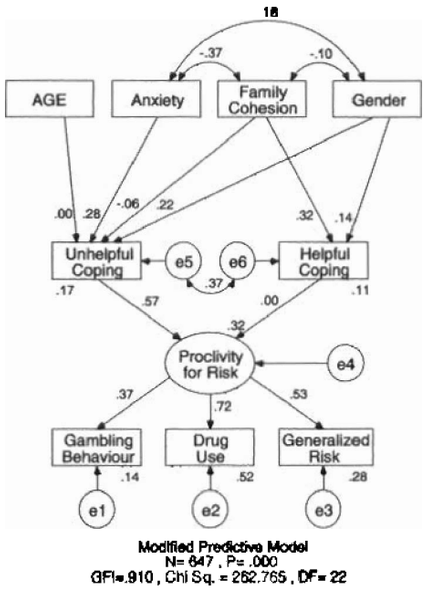


**Fig. 5** Competing model from hypothesis 2 using a fixed variance of zero for helpful coping's effect on proclivity for risk (or the model using unhelpful coping only)

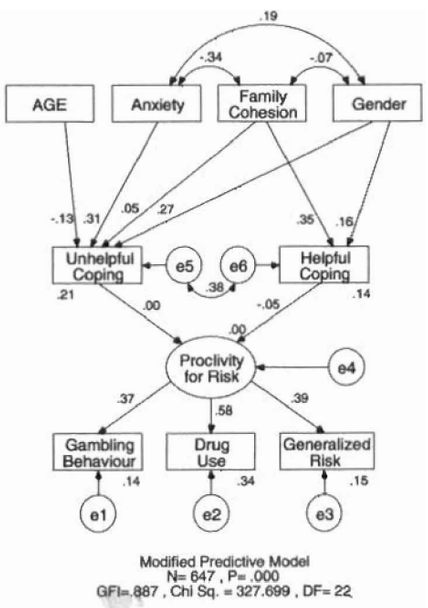


**Fig. 6** Competing model from hypothesis 3 using a fixed variance of zero for unhelpful coping's effect on proclivity for risk (or the model using helpful coping only)

**Table 3** Assessment of multivariate normality for the post-hoc model

| Variable | Min | Max | Skew | c.r. | Kurtosis | c.r. |
|---|---|---|---|---|---|---|
| Gender | 1 | 2 | −.341 | −6.226 | −1.884 | −17.186 |
| Age | 11 | 20 | .057 | 1.047 | −1.139 | −10.392 |
| ZANXTSCO | −2.166 | 4.95 | .574 | 10.483 | .229 | 2.092 |
| ZFACCRTF | −3.699 | 2.364 | −.396 | −7.218 | −.089 | −.81 |
| ZACOUHRE | −2.957 | 3.435 | .05 | .909 | −.055 | −.506 |
| ZACOHRTF | −3.029 | 3.012 | −.01 | −.179 | −.064 | −.588 |
| Multivariate | | | | | −1.328 | −3.03 |

After the analyses using both positive and negative coping simultaneously, the competing hypotheses using only one (helpful OR unhelpful coping) were tested. The model using only unhelpful coping was nearly as effective as the complete model (having $\chi^2 = 241.79$, df = 16, GFI = .906). There are few cascading effects, which differentiate it from the complete model, save some slightly weaker correlations from the loss of overall fit and a loss of variance within overall proclivity for risk.

The final competing model, using only helpful coping, was flawed in that it accounted for 0% of the variance in proclivity for risk, and for that reason was discarded. It did not otherwise diverge very much from the previous models.

Although it was inappropriate to use many of the participants' data in the model including proclivity for risk, the final connections between coping and risky behavior were strong enough that a post hoc run of the measurement model was done using data from all 1,998 participants, this time ending with the two coping variables as the outcomes (Fig. 7). Although this model had the best MV normality of any during this study (Table 2), the results were not statistically significant ($p = .08$). A second post-hoc model was tested where age exerted a direct effect on the outcome variable. However, it suppressed the significance of gambling within the constellation (Fig. 8).

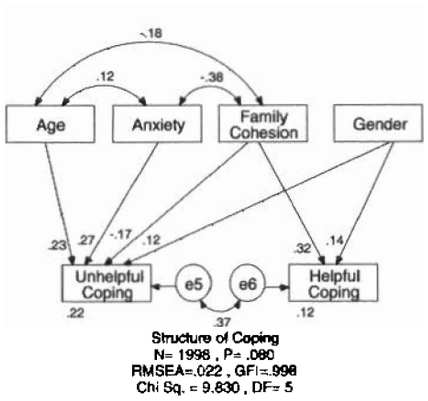


**Fig. 7** A post hoc analysis using coping as the outcome variables and the entire sample. Correlations having $p < .05$ were deleted

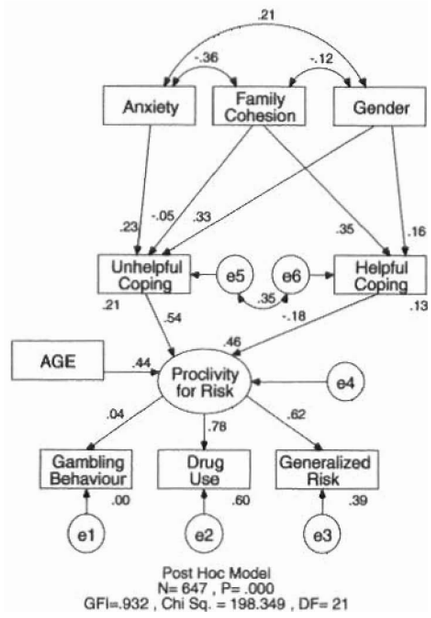


**Fig. 8** A post-hoc model using age as a main effect on the outcome variable. The outcome variable ceases to cohere under this model

## Discussion

We must acknowledge as a limitation of our study the decision to delete subjects unaffected by at least one high-risk behavior, since we focused on a much more concentrated sample for our final analyses. The study found support for two of the three competing models. However, the results diverged from our initial hypothesis at a few points. Although most of the relationships analyzed in our models were statistically significant, they were not as strong as expected. In general, this is likely an effect of doing community-based research as opposed to incorporating a clinical population where presence of a problem with a certain severity is a given for every case. However, there are more possible explanations accounting for specific individual variables.

Gambling, for instance, only approached significant correlation with the other specific risky behaviors when entered into the latent outcome variable, and became statistically significant only after the measurement model was added on top of this original sub-model. Even afterwards, the model accounted for the least amount of the variance within gambling as compared with both chemical dependence and generalized risky behaviors. Although all these behaviors share a common dimension, which is captured by the latent variable of "proclivity for risk," there are obviously other factors unaccounted for by this model. Many of these factors are probably circumstantial or incidental. For instance, a youth may have an unhealthy coping style for dealing with stress. This can take any number of forms, not all of which culminate in engaging in risky behavior. However, with some chance exposure, either through peers or parents, certain youth may adopt those risky behaviors into their repertoire of unhealthy coping behaviors. We suspect that this is especially true

of gambling behaviors, where the effects of socialization for gambling have been documented (Hardoon, Derevensky, & Gupta, 2001; Hardoon et al., 2004). Unlike alcohol use, gambling has only recently become sanctioned and expanded in many states, and is not modeled in the media as widely as substance use (although that is rapidly changing) as a risky behavior. More commonly, most youths first exposure to gambling comes from their parents (Hardoon et al., 2004). Blaszczynski's pathways model (Blaszczynski & Nower, 2002) suggests that for pathological gambling to really take hold, the vulnerable gambler usually experiences a big win early in their career, which imprints upon them so strongly as to encourage subsequent unhealthy levels of involvement. As well, prevalence rates for pathological gambling among adolescents are still low compared to other risky behaviors and the data tends to be non-normal (as was the case with this study), making them harder to predict, although taking the high-risk cohort from our community sample helped considerably. Future models, which seek to predict individual behaviors should pay attention to questions of access to materials and peers/adults who can foster its practice, although we nonetheless urge the research community to adopt a more holistic perspective in general. Despite these difficulties, gambling behavior remained a significant facet of our latent risk variable, suggesting that specific catalysts aside, it does have features in common with other risky behaviors and can be predicted from the same coping styles.

Anxiety, despite its prominence in theoretical models of addictive behaviors and self-regulation, seemed similarly weaker than anticipated. One effect that the model created for this study overlooks is the low-end of the anxiety spectrum discussed in Jacobs' (1986) *General Theory of Addiction*. While our model is sensitive to high levels of anxiety promoting the practice of high-risk behaviors to reduce arousal, it cannot differentiate low-level anxiety individuals who seek risky behaviors to try and restore a state of excitement. The model assumes a positive linear relationship where an inverted parabolic one might be most appropriate. This effect has been investigated empirically before, and support was found for both effects in boys, less so for girls (Gupta & Derevensky, 1998b).

Another recent development in the consideration of anxiety within risky behavior frameworks is the effects of specific subtypes of anxiety. In a longitudinal study of alcohol use onset in adolescents (Kaplow, Curran, Angold, & Costello, 2001), it was found that different profiles of anxiety could accelerate or delay the onset of regular drinking in youth. A measure like the STAI is insensitive to qualitative effects such as this, and youth scoring high on this measure who experience more separation anxiety (which caused them to start drinking later) may be diluting the effect of youth who experience more social anxiety (which encouraged earlier onset of drinking). So far, this effect of different types of anxiety has not been applied to constellations of risk, although Wills (Wills et al., 2001) has applied the constructs of positive versus negative emotionality (similar to anxiety) against a constellation of substance use onset.

Another potential confound of anxiety in this model is the assumption of directionality made. In all the models tested for this study, anxiety precedes coping style, because anxiety levels are a temperamental and largely stable trait, whereas coping styles develop later as part of maturation (Patterson & McCubbin, 1987). However, the quintessential problem with unhealthy coping styles is that they tend to aggravate anxiety in the long term by not addressing problems constructively. More realistically, the relationship between anxiety and unhealthy coping style could be modeled using a feedback loop, reflecting unhealthy coping's propensity to increase anxiety and vice-versa. If healthy coping works at actually reducing anxiety levels, a similar bi-directional effect could be argued.

In our sample, helpful, positive, coping strategies did not contribute very much variance at all to the unobserved outcome variable. In fact, the competing model with the correlation

between helpful coping and proclivity for risk fixed at zero was almost exactly as predictive as the complete model where both helpful and unhelpful coping are employed. However, we retained helpful coping for theoretical reasons outlined by Jessor (1998); namely, that both risk and protective factors operate on risky behaviors simultaneously. The effect of protection can only be detected in the presence of stress or adversity, which was not documented for our sample. It may be that those youth who selectively benefit from helpful coping skills are those who face more daily stressors. Such participants are lost within our sample among individuals who do not face as much adversity and for whom helpful coping skills are not a decisive factor in their choices to engage in risky behavior. Future studies, which wish to uncover the true effects of protective factors should include measures of stress/hassles, in order to create a subject pool that can reveal the effect of exercising one's coping skills. We consider helpful coping to be a very important factor when speaking of risky behaviors, and encourage future research to retain it as well.

While all the above correlations were statistically significant, albeit weaker than expected, the most surprising outcome of our analysis was the relative unimportance of age within the model. As an exogenous variable passing through coping styles, age was consistently insignificant within the high-risk cohort. As youth age, they have access to more money, more choice as to friends, and greater lengths of unsupervised time. Past research has confirmed that age is one of the few very good predictors for the onset of risky behaviors in general (Jessor, 1998; Romer, 2003), which is why it remained as part of the model. In the post-hoc test using the entire sample, age became significant again, although the overall model had $p = .08$. An additional post-hoc test using the main effect of age on the latent outcome variable was highly significant, although it suppressed the correlation of gambling behavior within the high-risk constellation.

Even though this data is cross-sectional in nature, it is still valuable as a guiding principle for youth education and prevention programming. The current landscape of prevention efforts is rigidly divided into separate domains, as if risky behaviors never co-occur. This is a problem both empirically and pragmatically.

Overall, our hypothesis reveals and emphasizes the commonality gambling shares with other, better known risky behaviors youth may use as unhealthy coping strategies. We suspect the strength of our correlations is tempered by the model's non-specificity for particular behaviors and risk factors. Overall, it appears that at this age, the presence of these unhealthy strategies has a strong effect, and the presence of helpful coping strategies may not be, by itself, an effective buffer.

## Implications for Prevention Efforts

The inclusion of gambling within the overarching categories of risky behaviors in which youth engage is of significant concern. Gambling may be especially dangerous for youth because it currently has no healthy guidelines. It furthermore enjoys an innocuous status compared to other better-known risky behaviors among adolescents, adults, educators and psychologists, to the point where parents frequently condone their children's gambling or actually furbish them with gambling materials (Gupta & Derevensky, 1997). Yet as indicated by our findings, we do not submit that gambling be treated to the exclusion of other risky behaviors.

Theories of various youth risky-behaviors are converging in the research world (Jessor, 1998; Romer, 2003), yet the face of prevention efforts has not kept up. The prevailing wisdom of educating youth remains singling out some specific issue and focusing on it to

the exclusion of others. Clearly, this is problematic. Unfortunately, in order to cover the breadth of risks that adolescents are liable to come across, this requires a considerable expenditure of time and money. In light of findings confirming general proclivities for risk, those same resources could be better spent developing campaigns which tackle the root of these numerous problems, and possibly have a greater impact due to their non-specificity. This is a problem for all youth, but especially for multi-problem youth, who tend to show the most severity across their risky behaviors. These youth are ill-served by campaigns which are hyper-focused on one issue, since their proclivity for risk is expressed as an entanglement of many risky behaviors (Jessor, 1998; Romer, 2003) and as goals our mental health curricula need to be rearranged and empirically validated.

Currently, there are myriad prevention efforts, which may reach youth over the course of their education. However, the programming is inconsistent across individuals, largely determined by which schools decide to grant time to which programs for which high risk behaviors. The result is that children emerge from school with a jagged, incomplete profile of skills to negotiate situations, which invites risky behavior. Unless the commonality between these risky behaviors becomes the focus of programming, children's knowledge of risky behaviors remains fractured and may leave them vulnerable to specific behaviors not addressed by their curricula.

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