Parsing Protection and Risk for Problem Behavior Versus Pro-social Behavior Among US and Chinese Adolescents

Richard Jessor · Mark S. Turbin

Abstract This study investigates the different roles played by protective factors and risk factors—and by particular protective and risk factors—when the concern is with accounting for adolescent problem behavior than when the concern is with accounting for adolescent pro-social behavior. The protective and risk factor literature on adolescent problem behavior reveals considerable conceptual and operational ambiguity; an aim of the present study was to advance understanding in this domain of inquiry by providing a systematic conceptualization of protection and risk and of their measurement. Within the systematic framework of Problem Behavior Theory, four protective and four risk factors are assessed in a cross-national study of both problem behavior and pro-social behavior involving large adolescent samples in China (N = 1,368) and the US (N = 1,087), in grades 9, 10, and 11; females 56 %, US; 50 %, China. The findings reveal quite different roles for protection and risk, and for particular protective and risk factors, when the outcome criterion is problem behavior than when it is pro-social behavior. The protective factor, Controls Protection, which engages rule and regulations and sanctions in the adolescent's ecology, emerges as most important in influencing problem behavior, but it plays a relatively minor role in relationship to pro-social behavior. By contrast, Models Protection, the presence of pro-social models in the adolescent's ecology, and Support Protection, the presence of interest and care in that same ecology, have no significant relationship to problem behavior variation, but they are both the major predictors of variation in pro-social behavior. The findings are robust across the samples from the two very diverse societies. These results suggest that greater attention be given to protection in problem behavior research and that a more nuanced perspective is needed about the roles that particular protective and risk factors play in reducing problem behavior and in promoting pro-social behavior.

Keywords Protective factors · Risk factors · Problem behavior · Pro-social behavior · Problem Behavior Theory

Introduction

In this study, we investigate the different roles played by protective factors and risk factors—and by particular protective and risk factors—when the concern is with accounting for adolescent problem behavior versus when the concern is with accounting for adolescent pro-social behavior. Recent decades have seen a burgeoning of interest in the role of protective and risk factors in accounting for variation in adolescent problem behavior (e.g., Jessor 1991; Hawkins et al. 1992; Luthar and Cicchetti 2000; Jessor et al. 1995, 1998a, b, 2003; Jessor 2014; Bernat et al. 2012). Despite substantial support for their explanatory usefulness, there has been considerable ambiguity in how their meaning has been conceptualized and their measurement operationalized by different investigators. The application in the present study of the protective and risk factor constructs of Problem Behavior Theory (Jessor 1991, 2014; Jessor et al. 1995) is an effort to advance analytic understanding in this domain of inquiry. The very same protection and risk model is used, in this article, to account for variation in *both* problem behavior and pro-social behavior. This approach, contrasting an analysis of a problem behavior criterion with an analysis of

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a pro-social behavior criterion, should yield results that illuminate the different roles played by particular protective and risk factors in the two analyses and also document the *promotive* function of protection.

The risk factor construct, borrowed from epidemiology, implies a greater likelihood of occurrence of problem behavior, while the protective factor construct is invoked to account for a diminished likelihood of occurrence of problem behavior, either as a direct effect or by buffering the impact of exposure to risk. In most of the problem behavior literature, however, when both constructs are brought to bear, it is usually to account for variation in problem behavior alone, and to use that account to suggest approaches for preventing or decreasing problem behavior involvement. What has been omitted in much of the problem behavior research has been a recognition that protective factors do not simply protect against risk and, therefore, against involvement in problem behavior, but that they also have promotive properties and can increase involvement in pro-social behavior. One of the aims of the present study is to demonstrate the positive relationship of protective factors to pro-social behavior involvement.

Also contributing to conceptual ambiguity has been the connotative meaning of the term "protective," an adjective that implies protecting against something, here against risk. Even when the effect of protective factors as moderators or buffers is acknowledged, the emphasis is generally on their reducing the impact of risk, e.g., "Protective factors are those that modify the effects of risk in a positive direction." (Luthar and Cicchetti 2000, p. 858). But that is a limitation that leaves open the question of what function protective factors might have *independent of the presence of risk*. Conceptualizing protective factors as *promotive* of pro-social behavior, as well as preventive of problem behavior, provides them with a function that expands their explanatory contribution to variation in adolescent behavior, both problem and pro-social. And involvement in pro-social behavior itself can, theoretically, serve as a protective factor against engaging in problem behavior. It is this latter conceptualization of protection, as both preventive and promotive, that has been relied upon in this research.

The promotive function of protective factors has, of course, been the main emphasis of the positive youth development approach to adolescence with its focus on developmental assets and competencies of young people (e.g., Benson 1997; Lerner and Benson 2003). In seeking to counter the emphasis on youth as "problems," however, research on positive youth development has at times ignored problem behavior or just assumed that problem behaviors would diminish as protective factors are brought to bear, even without specific attention to risk reduction. Important efforts have been made to bridge this divide between research on problem behaviors and research on positive development (e.g., Guerra and Bradshaw 2008; Hilliard et al. 2014; Phelps et al. 2007), but the promotive function of protective factors has not yet been fully assimilated in most problem behavior research. The present study, in engaging *both* problem behavior and pro-social behavior, aims to illuminate the promotive role of protective factors on positive behavior as well as their preventive role on problem behavior.

Further conceptual ambiguity derives from the practice of some investigators to specify protective and risk factors at the descriptive-level, the level that Lewin (1935), borrowing concepts from genetics, termed the phenotypic level, whereas others do so at the explanatory or genotypic level. For example, to consider a "mentor" for an at-risk adolescent as a protective factor would be an example of a descriptive-level or phenotypic designation; at the explanatory or genotypic level, what is actually protective are those behavioral processes that underlie what mentoring usually entails, namely, the modeling of pro-social behavior, the provision of social support, and the exercise of informal social controls. As another example, the descriptive-level risk factor, "neighborhood disorganization," entails at the genotypic level such risk factors as pervasive models for problem behavior, ready opportunity for engaging in problem behavior (via the presence of gangs), and personal vulnerability to risk exposure. In the present study, risk and protective factors are specified at the explanatory or genotypic level rather than at the descriptive or phenotypic level.

Finally, various investigators have determined which variables constitute protective factors and which constitute risk factors largely post hoc, that is, depending on the outcome of research: if a predictor variable relates in a positive direction to problem behavior in the empirical findings it is specified as a risk factor, and if it relates in a negative direction it is specified as a protective factor (e.g., Bernat et al. 2012; Blum et al. 2003; Pardini et al. 2012; Simantov et al. 2000). Without some a priori basis–theoretical or even common sense—such an entirely empirical and post hoc approach is unlikely to advance understanding. Nor is the often-related approach of specifying protection and risk as simply the opposite ends of a given dimension; for example, if high religiosity is identified as a protective factor then low religiosity is, therefore, deemed a risk factor (e.g., Herrenkohl et al. 2012; Lösel and Farrington 2012). Lost in this latter approach, of course, are the unique conceptual properties that protection and risk have and the explanatory value of retaining their conceptual independence which permits exploring their interaction or moderator effects. In the present study, protective and risk factors are specified theoretically rather than empirically, and their relationship is posited, theoretically, as orthogonal.

Problem Behavior Theory

The bulk of problem behavior research engaging protective and risk factor constructs has focused on the various manifestations of adolescent problem or risk behaviors, ranging across delinquency, marijuana and other illicit drug use, early and unprotected sex, tobacco and alcohol involvement, violence, school dropout, risky driving, and more recently such practices as gambling and cyber bullying. Clearly a very diverse array phenotypically, but all related because of the transgression of social or legal norms that is involved or the failure to fulfill normal social role expectations, e.g., at school or at work. Since its inception a half century ago (Jessor et al. 1968; Jessor 2014), Problem Behavior Theory has been applied to most of these problem behavior domains, not only by our Colorado group but by other investigators in the US and across the globe (e.g., Costa et al. 2005; Jessor 2014; Madkour et al. 2010; Ndugwa et al. 2010; Vazsonyi et al. 2008, 2010). Revised and elaborated over the years since 1968, Problem Behavior Theory is now constituted of sets of theoretically specified protective factors and risk factors, in both the individual adolescent and the social context, organized to account for variation in both problem behavior and pro-social behavior in adolescence.

Four protective factors that theoretically have a direct influence on the likelihood of occurrence of behavior have been articulated: models for pro-social behavior (Models Protection); informal social and personal controls against problem behavior (Controls Protection); social support for pro-social behavior (Support Protection); and actual engagement in pro-social behavior (Behavior Protection). Each protective factor captures an underlying process, e.g., social modeling, that, theoretically, can regulate or constrain problem behavior or promote the occurrence of pro-social behavior. Four risk factors that theoretically have a direct influence on the likelihood of occurrence of behavior have also been specified: models for problem behavior (Models Risk); opportunity to engage in problem behavior (Opportunity Risk); vulnerability for engaging in problem behavior (Vulnerability Risk); and actual engagement in problem behavior (Behavior Risk). The theoretical rationale for each of these constructs as protective factors or as risk factors was described by Jessor (1991) and Jessor et al. (2003) and, most recently, was elaborated in Jessor (2014). In short, each represents an influence on or determinant of behavior, both problem and pro-social. Their operational definitions in the current study are described in the "Methods" section below. In Problem Behavior Theory, beyond their having direct effects on preventing or reducing problem behavior involvement, protective factors are also theoretically specified as having effects as moderators or buffers of the impact of exposure to risk, operationalized

as significant interactions of the protective factors with the risk factors in regression analyses. Figure 1 illustrates the theoretical framework of protection and risk, and of their interaction, as implemented and tested in the present study.

The relative explanatory importance of the different protective and risk factors has been a topic of interest in a variety of studies. The protective factor of "support," or the related notion of "connectedness" in the literature, has often been given a salient role as a protective factor against problem behavior (Barber 1997; Barber and Olsen 1997); there has also been an emphasis in the literature on "controls"—rules, regulations, sanctions–as a protective factor against problem behavior, sometimes defined as parental rules and sanctions, sometimes as parental monitoring and knowledge (Kerr and Stattin 2000; Piko and Kovacs 2010) and Barber and Xia (2013) has further differentiated parental control into behavioral control and psychological control. In our own prior research, Costa et al. (2005) found that Controls Protection was a pre-eminent protective factor in both direct and moderator effects on adolescent problem behavior, whereas Support Protection played a much more limited role. It was speculated then that: "Support Protection could well play a larger role when the criterion is positive, pro-social behavior, and that possibility remains a matter for further inquiry" (p. 81). That further inquiry is a key aspect of the present research.

The Current Study

The main aim of this study is to examine the applicability of the Problem Behavior Theory framework of protection and risk to *both* problem and pro-social behavior and, in so doing, to illuminate the different roles played by protection and risk, and by the various protective and risk factors, when applied to the two different, even opposing, behavioral outcome criteria. It was expected, for example, that Controls Protection, while an important protective factor against problem behavior, might play a less significant role in accounting for variation in pro-social behavior since its function is largely regulatory rather than promotive; further, it was expected that Models Risk, a major risk factor for problem behavior, might be less important in relationship to pro-social behavior since it represents models for problem behavior, not for positive behavior. As noted above, it was also expected that Support Protection should be more influential for pro-social behavior variation than for problem behavior variation because it represents support for positive behavior. Establishing such differential roles for particular protective and risk factors could have important implications for those interventions seeking to reduce problem behavior versus those seeking to promote
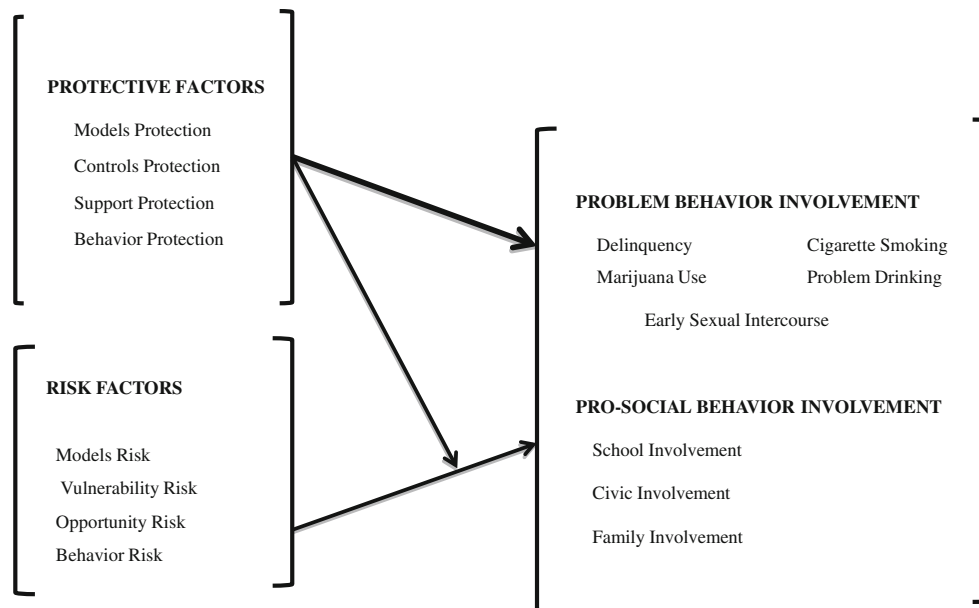
Fig. 1 Problem Behavior Theory explanatory framework

or enhance pro-social behavior. This was the secondary aim that animated this study.

Data from a large cross-national, comparative study of adolescents in China and the US (Jessor et al. 2003, 2010; Costa et al. 2005; Turbin et al. 2006) provided the opportunity to pursue these aims. Having data from two different samples of adolescents permits an immediate replication that can strengthen whatever inferences are drawn from the findings. And, in the present case, having the opportunity to replicate the findings on a sample of adolescents from a markedly different society, China, with its socialist government, its one-child policy, its tradition of respect for adults, etc., would provide a very stringent test of the robustness of any replicated findings.

In this regard, the methodologist Jacob Cohen's trenchant comment is apposite: "A successful piece of research doesn't conclusively settle an issue…. Only successful future replication in the same and different settings…provides an approach to settling the issue" (1990, p. 1311).

Methods

Study Design, Participants, and Procedures

Data were collected in 2002 as the third wave of a cross-national, longitudinal study of adolescent behavior and development. A 32-page "Adolescent Health and Development Questionnaire" (AHDQ) was administered to samples of adolescents in schools in Beijing, China and in a large urban area in the Rocky Mountain region of the US. The AHDQ is the most recent version of a theory-derived

questionnaire developed over the past several decades for use in both local and national sample studies (e.g., Jessor et al. 1995). Content of the AHDQ is logically derived from the constructs in Problem Behavior Theory. The questionnaire assesses a broad range of pro-social and problem behaviors, as well as psychosocial and behavioral protective factors and risk factors in the individual adolescent (values, beliefs, attitudes, expectations, and behaviors) and in the four social contexts of daily adolescent life: family, peers, school, and neighborhood. The full AHDQ with exact wording of items and response categories can be found at: http://www.colorado.edu/ibs/jessor/questionnaires/questionnaire_ahdq3.pdf.

Before the study began, the AHDQ was translated into Chinese and then back-translated into English by members of the Chinese research team. The translation and the back-translation were then reviewed in detail by a Chinese social scientist at the University of North Carolina. In addition, the Chinese language version of the AHDQ was reviewed by a native Chinese student at the University of Colorado, Boulder, and the back-translation was reviewed by members of the US research team. On the basis of these multiple reviews, a few instances where the meaning may have been compromised in translation were communicated to the Chinese team, and the Chinese version of the AHDQ was revised accordingly. Both of the Chinese-speaking reviewers in the US found the Chinese translation of the AHDQ to be very well done, and the agreed-upon equivalence of the two versions undergirds the appropriateness of comparisons between the Chinese and US samples. Similarity across the US and Chinese samples of alpha reliability coefficients and of bivariate validity coefficients

for a large number of measures in the AHDQ has been shown in an earlier study of the Wave-1 data (Jessor et al. 2003); such similarity provides further support for the inference of "meaning equivalence" of the two versions (see Knight and Hill 1998).

In Wave-3 of the study, 2533 students now in grades 9, 10, and 11 (76 % of the Wave-1 participants) took part— 1,392 in the Chinese sample (87 % of the Chinese Wave-1 sample) and 1141 in the US sample (71 % of the US Wave-1 sample). (For details about selection of schools and of classes within schools, see Jessor et al. 2003) Active parental consent and personal consent were required. Letters describing the study to the parents and adolescents were distributed to the sampled students, and signed consent forms were returned to teachers. Study participants filled out the questionnaire at school in large-group administration sessions proctored by research staff. Each participant received a token payment—$10 in the US; $2, plus a gift to each school, in Beijing. In both countries, about half the Wave-3 participants are female (50 % in China; 56 % in the US), and about a third were in grades 9 (32 and 31 %, respectively), 10 (35 %), and 11 (33 and 34 %, respectively). In the US, 43 % of the sample self-described as Hispanic, 30 % as African American, 22 % as White, 4 % as Asian American, and 1 % as American Indian. Nearly all (96 %) of the Chinese participants are of Han descent.

Adolescent Problem Behavior Involvement

The Multiple Problem Behavior Index (MPBI) assesses overall level of involvement in five different types of adolescent-reported problem behavior: (1) delinquent behavior, ten items including theft, vandalism, and physical aggression ($\alpha = .84$, US; .82, China); (2) cigarette smoking, based on self-reports of frequency and amount of smoking in the past month and in the past year ($\alpha = .79$, US; .84, China); (3) problem drinking, based on respondents' reports of frequency of drunkenness and frequency of high-volume drinking (4 or more drinks per occasion) $\alpha = .69$, US; .64, China); (4) marijuana use (one item, frequency of use in the past 6 months); and (5) sexual experience (a single item reporting any sexual intercourse history). Reported prevalence of marijuana use in the China sample was so low (6 participants, or 0.5 % of Wave-3 responses) that the MPBI (and also the related measures of protective and risk factors described below) was computed for the China sample excluding items about marijuana. Measures of the five components of the index (four components in the China sample) were transformed into T

Table 1 Protective and risk factor composite measures, component subscales, and Wave-3 alpha reliabilities

Measure [no. of items, (US, China if different)]	Cronbach's alpha	
	US sample	China sample
Protective factors		
Models Protection (20)	.83	.84
Parent models for conventional behavior (3)		
Parent models for health behavior (8)		
Friends models for conventional behavior (5)		
Friends models for health behavior (4)		
Controls Protection (43, 40)	.92	.91
Attitudinal intolerance of deviance (10)[a]		
Parent sanctions (5, 4)		
Family controls (8)		
Peer controls (4)		
Friends disapproval (3, 2)		
School controls (3)		
Student disapproval (4)		
Neighborhood controls (3)		
Neighborhood disapproval (3, 2)		
Support Protection (16)	.85	.86
Family support (7)		
Friends support (2)		
Teacher support (4)		
Neighborhood support (3)		
Behavior Protection Index—MPSBI (3)[a]	–	–
Family activities (5)		
School and community activities (6)		
Hours/week doing homework (1)		
Risk factors		
Models Risk (18, 15)	.83	.78
Family models for risk behavior (1)		
Peer models for risk behavior (8, 7)		
School models for risk behavior (6, 5)		
Neighborhood models for substance use (3, 2)		
Opportunity Risk (4, 3)	.58	.71
Availability of cigarettes at home (1)		
Availability of alcohol at home (1)		
Availability of alcohol in the neighborhood (1)		
Availability of marijuana in the neighborhood (1, US only)		
Vulnerability Risk (19)[a]	.88	.84
Depression (3)		
Low expectations for academic achievement (4)		
Low perceived life chances (5)		
Low self-esteem (7)		

Table 1 continued

Measure [no. of items, (US, China if different)]	Cronbach's alpha	
	US sample	China sample
Behavior Risk Index—MPBI (5, 4)[a]	–	–
Delinquent behavior (10)		
Cigarette smoking (2)		
High-volume drinking (2)		
Sexual intercourse (1)		
Marijuana use (1, US only)		

Alpha reliability is not meaningful for the behavior indexes

[a] Individual-level measures

scores (mean of 50 and standard deviation of 10) within each sample and averaged. In both countries, as would be expected, mean scores on this MPBI measure are significantly higher for older participants than for younger ones and, in China only, males have significantly higher MPBI scores than do females.

Adolescent Pro-social Behavior Involvement

The Multiple Pro-social Behavior Index (MPSBI) assesses involvement in three different types of adolescent-reported pro-social behavior: (1) activities with family, five items assessing the frequency in the past 6 months of activities with parents, such as going out to a movie, working together on a hobby or project, or going on a family hike ($\alpha = .81$ both samples); (2) involvement in school and community activities, six items assessing participation and time spent in school clubs (except sports), community or church groups, and volunteer work ($\alpha = .75$ both samples); and (3) a single item assessing hours per week spent doing homework. The MPSBI is the sum of z-scores of those three pro-social behavior measures.

Protection and Risk

A description of each Wave-3 measure is presented in Table 1. Protective factors and risk factors were assessed by multiple items for the most part, and scores for each measure were computed as averages of equally weighted z-scored items. For the social–contextual measures, the adolescent respondent characterized protection and risk as perceived in the social settings navigated in his/her everyday life—family, peers, school, and neighborhood; thus, all of the social context measures in the AHDQ are perceived context measures.

The protective and risk factor measures assessed the four kinds of protective factors (Models Protection, Controls Protection, Support Protection, and Behavior

Protection) and the four kinds of risk factors (Models Risk, Opportunity Risk, Vulnerability Risk, and Behavior Risk) specified in Problem Behavior Theory. Although an effort was made to measure every construct in every context, limitations on the length of the questionnaire made it necessary to omit measures of some of the contexts.

Measures of Protection

Models Protection

Models Protection was assessed in two contexts, family and peers. A 20-item scale of Models Protection ($\alpha = .83$ and .84 for the US and China samples, respectively) asks about parent and peer involvement in various conventional organizations and pro-social pastimes [e.g., "Does either of your parents take part" in community groups (specified to encompass organizations relevant to each country, like the Parent–Teacher Organization in the US, or the equivalent organization in China), or volunteer work (like at a hospital in the US, or in a "welfare service" in China)], and in health-enhancing behaviors (e.g., "How many of your friends pay attention to eating a healthy diet?').

Controls Protection

Controls Protection was measured in each of the four social contexts and also at the individual-level. Controls Protection is a 43-item scale (40 items in China; $\alpha = .92$ and .91 for the US and China samples, respectively) that assesses strictness of parental rules (e.g., about being home by a certain time at night), parental monitoring of the adolescent (e.g., "Do your parents make sure they know who you're spending your time with?"); parental sanctions (e.g., "If your parents knew that you had shoplifted something from a store, would you get in trouble for it?"); perceived friends' controls against social transgressions (e.g., "If you were going to do something that most people think is wrong, would your friends try to stop you?"); perceived friends' disapproval of risk behaviors (e.g., "How do most of your friends feel about someone your age drinking alcohol?"); perceived institutional controls against student misbehavior (e.g., "In your school, how strict are the rules about student behavior in class, in the halls, and on the school grounds?"); perceived student disapproval of student misbehavior such as cheating and vandalism (e.g., "What do most of the students at your school think about kids who damage school property?"); perceived neighborhood disapproval of teenage transgression e.g., smoking, drinking, and vandalism (e.g., "How do you think most of the adults in your neighborhood feel about someone your age smoking cigarettes or drinking alcohol?"); and perceived neighborhood controls against adolescent

misbehavior (e.g., "If adults in your neighborhood saw kids doing something wrong or getting in trouble, would they tell the parents about it?"). And at the individual-level, Controls Protection was measured by 10 items that assess attitudinal intolerance of normative transgression (e.g., "How wrong do you think it is to cheat on tests or homework?").

Support Protection

Support Protection was measured in all four contexts by 16 items assessing perceived social support ($\alpha = .85$, US; .86, China). Support Protection includes seven items in the family context (e.g., "Are your parents interested in what you think and how you feel?"); two items in the peer context (e.g., "When you have personal problems, do your friends try to understand and let you know they care?"'); four items in the school context (e.g., "Do teachers at your school try to help students when they are having problems?"); and three items in the neighborhood context (e.g., "In your neighborhood, do people help each other out and look after each other?").

Behavior Protection

Behavior Protection was measured by the Multiple Pro-social Behavior Index, described above, in the analyses of problem behavior variation. Since it is an index rather than a scale, an alpha is not calculated.

Measures of Risk

Models Risk

Models Risk was measured in all four contexts. Models Risk ($\alpha = .83$, US; .78, China) comprises one family context item ("Does anyone in your close family smoke cigarettes?"); and 17 items (14 items in the China sample) across the other three social contexts, assessing social models for a variety of risk behaviors (e.g., school dropout, delinquent behavior, unhealthy diet, cigarette smoking, alcohol use). Example items are: "How many of your friends have dropped out of school or are thinking about it?"; "How many of the students at your school get into fights?"; and "How much drinking is there among adults in your neighborhood, as far as you know?"

Opportunity Risk

Opportunity Risk was measured in two contexts. Opportunity Risk ($\alpha = .58$, US; .71, China) comprises four items (three items in the China sample) that assess perceived availability of cigarettes and alcohol in the home, and perceived availability of alcohol and marijuana in the neighborhood.

Vulnerability Risk

Vulnerability Risk was assessed by a multiple-item measure of personal vulnerability. The 19 items in this scale ($\alpha = .88$, US; .84, China) all measure personal vulnerability risk, including depression (three items, e.g., "In the past 6 months, have you just felt really down about things?"); limited perceived chances for success in life (five items, e.g., "What are the chances that you will have a job that pays well?"); low expectations for school achievement (four items, e.g., "How sure are you that you will get at least a B average this year?"); and low self-esteem (seven items, e.g., "On the whole, how satisfied are you with yourself?").

Behavior Risk

Behavior Risk was measured by the Multiple Problem Behavior Index (MPBI), described above, in analyses of pro-social behavior variation.

In general, the multiple-item scales used to assess protection and risk in the four social contexts and at the individual-level have good scale properties (Table 1), although the alphas for Opportunity Risk were lower (.58, US; .71, China). Overall, then, the complete set of measures provides, with acceptable reliability and with well-established construct validity from earlier studies, a theoretically comprehensive assessment of protection and risk at the individual-level and across the four social contexts.

Correlations among the psychosocial protective and risk factors are shown in Table 2, separately for each gender within each country sample. As expected, in each subgroup, the protective factors are positively related among themselves, as are the risk factors, and each protective factor is negatively related to each risk factor. The strongest correlations are among the protective factors. In particular, Controls Protection and Support Protection are correlated around .60 for each subgroup.

Method of Analysis

The analytic procedure used in the research is hierarchical multiple regression testing protection and risk main effects and their interactions. All analyses were run separately for the China sample and the US sample. Since standardized regression coefficients are inappropriate with interaction terms (Aiken and West 1991, pp. 40–47), all predictor measures were standardized to make the unstandardized regression coefficients comparable to one another. Because intra-class correlations were negligible, ranging from .02

Table 2 Bivariate correlations among and between protective and risk factor measures

Measure	Models Protection	Controls Protection	Support Protection	Models Risk	Vulnerability Risk	Opportunity Risk
US sample						
Models Protection	–	.46	.42	−.22	−.38	−.20
Controls Protection	.50	–	.62	−.47	−.42	−.42
Support Protection	.57	.63	–	−.29	−.52	−.27
Models Risk	−.39	−.55	−.47	–	.22	.45
Vulnerability Risk	−.36	−.39	−.49	.30	–	.15
Opportunity Risk	−.23	−.45	−.27	.47	.08	–
China sample						
Models Protection	–	.34	.51	−.21	−.33	−.21
Controls Protection	.46	–	.58	−.51	−.33	−.23
Support Protection	.53	.58	–	−.38	−.45	−.17
Models Risk	−.30	−.41	−.35	–	.24	.21
Vulnerability Risk	−.35	−.28	−.43	.23	–	.12
Opportunity Risk	−.28	−.29	−.22	.27	.13	–

Correlations for males are in the upper triangle, for females in the lower triangle

All correlations are significant at $p < .05$

China to .03 US, indicating that students' responses on the criterion measures can be treated as independent observations, multilevel modeling was not used.

Measures of socio-demographic characteristics were entered at Step 1 of each hierarchical regression analysis to control for the effects of gender, grade in school, intact family (i.e., families that include both biological parents versus families missing at least one biological parent), and socioeconomic status [average of father's job level (a Hollingshead-type rating) and father's and mother's educational attainment; for homes with no father, average of mother's job level and educational level].

Results

Results are presented in the following order. First, we examine the protective and risk factor explanatory account of variation in problem behavior (the MPBI criterion measure) in Wave-3 of the study. The participants are now in mid-adolescence (age 15–17), and the current findings predicting problem behavior can be compared with those previously reported from the Wave-1 analyses (Jessor et al. 2003) when the participants were in early adolescence (age 13–15). Next, we examine whether the same model, applied first to account for variation in problem behavior, is also useful in explaining variation in prosocial behavior (the MPSBI criterion measure). The contrasting analyses can reveal whether the roles played by protection and risk, and by particular protective and risk factors, differ when accounting for problem behavior versus pro-social behavior—the key concerns of the present study.

Applying Problem Behavior Theory to Account for Adolescent Problem Behavior (MPBI)

The complement of protective factors used in the present analysis was enlarged over that used in the Wave-1 analyses by the inclusion of the measure of Behavior Protection (MPSBI), now part of the expanded theoretical model (Jessor 2014). Regression results are shown in Table 3. Also shown in the first column for each sample in Table 3, are the bivariate correlations of the four protective factors with the MPBI criterion; all are significant in the theoretically expected negative direction for both country samples. Of particular interest is the negative correlation of the Behavior Protection measure, the MPSBI, with the problem behavior criterion measure, the MPBI; while significant in both country samples (r = −.27, US; −.08, China), the relationship is small indicating relative independence of the two outcome criteria in the present study. Correlations of the three risk factors with the MPBI outcome criterion are also all significant and in the theoretically expected positive direction for both country samples. These bivariate correlations contribute to the construct validity of the protective and risk factor measures.

At Step 1 of the regressions, the socio-demographic control measures account for a small but significant portion of variance in both country samples. The addition at Step 2 of the protective factors adds a substantial increment to the account, 31 % for the US sample and 18 % for the China sample. Entry of the risk factors at Step 3 adds another significant increment in variance accounted for, 9 % for the US sample and 7 % for the China sample. Finally, at Step 4, there are two significant interactions (of the 12 tested: four protective factors-by-three risk factors) and they add another increment in variance accounted for, 5 % in the US

Table 3 Hierarchical regression of the Multiple Problem Behavior Index (MPBI) on protective factors and risk factors in the US and China: Wave-3

Step		US			China		
		r	b^a, final step	ΔR^2	r	b^a, final step	ΔR^2
1	Socio-demographic background			.03			.08
	Gender (f = 1, m = −1)	.01	.26		−.26***	−.80***	
	Grade in school	.14***	.57**		.09***	.28	
	Intact family	−.10***	−.50		−.05*	−.15	
	Socioeconomic status	.01	.27**		−.06*	.24	
2	Protective factors[b]			.31			.18
	Models Protection	−.28***	.25		−.05*	.92	
	Controls Protection	−.57***	−2.29***		−.48***	−2.04***	
	Support Protection	−.40***	−.02		−.27***	−.06	
	Behavior Protection	−.27***	−.46*		−.08**	.09	
3	Risk factors			.09			.07
	Models Risk	.55***	2.22***		.45***	1.95***	
	Vulnerability Risk	.30***	.48*		.17***	.47**	
	Opportunity Risk	.37***	.52**		.10***	−.08	
4	Protection-by-risk interactions			.05			.06
	Controls Protection × Models Risk		−1.28***			−1.25***	
	Controls Protection × Vulnerability Risk					−.52***	
	Total R²			.48			.39

$N = 1,087$ (US), 1,368 (China). Only significant interactions are included in the final model

* $p \leq .05$; ** $p \leq .01$; *** $p \leq .001$. All ΔR^2 and R^2 values are significant at $p \leq .001$

[a] Unstandardized regression weights of standardized predictor measures; standardized weights are inappropriate with interaction terms (see Aiken and West 1991, pp. 40–47)

[b] Variance accounted for uniquely by protective factors = .08*** in each sample

sample and 6 % in the China sample. The total R^2 reaches a substantial 48 % of variance in the US sample and 39 % in the China sample. The applicability of the Problem Behavior Theory framework for explaining involvement in problem behavior, the MPBI, in mid-adolescence is strongly supported in both country samples by these findings.

In light of the study's main objective, it is especially important to take note of the pattern of relative importance among the protective factors and among the risk factors shown by their regression coefficients in Table 3. With respect to the protective factors, Controls Protection is the strongest protective factor in both countries and, in China, it is the only protective factor that is significant in the final model. In the US sample, although Behavior Protection is also a significant protective factor, its regression coefficient is only a fifth that of Controls Protection. What is noteworthy in this pattern of regression coefficients is that neither Models Protection nor Support Protection has a significant regression coefficient in the final model in either country sample.

Among the risk factors, the strongest predictor in Table 3 is Models Risk. Although the other two risk factors are significant in the US sample and one of them, Vulnerability Risk, is also significant in the China sample, their b coefficients are about one-fourth the magnitude of the Models Risk regression coefficient. As shown in Table 3,

the risk factors entered at Step 3 added 9 and 7 % unique variance. Since the protective factors entered earlier at Step 2 included any variance shared with the risk factors, the order of entry was reversed for the protective and risk factors, in a supplementary regression analysis, to determine the unique variance of the protective factors. In that analysis, the protective factors accounted uniquely for 8 % of variance in each country sample, beyond that accounted for by the socio-demographic and risk measures. Thus, the protective factors and the risk factors accounted uniquely for about equal proportions of the variance in problem behavior involvement, the MPBI, in both country samples.

Further support for the pre-eminent role of Controls Protection in accounting for variation in problem behavior is the fact that it is the only protective factor that significantly moderates risk, Models Risk in the US sample, and both Models Risk and Vulnerability Risk in the China sample, and the magnitude of the interaction effects in both samples is large for field studies (see McClelland and Judd, 1993). The moderator effect of Controls Protection on Models Risk means that the impact of Models Risk on problem behavior is attenuated by higher levels of Controls Protection. Figure 2 illustrates the significant moderator effect of Controls Protection on Models Risk in both country samples; indeed, in the China sample, the line from Low Models Risk to High Models Risk is almost flat under high protection. Since only one of the twelve interactions

Fig. 2 Moderator effect of Controls Protection on Models Risk in US and China samples
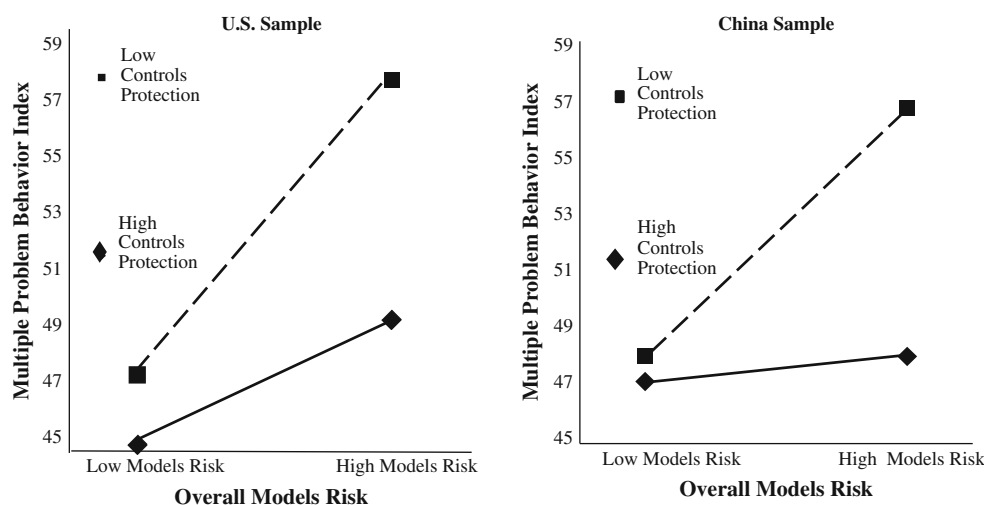
tested was significant in the US sample and only two in the China sample, concern about Type 1 error could arise. Countering that concern is the evidence that the Controls Protection × Models Risk interaction is significant in both samples, i.e., it is already a replicated finding in this study. In addition, it is the same interaction that has emerged in earlier waves of this study, and it is also the same interaction that has emerged in studies by other investigators with other adolescent samples, e.g., adolescents in northern Italy (Ciairano et al. 2009). Finally, the same interaction emerges in the analysis of the pro-social behavior criterion, the MPSBI, for the China sample in the present study.

Applying Problem Behavior Theory to Account for Adolescent Pro-social Behavior (MPSBI)

In this analysis of pro-social behavior involvement, the same protective and risk factor measures were used as were used in the analysis of problem behavior involvement, except that now the MPSBI is the outcome criterion measure to be predicted and the MPBI is now employed as a risk factor, individual-level Behavior Risk. Regression results are shown in Table 4.

Again, bivariate correlations of the protective and risk factor measures with the MPSBI in the first column of Table 4 show the theoretically expected positive relationships of the protective factors and negative relationships of the risk factors with the MPSBI criterion, contributing to the construct validity of the measures. In general, the correlations of the protective factors are larger than those of the risk factors. The socio-demographic background measures entered at Step 1 of the hierarchical regression account for significant variance, but smaller in the China sample (2 %) than in the US sample (10 %). The entry of the three protective factor measures (models, controls, support) at Step 2 accounted for substantial variance in

each sample (22 %, US; 12 %, China). What is especially noteworthy is that both the Models Protection measure and the Support Protection measure, neither of which had significant regression coefficients in relationship to the problem behavior criterion (MPBI), in either country sample, now have relatively large regression coefficients, while the Controls Protection measure, the major protective factor for the MPBI, does not, and it is not even significant in the China sample. This is a markedly different pattern.

The risk factor measures (models, vulnerability, opportunity, behavior), entered at Step 3, provided a very modest increment in variance accounted for (3 %, US; 1 %, non-significant, China). Noteworthy in this part of the analysis is that the Models Risk measure, which was the major risk factor for the problem behavior criterion (MPBI), is no longer significantly related, in either country sample, to the pro-social behavior criterion (MPSBI). Only the risk factor measure of Vulnerability Risk has a significant regression weight in the final regression model in both samples, and Behavior Risk is also significant in the US sample, as noted earlier. Finally, the twelve protection-by-risk interactions were tested for significance at Step 4. In the US sample, Controls Protection moderated Opportunity Risk; in the China sample, Controls Protection was a significant moderator of Models Risk, as noted earlier, and also of Vulnerability Risk, and Models Protection also moderated Opportunity Risk in the China sample.

In a supplemental hierarchical regression analysis, when the protective factors were entered after the risk factors, they accounted uniquely for 9 % (US) and 8 % (China) of variance, considerably more than the risk factors had (3 and 1 %, as noted above). All together, the entire set of theoretical predictor measures accounted for 35 % of the variance in pro-social behavior involvement in the US sample, and 16 % in the China sample, again a substantial and theoretically informative account—although less than

Table 4 Hierarchical regression of the Multiple Pro-social Behavior Index (MPSBI) on protective factors and risk factors in the US and China: Wave-3

Step		US			China		
		r	b^a, final step	ΔR^2	r	b^a, final step	ΔR^2
1	Socio-demographic background			.10			.02
	Gender (f = 1, m = −1)	.03	.12*		.05*	.11*	
	Grade in school	−.08**	.02		−.06*	−.06	
	Intact family	.15***	.44***		−.01	−.12	
	Socioeconomic status	.27***	.21***		.11***	.10*	
2	Protective factors[b]			.22			.12
	Models Protection	.44***	.43***		.32***	.38***	
	Controls Protection	.37***	.14*		.20***	−.08	
	Support Protection	.45***	.38***		.32***	.34***	
3	Risk factors			.03			.006
	Models Risk	−.23***	−.02		−.16***	−.06	
	Vulnerability Risk	−.41***	−.32***		−.20***	−.10*	
	Opportunity Risk	−.07**	.21		−.05*	.10	
	Behavior Risk	−.27***	−.17*		−.08**	−.09	
4	Protection-by-risk interactions			.005			.014*
	Controls Protection × Opportunity Risk	.12*					
	Controls Protection × Models Risk					.17**	
	Controls Protection × Vulnerability Risk					.09*	
	Models Protection × opportunity Risk					.10*	
	Total R^2			.35			.16

$N = 1,087$ (US), 1,368 (China). Only significant interactions are included in the final model

* $p \le .05$; ** $p \le .01$; *** $p \le .001$. All ΔR^2 and R^2 values >.014 are significant at $p \le .001$

[a] Unstandardized regression weights of standardized predictor measures; standardized weights are inappropriate with interaction terms (see Aiken and West 1991, pp. 40–47)

[b] Variance accounted for uniquely by protective factors = .09*** (US), .08*** (China)

that obtained for the measure of problem behavior involvement (48 and 39 %, respectively).

Discussion

The theoretical approach engaged in this study, Problem Behavior Theory, is a psychosocial explanatory framework developed over the past half century to provide understanding of adolescent and young adult behavior and development (Jessor et al. 1968, 1991; Jessor and Jessor 1977; Jessor 1991, 2014).

The protective and risk factors articulated in Problem Behavior Theory have, in the present study, provided substantial accounts of variation in both problem behavior and pro-social behavior, accounts that are largely parallel in pattern for adolescents in the US and the China samples. Those accounts have revealed that, although the protection measures and the risk measures make equivalent contributions to explaining problem behavior variation, protection makes a much larger contribution than risk when explaining variation in pro-social behavior. They have also made apparent the very different contributions that

particular protective and risk factors make when accounting for problem behavior than when accounting for pro-social behavior. Together these findings call for a more nuanced understanding of the role of protection and risk in general and, more specifically, of the varying roles of particular protective and risk factors. It hardly makes sense any longer to speak of protective or risk factors as having certain impacts; it seems necessary, instead, to speak of their impacts in specific relationship to particular criteria or outcomes–in the present case, to either adolescent problem behavior or adolescent pro-social behavior.

The part played by protective factors in the present analyses is especially worth emphasizing. It challenges the overriding concern with risk and risk reduction that characterizes so much of current problem behavior research and intervention efforts and argues for a more balanced inclusion of the contribution that protection can make. Not only equivalent to the risk factors in their direct impact on problem behavior, the protective factors also emerged from this study as having effects as moderators or buffers of the impact of exposure to risk, Controls Protection moderating Models Risk in both country samples as the key example. Equally important, protective factors far outweighed risk

factors in unique variance accounted for when predicting pro-social behavior, supporting its promotive as well as its preventive function. And involvement in pro-social behavior itself, the MPSBI measure, served as a significant protective factor against problem behavior in the US sample, although not in the China sample.

The important role of Controls Protection in regulating problem behavior in this study is consonant with the literature (e.g., Barber and Xia 2013). On the other hand, Support Protection (analogous to the protective factor of "connectedness" in the literature) did not emerge as significant for problem behavior variation in either country sample, and this finding is consistent with results from an earlier wave of our data (Costa et al. 2005). It is also consonant with the results of Madkour et al. (2012) in their cross-national study of early sexual initiation in nine European countries: the negative association of parental support with early sexual initiation disappeared when parental knowledge (an indicator of Controls Protection) was added to the model. Support Protection *was* significant, however, and in both country samples, in predicting the positive criterion of pro-social behavior. These latter findings suggest the need for a more differentiated view of support/connectedness as a protective factor for problem behavior versus for pro-social behavior.

While the literature has largely been concerned with controls and connectedness, a contribution of the present study is the articulation of additional theoretically important protective and risk factors in the same systematic framework: Models Protection and Behavior Protection, and Models Risk, Vulnerability Risk, and Opportunity Risk, all of which contributed significantly to the explanatory account for one or both criterion measures. Indeed, Vulnerability Risk, an individual-level measure, emerged as a significant predictor for both problem behavior and pro-social behavior. Clearly, further theoretical articulation can still be achieved in the quest for a more comprehensive account. For one example, there is a theoretically promising contextual construct, "Opportunity Protection." Although it was not assessed in this study, it would be a logically relevant addition to the explanatory scheme in future research.

The pattern of significant protective and risk factor predictors that emerged in Table 3 changed markedly and similarly in both country samples, when the criterion measure shifted, in Table 4, from problem behavior (MPBI) to pro-social behavior (MPSBI); this shift is a key finding of the present study. From its pre-eminent role among the protective factors in predicting problem behavior (Table 3), Controls Protection shifts to a relatively minor and even insignificant (for China) role when the criterion is pro-social behavior (Table 4). Likewise, Models Protection and Support Protection, neither

protective factor significant in the final model accounting for problem behavior in the US and China samples (Table 3), become the two major protective factor predictors when the criterion shifts to pro-social behavior (Table 4), and they are, indeed, the only protective factors that are significant in the China sample. Turning to the risk factors, a similar marked shift in pattern can be seen, and in both country samples, with the shift in outcome criterion predicted from problem to pro-social behavior. Models Risk, which had the largest *b* coefficient when predicting problem behavior, is no longer even a significant risk factor when accounting for pro-social behavior. These findings are important in illuminating the varying roles that a particular protective or risk factor may play depending on what the predictive focus is. Their different implications for efforts to reduce problem behavior versus to promote positive behavior would seem to deserve serious attention.

The inclusion of Behavior Protection, the MPSBI measure, as a protective factor when predicting involvement in problem behavior, and of Behavior Risk, the MPBI measure, as a risk factor when predicting involvement in pro-social behavior follows from the theoretical position that actual involvement or experience with particular behaviors has an impact on the likelihood of engaging in other behaviors, both conventional and unconventional. Engaging in heavy drinking, for example, has implications for engaging in smoking and for lesser involvement with parents than with peers; on the other hand, involvement with, say, religion has implications for engaging in other conventional or pro-social activities and for avoiding problem behavior involvement. Nevertheless, the issue of endogeneity can be raised since those behavioral predictors are themselves the outcome of the other protective or risk factors in the Problem Behavior explanatory scheme. To address this issue, we re-ran the regression analyses in Tables 3 and 4, omitting the Behavior Protection measure from Table 3 and the Behavior Risk measure from Table 4. The results were essentially the same. The proportion of variance accounted for remained almost identical, and the overall pattern of findings with the behavior predictors omitted is pervasively congruent with the findings reported in Tables 3 and 4.

The robustness of the results obtained in this study can be made apparent in several ways. First, the analysis of the Wave-3 problem behavior criterion in Table 3 can be compared with the results from the comparable analysis of the Wave-1 data reported in an earlier paper (Jessor et al. 2003). Findings were pervasively similar across the two different waves of data thus supporting the replication of the Problem Behavior Theory model at both the early- and the mid-adolescent developmental stages in accounting for problem behavior.

Another approach to appraising the robustness of the problem behavior findings was an analysis that controlled for the contribution of the individual-level measures [Attitudinal Intolerance of Deviance (a component of Controls Protection); Behavior Protection; Vulnerability Risk; and Behavior Risk], and that sought to determine whether the MPBI findings held for the social context measures of protection and risk alone, i.e., when individual-level measures as well as socio-demographic measures were controlled. The results of that analysis (table available from the authors) are fully consonant with the explanatory model as a whole: Controls Protection and Models Risk were still the most important protection and risk measures, respectively, both in their main effects and in their interaction. Of further interest from that analysis, the social context measures of the protective and risk factors were, taken together, able to account for substantial variance in problem behavior involvement (19 %, US; 17 %, China), with socio-demographic and individual-level measures controlled. This latter point is of special interest because of the linkage of protective and risk factors in the literature to the concept of "resilience." The tendency to ascribe resilience to the individual, as a personal characteristic, has been widespread, but as several key investigators have noted: "Resilience… does not represent a personality trait or an attribute of the individual" (Luthar and Cicchetti 2000, p. 857); and "resilience may reside in the social context as much as within the individual" (Rutter 1993, p. 626). Our finding that social context protective and risk factors alone can account for substantial problem behavior variance supports the view that resilience is as much an outcome of processes in the environment of daily adolescent life as it is of processes in the adolescent.

Finally, the comparable pattern of findings observed across the two country samples further attests to the robustness of the explanatory framework, a framework at the underlying genotypic level, even when applied to samples that are descriptively so different and drawn from such diverse societies. As argued in a recent commentary (Jessor 2008), genotypic generality often underlies phenotypic specificity in cross-national inquiry.

Several limitations constrain inferences about the findings of this study. First, the present findings represent relationships that have been observed at a particular time, and causal inferences are not warranted. It is the case, however, that in our earlier studies of developmental change in a different positive outcome, an index of health-enhancing behavior (Turbin et al. 2006; Jessor et al. 2010), change in protective and risk factors over time was shown to be predictive of change in the health-enhancing behavior index over both a 1-year and a 2-year interval. Second, it is possible that the relative contributions of protection and risk reported in the analyses could simply reflect differential adequacy or comprehensiveness of measurement. The fact is, however, that the protective factor variables and the risk factor variables were all based on multiple-item scales with good reliability (Table 1), and both the problem and the pro-social behavior measures, the MPBI and the MPSBI, were multi-item indexes.

There are additional limitations, as well. A third limitation needing acknowledgement is that the data are all self-report. In earlier reports from the larger study, however, it was possible to compare a subsample of adolescent Wave-1 reports of their perceived social contexts with independent reports about those same contexts by their parents. "Those comparisons revealed a significant degree of consistency… providing some indication of… external validity" (Turbin et al. 2006, p. 453). Fourth, it should be clear that the samples employed in the present study, drawn from local, urban, school-based settings, cannot in any way represent the countries from which they were drawn; rather, they constitute similar samples from countries and settings known to be different on a variety of dimensions, from economic system to family structure to traditional values. Finally, the differential retention rate between Wave-1 and Wave-3 in the two country samples (71 %, US; 87 %, China) might have affected the results through differential loss of the more problem-prone adolescents; such loss, however, is more likely to affect mean scores on problem behavior than the underlying theoretical relationships among the variables involved.

Conclusion

The Problem Behavior Theory framework of protective and risk factors has received impressive support from the findings in this study. The analyses of two contrasting outcome criteria—problem behavior and pro-social behavior—have contributed to a more differentiated perspective about protection and risk as explanatory constructs for understanding *both* problem and pro-social behavior in adolescence. That the very same protective or risk factor plays a different role when different outcome criteria are engaged has emerged as a novel and important finding. Although Controls Protection was the pre-eminent protective factor in accounting for problem behavior in both country samples, it was only modestly related to pro-social behavior in the US sample and not related at all in the China sample. Likewise, neither Models Protection nor Support Protection was related significantly to problem behavior in either country sample, but both were highly significant predictors of pro-social behavior. Important also is the evidence for the positive or promotive role of protective factors in relationship to pro-social behavior as well as their preventive role in relationship to problem behavior.

Together, the findings not only strengthen the Problem Behavior Theory framework but they advance the kind of understanding about protection and risk that can usefully inform the design of intervention efforts. Hopefully, the study makes clear the advantages that would accrue to both the problem behavior constituency and the positive youth development constituency if each engaged *both* problem behavior and pro-social behavior in future research on adolescent behavior and development. The antinomy between those two research constituencies has long ago lost its warrant.

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